Total No. of Printed Pages:2

SUBJECT CODE NO:- H-476
FACULTY OF SCIENCE AND TECHNOLOGY
B.E. (EEP/EE/EEE)
Elective-I: Power Electronics -II
(REVISED)

[Time: Three Hours]   **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B   1) Question no.1&6 are compulsory.
                       2) Solve any two questions for each section from remaining questions.

Section A

Q.1   Write a short note on any two   10
       a. Explain IGCT
       b. Semi-Converter
       c. Explain IGBT
       d. Performance Parameters of Single Phase Controlled converter.

Q.2   a. Explain V-I Characteristics of SCR in detail.   08
       b. Explain Power MOSFET in detail & state the difference between PMOSFET & MOSFET   07

Q.3   a. What is power factor improvement of converter? Enlist PF improvement methods &   07
          Explain symmetrical Angle control in detail.
       b. Write classification of controlled rectifier & Explain Single Phase Controlled converter for   08
          RL load.

Q.4   a. Give the classification of Inverters & explain operation of single phase full bridge inverter   07
          for RL load.
       b. Enlist voltage control methods of inverter & Explain Sinusoidal Pulse Width modulation.   08

Q.5   a. What is twelve pulse rectifier & explain its TUF & application.   08
       b. What are Advance PWM Technics & explain any one in detail.   07

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Section B

Q.6	Write Short Notes on any two	10
	a. Three Phase VSI.	
	b. Forward converter	
	c. Class E Resonant Converter	
	d. Cascade Multi level Inverter	
	e. SV-PWM	
Q.7	a. What are Multi level inverters? Explain Diode Clamped MLI in detail.	08
	b. Explain Flying capacitor Multilevel inverter in detail & Explain Why it is called as Flying capacitor?	07
Q.8	a. Write the classification of Resonant inverter & Explain Series Resonant Inverter.	08
	b. What is the operation of Zero Voltage Switching Resonant Converter (ZVS)? & Write its significances.	07
Q.9	a. What are the advantages of SMPS? Explain Flyback converter in detail.	08
	b. Explain Full bridge converter & give its application.	07
Q.10	a. What is frequency response? Explain it for series resonant Inverter for series loaded.	08
	b. Explain the comparison between ZCS & ZVS resonant converter & write their applications.	07

Total No. of Printed Pages:02
SUBJECT CODE NO: H-477
FACULTY OF SCIENCE AND TECHNOLOGY
B.E. (EEP/EE/EEE)
Elective-I: Digital System Design
(REVISED)

[Time: Three Hours]   **[Max.Marks:80]**

Please check whether you have got the right question paper.
N.B   1) <u>Q. No.1 and 6 are compulsory</u>.
             2) Attempt <u>any two</u> from <u>Q.2 to 5 and Q.7 to 10.</u>
             3) Assume suitable data if required.

SECTION – A

Q.1   Attempt <u>any two</u> questions.   10

      a) Effect of velocity saturation and Mobility degradation.
      b) What is Body effect?
      c) Implement NAND gate using CMOS gate
      d) Explain static Power consumption.

Q.2   a) Derive Expression of Id current in NMOS and draw I –V characteristics.   08

      b) Draw and explain the channel length Modulation effect.   07

Q.3   a) Describe Pass transistor logic in detail.   08

      b) Explain static CMOS logic in detail   07

Q.4   a) Draw and explain P – well process.   08

      b) Draw CMOS inverter layout and explain their design rule.   07

Q.5   Write short notes on (<u>any three</u>)   15
      1) Self aligned CMOS Process
      2) Dynamic CMOS logic
      3) Voltage – transfer char of CMOS inverter
      4) CPL

SECTION – B

Q.6   Attempt <u>any two</u>   10
      a) Describe EDA Tool in VHDL
      b) Compare Functions and procedures
      c) Explain stuck at open and stuck short faults.
      d) Write Code in VHDL for Full Adder.

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Q.7	a)	Write VHDL Code for 8:1 MUX in Case Statement.	07
	b)	What are the Modeling Styles? Explain process Statement with example.	08

Q.8	a)	Define test Benches. Describe test benches with example & types.	08
	b)	Draw Architecture of XC 9500 CPLD and explain in detail.	07

Q.9	a)	Draw state diagram of TAP controller and explain it.	08
	b)	Explain controllability and observability with example.	07

Q.10   Write short notes on (any three)   15
      a)   Full and Partial scan
      b)   VLSI Design flow
      c)   Packages and libraries
      d)   Need of design for testability.

Total No. of Printed Pages:02

SUBJECT CODE NO: H-478
FACULTY OF SCIENCE AND TECHNOLOGY
B.E. (EEP/EE/EEE)
Elective-I: Recent Trends in Power Systems
(REVISED)

[Time: Three Hours]   **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B   i) <u>Q.1 & Q. 6 are compulsory</u>.

              ii) Solve <u>any two</u> questions <u>from section A</u> and B excluding <u>compulsory questions</u>.

              iii) Assume suitable data.

SECTION – A

Q.1   Attempt <u>any five</u>   10

         a) Define smart grid

         b) What is the need of smart grid

         c) What is Feeder Automation

         d) What are the different smart appliances?

         e) What is SMES?

         f) Give the function of PMU.

         g) What are the application of IED?

         h) What is GIS? Give the function of GIS.

Q.2   a) What are the components of substation automation system?   08

         b) Explain in details outage management system.   07

Q.3   a) Explain concept of Resilient & self-healing Grid.   08

         b) What are the CDM opportunities in smart Grid? Explain.   07

Q.4   a) Explain home and building automation.   08

         b) What is phase shifting transformers? What are its uses?   07

Q.5   a) What is the difference between conventional and smart grid.   08

         b) Explain compressed Air energy storage.   07

SECTION – B

Q.6   Attempt <u>any five</u>   10
  - a) Define micro grid
  - b) What is the need of micro grid
  - c) Define fuel cell
  - d) What is the function of PV cell
  - e) What is mean by array?
  - f) What are the different types of filters?
  - g) What is micro grid?
  - h) What are the different applications of micro grid?

Q.7   a) Give the difference between active & shunt filters.   08

       b) Explain Flywheel energy storage system.   07

Q.8   a) Write a short note on micro turbine.   08

       b) Draw and explain simplest equivalent circuit of PV cell.   07

Q.9   a) What are the different components of building integrated PV system? Explain any two   08

       b) What are the different energy storage system? Explain super conducting magnetic energy storage system.   07

Q.10   a) Write a short note on Inter connection system.   08

       b) Write a short note on captive power plants.   07

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-456
FACULTY OF SCIENCE AND TECHNOLOGY
B.E. (Civil/Mech./EE/ECT)
Elective-I: SAP Material Management - I
(REVISED)

[Time: Three Hours]   **[Max.Marks: 80]**

Please check whether you have got the right question paper.

N.B
1) Q.No.1 from Section A& Q.No.6 from Section B is compulsory.
2) From remaining questions in Section A& B student are supposed to solve any two questions from each section.
3) Assume suitable data wherever necessary.
4) Draw neat sketches wherever necessary.

Section A

Q.1   Write a short note on(Any Two)   10
       a) Management accounting & corporate governance.
       b) Life cycle management.
       c) Sales order management.

Q.2   a) Explain the procurement of consumable material.   07
      b) What are valuated & non-valuated receipts?   08

Q.3   a) Explain standard report in service.   07
      b) Explain drafting of material requisition planning.   08

Q.4   a) Explain system wide concept.   07
      b) Explain procurement of stock material.   08

Q.5   a) Explain the importance of batch record.   07
      b) Explain how you can link a document to a vendor master record?   08

Section B

Q.6   Write a short note on(Any Two)   10
       a) Basics of price determination.
       b) Explore source determination with quota.
       c) Extracting purchase information.

Q.7   a) Define function authorization for buyers & explain it in detail.   07
      b) What is invoicing plan?   08

Q.8   a) How to post invoice? Explain procedure.   07
      b) How to create invoice entry by applying taxes, cash discount & foreign currency.   08

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Q.9 a) How to create purchase order with reference of source determination. 07
   b) Explain how to enter the invoice without reference to purchase order. 08

Q.10 a) What are the steps involved in consignment cycle. 07
   b) What is the difference between stock transfer between two plants belonging to same company 08
    code & those belonging to different company code?

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-438
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (EE/EEE/EEP)
Elective – I: Signal and System
(REVISED)

[Time: Three Hours]   [Max.Marks: 80]

Please check whether you have got the right question paper.

N.B   1. Q.No.5 & 10 are compulsory.
         2. Solve any two questions from remaining questions from each section.
         3. Assume suitable data.

Section A

Q.1   a) Obtain convolution sum of two sequences   08
          $x(n) = \{1, 4, 3, 2\}$ $h(n) = \{1, 3, 2, 1\}$

      b) State & explain properties of convolution.   07

Q.2   a) Check whether following system is linear or non linear   08
          a. $y(n) = n\, x(n)$
          b. $y(n) = x(n^2)$

      b) Represent symbols used for system modeling.   07

Q.3   a) Check whether following system is time variant or time invariant   08
          a. $y(n) = x(n^2)$
          b. $y(n) = x(n)\sin w_0 n$

      b) Explain system properties in terms & impulse response.   07

Q.4   a) Explain following terms; sampling, aliasing, Nyquist rate, sampling frequency.   08

      b) Explain the steps involved in reconstruction of signals from its samples.   07

Q.5   Write a short note on any two: 10
      a) Sampling of band pass signal
      b) Classification of discrete time systems
      c) Different methods of convolution.

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Section B

Q.6   a)   Explain necessity of CT & DT Fourier series & Fourier transform.   08

        b)   Explain the response of LTI system for exponential signal.   07

Q.7   a)   Find auto correlation of two finite sequences   08
$$x(n) = \{1 \quad 2 \quad 2 \quad 1\} \; y(n) = \{1 \quad 1 \quad 3 \quad 2\}$$
$$\uparrow \qquad\qquad\qquad\qquad \uparrow$$

        b)   State & explain properties of cross correlation.   07

Q.8   a)   Determine the power spectra for the random processes generated by,   08
$$x(n) = -0.81\, x(n-2) + w(n) - w(n-1) \text{ Also sketch the spectra.}$$

        b)   Explain sampling of band pass signal.   07

Q.9   a)   Explain the analogy between CT FS & DT FS with its properties.   08

        b) State & explain properties of Fourier series.   07

Q.10   Write a short note on any two: 10
        a)   Applications of FS for system analysis
        b)   Energy & power signal
        c)   Interrelation between auto correlation & ESD.

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-437
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (EE/EEE/EEP)
Elective – I: Numerical Method Using MATLAB
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

N.B
1. Q.No.1 & 6 are compulsory.
2. Assume suitable data.
3. Solve any two questions from remaining for each section.

Section A

Q.1 Write a short note on (any two)   10
 a) Newton-Cotes integration formulae
 b) Array operation in Matlab
 c) Error propagation

Q.2 a) With suitable examples explain script & function file.   08
 b) With suitable example state & explain loops available in Matlab.   07

Q.3 a) Explain the use of Taylor series to estimate truncation errors.   08
 b) Define the terms errors, precision, round off error, global errors.   07

Q.4 a) Use trapezoidal rule to integrate   08
 $f(x) = 0.2 + 25x - 200x^2 + 675x^3 - 900x^4 + 400x^5$
 From $a = 0\ to\ b = 0.8$

 b) How Matlab function can be employed to differentiate the function   07
 $f(x) = 0.2 + 25x - 200x^2 + 675x^3 - 900x^4 + 400x^5$
 From $x = 0\ to\ 0.8$

Q.5 a) Explain the multistep application of Trapezoidal rule.   08
 b) Explain loop & execution control in Matlab.   07

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Section B

Q.6	Write a short note on (any two)	10
	a) Tri diagonal matrix algorithm	
	b) Linear least squares regression	
	c) Explicit Euler's method	

Q.7	a) State & explain with examples addition, substration, multiplication & inverse of matrix using Matlab.	08
	b) With suitable assumptions write a Matlab program to implement Newton-Raphson method for non-linear system of equations.	07

Q.8	a) Write a M file to implement Lagrange Interpolation.	08
	b) Explain functional & non-linear regression.	07

Q.9	a) Write a M File to implement second order runge-kutta method.	08
	b) Explain Matlab ode 15s algorithm.	07

Q.10	a) Explain Tri-diagonal matrix algorithm.	08
	b) Explain interpolation in Matlab using pchip.	07

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Total No. of Printed Pages:2

SUBJECT CODE NO:- H-436
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (EE/EEE/EEP)
Elective – I: Electronics Devices & Circuits
(REVISED)

[Time: Three Hours]   **[Max.Marks: 80]**

Please check whether you have got the right question paper.

N.B   1. Q.No.1 & 6 are compulsory.
         2. Solve any two questions from Q.No.2 to Q.No.5 and Q.No.7 to Q.No.10.
         3. Assume suitable data if required.

Section A

Q.1   Solve any five: 10
         a) List the types of filters used in power supply.
         b) What is Peak Inverse Voltage?
         c) In which region of operation, the transistor works as a switch & amplifier.
         d) What do you mean by quiescent point?
         e) Draw circuit diagrams of common base and common collector configurations.
         f) Explain in brief about the effects of cascading in multistage amplifiers.
         g) Derive average load voltage for half wave rectifier.

Q.2   a) Explain Depletion & Enhancement types MOSFET with circuit diagram.   08

         b) Compare the filter circuits of L, C and L-C.   07

Q.3   a) What is biasing, Q-point & load line? Explain its relevance. Describe the graphical method   07
            of drawing it.

         b) Draw & explain I/O characteristics of CE amplifier.   08

Q.4   Write short notes on the following.   15
         a) Voltage Multiplier
         b) Types of Field Effect Transistors
         c) Operation of full wave rectifier with Π-filter.

Q.5   a) What is tuned amplifier? Explain with the help of circuit diagram.   07

         b) How stability factor is calculated in fixed biasing method of BJT. Explain it with the help   08
            of circuit.

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Section B

Q.6 Solve any five: 10
    a) Describe the operation of tank circuit in oscillators.
    b) What do you mean by Ripple factor & efficiency in rectifiers?
    c) What is cross over distortion? How it is minimized?
    d) State the necessary criteria for oscillations.
    e) What are the effects of negative feedback on different parameters of amplifier?
    f) Draw the frequency response of an amplifier.
    g) Define & explain Rise time & fall time of an amplifier.

Q.7 a) Explain the small signal high frequency CE model of a transistor. 08

    b) What is feedback amplifier & describe the effect of feedback on gain & bandwidth. 07

Q.8 a) Explain the operation of transformer coupled two stage amplifier. Discuss about its advantages & disadvantages. 08

    b) Describe the operation of Class-B push pull amplifier. Comment on advantages & disadvantages in comparison with other classes of amplifiers. 07

Q.9 a) Explain the operation of R-C phase shift oscillator. Derive the relation of frequency of oscillation. 07

    b) Explain the operation of Class –B power amplifier. 08

Q.10 Write short notes on the following. 15
    a) Bootstrapping in Emitter follower
    b) Colpitt's oscillator
    c) Push pull amplifier

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-434
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (EEE)
Electronics Devices and Circuit
(OLD)

[Time: Three Hours]   **[Max.Marks: 80]**

Please check whether you have got the right question paper.

N.B   1. Attempt any three questions from each section.
         2. Q.no.1 & Q.no.6 is compulsory.

Section A

Q.1   Solve any five questions: 10
         a) What is thermal runaway in BJT?
         b) What is TUF in rectifier?
         c) What is need of voltage regulation?
         d) What do you mean by depletion mode in MOSFET?
         e) Define trans conductance in FET.
         f) State working of BJT as switch.
         g) What is DC load line?
         h) What is pinch -off voltage in JFET?

Q.2   a) Explain the operation of full wave rectifier with capacitive filter.   08
         b) Explain voltage multiplier circuit using two PN junction diodes.   07

Q.3   a) Compare JFET and MOSFET.   07
         b) Explain construction & working of POWER MOSFETS. Also draw its static characteristics. 08

Q.4   a) What is biasing? Explain self-biasing method in BJT.   07
         b) Explain the drain characteristics of JFET. Also draw transfer characteristics   08

Q.5   Write notes on: 15
         a) Base Width Modulation
         b) Transistor current components
         c) FET Biasing

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Section B

Q.6   Solve any five questions: 10
   a)   What is necessity of feedback in amplifier?
   b)   What is piezoelectric effect?
   c)   Compare voltage & power amplifier.
   d)   State relations in between α, β and γ.
   e)   What is Hybrid parameters in BJT?
   f)   State effect of feedback on gain & bandwidth.
   g)   Draw hybrid –Π model for high frequency amplifier.
   h)   What is working principle of power amplifier?

Q.7   a)   Explain the frequency response of RC coupled amplifier.   08
       b)   Explain negative feedback amplifiers.   07

Q.8   a)   Derive the effect of negative feedback on gain, input & output resistance, Noise & distortion. 07

       b)   Derive the expression of current gain, voltage gain, input impedance & output impedance of 08
            BJT amplifier in H-parameters.

Q.9   a)   In Hartley oscillator, $L_1 = 0.2mH, L_2 = 10\mu H$ & $M = 20\mu H$. Calculate 'c' of oscillating   08
            circuit to obtain frequency of 4110KHz. Also determine amplifier gain for oscillations.

       b)   Explain RC phase shift oscillator in detail.   07

Q.10   Write notes on: 15
   1)   Power Amplifier
   2)   Wien Bridge Oscillator
   3)   Tuned Amplifiers

Total No. of Printed Pages:03

SUBJECT CODE NO:- H-422
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (EEP/EE/EEE)
Power Systems Analysis
(OLD)

[Time: Three Hours]   [Max. Marks:80]

Please check whether you have got the right question paper.

N.B   i) Question No.1 & Question No. 6 are compulsory.
             ii) Attempt from each section any two questions from remaining questions.
             iii) Assume suitable data wherever necessary.

Section A

Q.1   Solve any five questions   10
       1) What do you mean by loud flow study?
       2) A generator rated at 50 MVA, 11kv, has a reactance of 25%. Calculate it's per unit reactance
          by selecting 100MV, 10KV base.
       3) Define per unit value.
       4) What are different types of load buses?
       5) Define terms:
          i.   Tree
          ii.   Co-tree
       6) What are symmetrical components?
       7) What is bus admittance matrix?

Q.2   1) Explain impedance diagram.   07
       2) For a 3-φ power system, the ratings are as follow: 08
          G_1: $-$ 60 MVA, 20 KV, $X = 9\%$
          T_1: $-$ 50 MVA, 20/200KV, $X = 10\%$
          T_2: $-$ 50 MVA, 20/200 KV, $X = 10\%$
          M: 43.2MVA, 18KV, $X = 8\%$
          $Line$: $-$ 200KV, $Z = 120 + j$ 200Ω
          Draw impedance diagram showing all impedances in $p.u.$ on a 100MVA base. Choose 20KV
          as the voltage base for generator.

Q.3   a)   Prove the bus admittance matrix from singular transformation of primitive Y-matrix.   07

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b) For the power system as shown in Fig.2. obtain $A, \bar{A},$ & B. 08
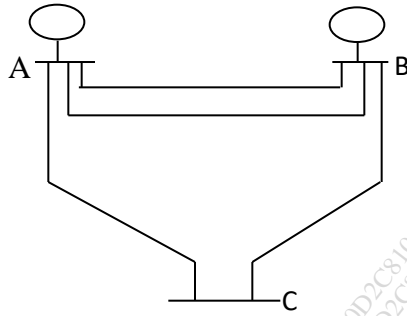

Fig 2

Q.4 a) Explain step by step procedure for NR method of load flow studies. 07
     b) The parameter of 4-bus system are as under: 08

Bus code	Line impedance (pu)	Charging admittance (pu)
1-2	$0.2 + j0.8$	$j0.02$
2-3	$0.3 + j0.9$	$j0.03$
2-4	$0.25 + j1.0$	$j0.04$
3-4	$0.2 + j0.8$	$j0.02$
1-3	$0.1 + j0.4$	$j0.01$

Draw the network & find bus admittance matrix

Q.5 a) Derive the expression for selection of circuit breaker. 08
     b) The voltage at the terminals of a balance load consisting of three 20Ω Y- connected resistors 07
        Are $200\llcorner0^o, 100\llcorner255.5^o$ & $200\llcorner151^o V$.
        Find the line current from symmetrical components of the line voltages.

Section B

Q.6 Solve any five questions of the following: 10
     1) Give the classification of faults occur on system.
     2) Define sub transient reactance.
     3) What is difference between L-G & L-L fault?
     4) What is meant by doubling effect?
     5) How symmetrical faults are analysed?
     6) What is need of slack bus?
     7) What is need for short circuit studies?
     8) What are the main factors to be considered to select a circuit breaker?

Q.7 a) Explain phenomenon of transient on a transmission line with waveform. 07
     b) Determine symmetrical components of three voltages 08
        $V_a = 225\llcorner0^o;\ V_b = 225\llcorner240^o;\ V_c = 225\llcorner110^o$

2

Q.8   a)   Explain zero sequence network of transformer   08
             i. $\Delta - \Delta$
             ii. $Y_{\underline{1}}. - Y_{\underline{1}}$

      b)   Derive an expression for symmetrical components $V_s = A^{-1}V_p$ 07

Q.9   a)   A three phase 20MVA, 11KV generators with positive, negative & zero sequence reactances   08
           are 0.4pu, 0.4pu, & 0.1pu respectively, neutral is solidly grounded. Calculate fault current for
           L-L fault?
      b)   Derive the expression to determine fault current for L-L-G fault. Draw sequence network.   07

Q.10   a)   Explain briefly the static analysis at control centres.   07
       b)   Explain open conductor faults.   08

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Total No. of Printed Pages:2

SUBJECT CODE NO:- H-342
FACULTY OF SCIENCE AND TECHNOLOGY
B.E. (EEP/EE/EEE)
Power System Protection
(REVISED)

[Time: Three Hours]   [Max.Marks:80]

Please check whether you have got the right question paper.

N.B
1. Q.no.1 and Q. no.6 are compulsory.
2. Solve any two question from section A & B each, excluding compulsory questions.
3. Assume suitable data if Necessary.

Section A

Q.1	Attempt any five	10
	a) Classify Distance relay	
	b) What is zone protection?	
	c) Define operating force and restraining force.	
	d) Why Distance protection is Necessary?	
	e) State Application of Static relay.	
	f) Explain working principle of differential relay	
	g) Define current setting & Pickup level.	

Q.2 a) Derive Torque Equation for Induction type relay.   07
    b) Determine the time of operation of 5 amps 3 second over current relay having current   08
       setting of 125% & time setting multiplier of 0.6 connected to a supply circuit though a
       400 / 5 C.T When a circuit carries fault current of 4000 amp(consider time of operation
       3.5 second)

Q.3 a) State the type of functional relay & explain Induction type directional over current relay. 07
    b) Explain in detail Percentage differential relay with its advantages.   08

Q.4 a) Explain Different types of faults occurred in Induction motor.   07
    b) Explain Buchholz relay.   08

Q.5 Write a short note
    a) Single phasing Preventer   05
    b) Translay relay   05
    c) Thermal relay   05

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Section B

Q.6	Attempt any five	10
	a) Write the Application of Circuit Breaker.	
	b) What is difference between recovery voltage & arc voltage?	
	c) What is Arc Phenomenon?	
	d) State Application & Properties of SF6 circuit Breaker	
	e) What do you mean by recovery voltage?	
	f) State the factors on which Arc resistance is depends.	
	g) List significance of backup protection.	
Q.7	a) Explain in details Vacuum circuit breaker.	07
	b) Explain carrier aided protection of transmission line scheme.	08
Q.8	a) Explain in detail Microprocessor based impedance relay.	07
	b) Explain in detail Air circuit breaker.	08
Q.9	a) An 11KV 500MVA circuit breaker suddenly closes on a top fault determine	07
	1) Symmetrical breaking current	
	2) Asymmetrical breaking current assuming 50% of D.C. Component	
	3) The peak making current	
	4) Short time current rating	
	b) Explain MHO relay characteristic on the R-X diagram. Discuss the range setting of various distance relays placed on particular location.	08
Q.10	Write a short note	
	a) Protection of substation against direct stroke	05
	b) Peterson coil	05
	c) Lightning arrester.	05

Total No. of Printed Pages:02

SUBJECT CODE NO: H-330
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (EEP/EE/EEE)
Transformers & DC Machines
(OLD)

[Time: Three Hours] **[Max. Marks: 80]**

Please check whether you have got the right question paper.
N.B   i) Q. No. 1 and Q. No. 6 are compulsory.
        ii) Solve any two questions from Q.2 to Q.5.
        iii) Solve any two questions from Q.7 to Q.10.
        iv)Assume suitable data wherever necessary

Section A

Q.1 Attempt the following(any five)   10
1. State the working principle of transformer.
2. Why core of transformer is laminated?
3. What are the losses in transformer? How do they vary with load?
4. The maximum flux density in the core of 250/3000 volts, 50 Hz single phase transformer is 1.2 tesla if the emf per turn is 8 volts determine primary and secondary turns.
5. In a 25KVA, 2000/200v, single phase transformer the iron and full load copper losses are 350 watt and 400 watt respectively. Calculate efficiency at full load 0.8 lagging power factor.
6. Why it is necessary to connect two transformers in parallel?
7. State the applications of stepper motor.
8. Define regulation of transformer? What should be the Ideal value of regulation?

Q.2 a) Derive the emf equation of single phase transformer.   05
     b) Explain the working of transformer with phasor diagram on load.   05
     c) A 230/460 volt Transformer has primary resistance of 0.2Ω and reactance of 0.5Ω and   05
         corresponding 05 values for secondary are 0.75Ω and 1.8Ω respectively. Find the secondary
         terminal voltage when supplying 10Amp at 0.8 Pf lagging.

Q.3 a) Explain with diagram open circuit and short circuit test performed on single phase Transformer. 05
     b) Derive the condition for maximum efficiency of transformer.   05
     c) For 20KVA, 2200/200 volt, 50Hz transformer. The O.C. and S.C. test results are as follows   05
         O.C. test : 220v , 4.2A, 148watt (l.v.side).
         S.C. test: 86v, 10.5A, 360watt (h.v.side).
         Determine the regulation at 0.8Pf lagging and at full load

Q.4   a) Explain construction and working of any one type of stepper motor.   08
       b) Explain construction and working of PMDC motor.   07

Q.5 Explain the following (any three)   15
     a) Auto transformer
     b) Scott connection
     c) Three winding transformer

1

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    d) PMDC motor

    e) D.C. servo motor

Section B

Q.6 Attempt <u>any five</u>   10

    a) Enlist the different types of D.C. generator

    b) Give the function of yoke and pole shoes in D.C. generator

    c) Why D.C. series motor never started on no load?

    d) What is the function of commutator in DC machine?

    e) Enlist the various losses occurring in D.C. machine

    f) A 4-pole d.c shunt generator has wave wound armature with 792 conductors the flux per pole is 0.0121 wb. Determine the speed at which it should run to generate 240v on no load

    g) What do you mean by armature reaction?

    h) Why D.C. shunt motor called as constant speed motor?

Q.7   a) Explain with neat diagram compunction of D.C machine.   05

    b) Derive emf equation of D.C. generator.   05

    c) An 8 pole d.c. shunt generator with 778 waves. Connected armature conductor and running at   05
500rpm. Supplies a load of 12.5 Kw resistances at terminal voltage of 250 volts the armature resistance is 0.24Ω and field resistance is 250Ω. Find armature current induced emf and flux per pole.

Q.8   a) What are the different motor characteristics? Draw and explain them for D.C. shunt motor. Write   09
its application.

    b) A D.C series motor having a resistance of 1 ohm between terminals, runs at a speed of 800 rpm at   06
200v with a current of 15A. Find the speed at which it will run when connected in series with a 5 ohms resistance taking the same current at the same supply voltage.

Q.9   a) Draw and explain the torque armature current, speed armature current and speed torque   05
characteristics of D.C series motor.

    b) Explain various speed control methods of D.C shunt motor.   05

    c) A 250 volts D.c shunt motor has armature resistance of 0.2 ohm on load it takes an armature   05
current of 50A and runs at 750rpm if the flux of motor is reduced by 10% without changing the load torque find the new speed of motor.

Q.10 Attempt <u>any three</u>   15

    1. Three point starter

    2. Swinburne test

    3. Armature windings in D.C machine

    4. Solid state starter

    5. Parallel operation of D.C generator

Total No. of Printed Pages:3

SUBJECT CODE NO:- H-331
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (EE/EEE/EEP)
Transformers & DC Machines
(REVISED)

[Time: Three Hours]   [Max.Marks: 80]

Please check whether you have got the right question paper.

N.B
1. Q.1 and Q.6 are compulsory.
2. Solve any two questions from Q.2 to Q.5
3. Solve any two questions from Q.7 to Q.10
4. Assume suitable data if necessary.

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Section A

Q.1   Attempt any five   10
   i) What are the different losses in transformer? How they can be reduced?
   ii) State the necessary condition for parallel operation of transformer.
   iii) The maximum flux density in the core of a 250/ 3000V, 50Hz single phase transformer is 1.2wb/m^2. If the emf/ turn is 8V find is
      i)   Area of the core.
      ii)   Primary and secondary turns.

   iv) Why transformer rating is in KVA?
   v) Define voltage Regulation of transformer? What is the ideal value of Regulation?
   vi) State the difference between Auto- transformer and two winding transformer.
   vii) Explain working principle of transformer.
   viii) What is the effect of change in frequency on losses of transformer?

Q.2   a) Draw and explain approximate equivalent circuit of transformer ref. to secondary side.   08

        b) Define efficiency of transformer and derive the expression for maximum efficiency.   07

Q.3   a) Obtain the equivalent circuit of a 200/ 400V 50Hz 1ϕ transformer from the following test   08
           data

| O.C Test : | 200V | 0.7A | 70w---- | On L.V .side |
| S.C Test : | 15V | 10A | 85w--- | On H.V side |

           Calculate the secondary voltage when delivering 5KW at 0.8 p.f lagging the primary
           voltage being 200V.

        b) Derive the emf equation of transformer and define is i) Turns ratio   ii) Transformation   07
           Rate.

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Q.4   a) A load of 400 kw, at 0.8 lag P.F , is supplied by two 3 ϕ transformer rated 200KVA and   08
300KVA operating in parallel. The transformer have same turns ratio and their per unit
Resistance and reactance are as follow.

200 KVA Transformer ⊏   R-0.02 ohm 300 KVA   ⊏   R-0.01 ohms
⊔   X- 0.04ohm , Transformer   ⊔   X-0.05ohms
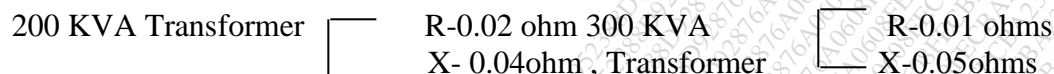
b) State the conditions for parallel operation of two 3 phase transformers.   07

Q.5   Explain the following (any three)   15
a) V-V connections of transformer
b) P.M.D.C motor
c) D.C servomotor
d) Standard three phase transformer connection, phasor group, clock notation.
e) Tertiary winding

Section B

Q.6   Attempt any five   10
i)   What is the use of compensating winding in DC machines?
ii)   What are the methods to improve commutation.
iii)   Draw torque Vs Armature current chara. Of DC series motor.
iv)   Draw circuit diagram for compound generator(both)
v)   What is significance of back emf in DC machine?
vi)   Write the torque equation for DC machine.
vii)   What are the different types of speed control in DC motor?
viii)   What is the function of Hold – on coil in starter?

Q.7   a) What is the necessity of starter; explain three point starters with diagram.   08

b) Draw and explain different characteristics of DC shunt motor.   07

Q.8   a) A 220V, dc shunt motor develops an output of 16.9 kw when taking an input of 20.2kw   08
the field winding resistance is 50Ω and armature resistance is 0.06 Ω. Calculate the
efficiency and power input when the output is 7.35kw.

b) Explain various speed control methods of DC motor(shunt) in detail.   07

Q.9   a) With neat sketch explain the construction of DC machines.   08

b) Explain with neat diagram Armature Reaction in case of DC motor.   07

Q.10   Explain the following (any three)   15
         a) Losses in DC machine
         b) Swinburne test
         c) Methods of communication (one)
         d) Torque equation of DC machine
         e) Power stages in generator.

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Total No. of Printed Pages:2

SUBJECT CODE NO: H-365
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (EEP/EE/EEE)
Electrical Measuring Techniques
(OLD)

[Time: Three Hours]   [Max.Marks: 80]

Please check whether you have got the right question paper.

N.B
    i)   Q. No. 1 and Q. No.6 are compulsory
    ii) Attempt any two questions from the remaining questions of each section
    iii) Assume suitable data whenever required

Section A

Q.1   Solve any five of the following   10
    a) Define the terms linearity and dead zone
    b) What is need of calibration?
    c) Define relative error
    d) What are different sources and detectors used in AC Bridges?
    e) What are advantages of poly phase wattmeter?
    f) What are advantages of bridge circuit?
    g) What are gross errors? How these can be avoided?
    h) What are the classifications of measurement resistance with range?

Q.2   a) Explain earth tester for earth resistance measurement with diagram   08

       b) The following data is related to bridge Arm AB: $R_1 = 200\Omega$, Arm BC: $R_2 = 200\Omega$ in series   07
           with $C_2 = 5\mu f$, Arm CD: consists Zx Arm DA: $R_3 = 300\Omega$ in series $C_3 = 0.2\mu f$. calculate the value of independence Zx

Q.3   a) Explain construction and working of PMMC instrument with neat figure   08

       b) The resistance of moving coil voltmeter is 12000Ω, the moving coil has 100 turns and is   07
           $4cm \times 3cm$ wide. The flux density in air gap is 0.006 wb/m². Find the deflection produced by 300 volts. If the spring control gives deflection of one degree for a torque of $25 \times 10^{-7} Nm$

Q.4   a) Explain the construction and working of electro dynamometer type wattmeter   08

       b) Explain the extension of range of ammeter and voltmeter using shunt and multiplier   07

Q.5 Write short notes on   15
    a) Megger
    b) Different error in wattmeter
    c) Maxwell's Bridge

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Section B

Q.6 Solve <u>any five</u> of the following 10
a) What is function of focus and intensity in CRO?
b) What are limitations of oscilloscope?
c) What is the effect of shaded band on energy meter?
d) List the applications of capacitive transducers
e) What are the advantages of universal shunt?
f) What is strain gauge?
g) Why secondary of CT is always short circuited
h) What is the principle of working of resistive transducers?

Q.7 a) Explain the procedure of adjustment of different compensation system in 1Ø energy meter 08

b) A correctly adjusted 1Ø, 230V energy meter has a meter constant of 600 rev/kwh. Determine the speed of disc for a current of 10A at p.f. 0.7 lagging 07

Q.8 a) Explain the extension of range in ammeter and voltmeter using instrument transformer 08

b) Draw and explain the block diagram of CRO. 07

Q.9 a) Explain measurement of 3Ø power using two watt meter method 08

b) Explain construction and working of 3Ø energy meter. How we can correct if it is moving fast? 07

Q.10 Write short notes on: 15
a) Low power factor watt meter
b) Potential transformer
c) Capacitive transducers

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-366
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (EE/EEE/EEP)
Electrical Measuring Techniques
(REVISED)

[Time: Three Hours]   [Max.Marks:80]

Please check whether you have got the right question paper.
N.B   i) Q.1 and Q.6 are compulsory.
                ii) Attempt any two questions from remaining questions in each section.
                iii) Assume suitable data if necessary.

Section A

Q.1   Answer the following (Any five)   10

   i)   What are the different types of secondary instruments? Give example of each.
   ii)   What are the different types of damping systems? Which is the most effective?
   iii)   What is dead zone?
   iv)   Differentiate between reproducibility and repeatability.
   v)   What is Hysteresis in relation with instruments?
   vi)   Draw schematic diagram of Maxwell's bridge. What is its use?
   vii)   Which bridge is used for measurement of very low resist. Draw its diagram.
   viii)   Which type of instruments are used for d.c. measurements? Why?

Q.2   (a) Draw schematic diagram and explain working of wheatstone's bridge   08
        (b) Explain the method of measurement of insulation resistance when power is on.   07

Q.3   (a) Derive the expression for torque or moving iron type of instruments and hence state   08
            nature of scale.
        (b) A moving coil voltmeter with a resistance of 20Ω gives a full scale deflection of 120°   07
            when a potential difference of 100 MV is applied across it. The moving coil has
            dimensions of 30mm x 25mm and is wound with 100 turns. The control spring constant is
            0.375×10^6 Nm/deg. Find the flux-density in the air gap. Find also the diameter of copper
            wire of coil winding if 30 percent of instrument resistance is due to coil winding. The
            specific resistance of copper = 1.7×10^8 Ωm.

Q.4   (a) With the help of neat diagram explain working of scheming bridge. Draw vector diagram at   08
            balanced bridge condition.
        (b) A bridge is used to measure the properties of a sample of sheet at 2 KHz. At balance, arm ab   07
            is test specimen; arm bc is $R_3=100Ω$; arm cd is $C_4=0.1\mu f$ and arm da is $R_2=834$ Ω in series
            with $C_2=0.214$ μF. Derive balance conditions and calculate the effective impedance of the
            specimen under test conditions.

Q.5   (a) Describe different types of errors in dynamometer type of Wattmeter. How are they reduced? 08
        (b) Explain the use of shunts and multipliers for extension of range of ammeters and voltmeters. 07

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Section B

Q.6   Answer the following (Any five)   10

i)   Differentiate between analog and digital transducer giving suitable example.
ii)   Explain principle of capacitive transducer.
iii)   What is LVDT? What is its use?
iv)   State the transducer used for temperature measurement. What is its principle?
v)   What are the applications of CRO.
vi)   For a current transformer define the following
        (a) Burden
        (b) Ratio correction factor
vii)   What are advantages of electrical transducer.
viii)   AØ5A, 230V meter on full load unity p.f. test makes 90 revolutions in 420 sec. The
        normal disc speed is 600 rev/KWH. What is the percentage error?

Q.7   (a) With the help of neat block diagram explain working of electronic energy meter.   08
        (b) A 230V, single phase watt hour meter has a constant load of 5A passing through it for   07
        8 hrs. at unity p.f. If the meter disc makes 2400 revolutions during this period, what is the
        meter constant in revolutions per KWH. Calculate power factor of the load if the number
        of revolutions made by the meter are 1648 when operating at 230 V and 6A for 4 hours.

Q.8   (a) Explain working of Dual trace CRO with the help of block diagram.   08
        (b) What are different errors in single phase induction type energy meter? How are they   07
        compensated?

Q.9   (a) A 1000/5A, 50 Hz current transformer has a secondary burden comprising of non inductive 08
        impedance of 1.6 Ω. The primary winding has one turn. Calculate the flux in the core and
        ratio error at full load. Neglect leakage reactance and assume the iron loss in the core to be
        1.5W at full load. The magnetizing mmf is 100A.
        (b) Explain construction and working of energymeter. How is it corrected if moving fast.   07

Q.10   (a) Explain how is phase angle measured with the help of CRO.   08
        (b) Explain the use of instrument transformers. What are their advantages over shunts and   07
        multipliers?

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Total No. of Printed Pages:2

SUBJECT CODE NO:- H-377
FACULTY OF SCIENCE AND TECHNOLOGY
B.E. (EEP/EE/EEE)
Digital Signal Processing
(REVISED)

[Time: Three Hours]   [Max.Marks:80]

Please check whether you have got the right question paper.

N.B
    i.   Q.No.1 from section A and Q.No.6 from section B are compulsory.
    ii.   Attempt any three questions from each section.
    iii. Assume suitable data if necessary.

Section A

Q.1   Solve

    1) State the properties of convolution.   03
    2) Define signal system & signal processing.   03
    3) What are the properties of discrete time signals?   03
    4) Define deterministic and random signals.   03
    5) According to Nyquist criteria. What should be minimum value of sampling frequency?   01

Q.2   a) State and explain advantages of digital signal processing over analog signal processing.   07
    b) Determine which of the following sinusoids are periodic and compute their   06
    fundamental. Period –
    i) $\cos 0.01\pi n$
    ii) $\cos\left(\pi\frac{30n}{105}\right)$
    iii) $\sin 3n$

Q.3   a) Draw blocks diagram representation. For following functional blocks-   06
    i)   Adder
    ii)   Subtractor
    iii) Multiplier
    iv) Constant multiplier
    v)   Unit delay
    vi) Unit advance.
    b) Draw basic blocks of block-diagram representation.   03
    c) Draw block diagram for following system-   04
$$y(n) - 3y(n-1) - 4y(n-2) = x(n) + 2x(n-1).$$

Q.4   a) Compute convolution $y(n) = x(n) * h(n)$. of following signals.   07
$$x(n) = \{1, -2,3\}, h(n) = \{0,0,1,1,1,1\}$$
    b) Perform following operations. On $x(n) = \{1,2,3,4,5,4,3,2,1\}$.   06
    i)   Time scaling by 2 and $^1/_2$.

1

Q.5   Write short note on – (any two).   14
1) Concept of frequency in continuous time and discrete time signals.
2) Correlation of signals.
3) Discrete time system described by difference equation.

Section B

Q.6   Solve :-
1) What is meant by pole and zero?   03
2) State is ROC of infinite. Causal signals.   01
3) State importance of twiddle factor.   03
4) Differentiate between linear and circular convolution.   03
5) When, the DFT X(K) of a sequence. x(n) is real and when it is imaginary.   03

Q.7   a) Find. Z-transform   and ROC of signal   07
$$x(n) = a^n u(n) + b^n u(-n-1).$$
b) State and prove following properties. Of Z-transform:-   06
i)   Linearity
ii)   Time shifting
iii)   Convolution

Q.8   a) Find the DFT of a sequence x(n)={1,1,0,0}   06
b) Find the IDFT of y(k)=1,0,1,0}.   07

Q.9   a) Establish relation between z-transform and desecrate Fourier transform.   07
b) What is zero padding? What are its uses?   06

Q.10   Write short note on- (any two)   14
1) Methods of inverse z-transform.
2) FIR filters structures.
3) Signal flow graphs.

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-387
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (EEP/EE/EEE)
Microprocessor & Interfacing
(OLD)

[Time: Three Hours]   [Max. Marks: 80]

Please check whether you have got the right question paper.

N.B
i. Q.1 and Q.6 are compulsory.
ii. Solve any two from Q.2 , Q.3 ,Q.4 and Q.5
iii. Solve any two from Q.7 , Q.8, Q.9 and Q.10
iv. Assume suitable additional data if necessary.
v. Figures to the right indicates full marks.

Section A

Q.1   Solve any five   10
  a. What is microprocessor?
  b. What is DMA
  c. List various instructions that can be used to clear accumulator in 8085.
  d. Why data bus is bidirectional
  e. What is three byte instruction?
  f. What is function of $\overline{RD}$ and $\overline{WR}$ control signal.
  g. What happens when STA D200 instruction executed.
  h. Define the type of branching operation.

Q.2   a. Explain in detail architecture of 8085.   08

        b. Write a 8085 ALP to generate time delay of 10ms   07

Q.3   a. Draw and explain the timing diagram of opcode fetch .   08

        b. Write a program to add ten data bytes. Data is stored in memory location starting from   07
           D000H . Result is more than 8 bit store the result from E000H.

Q.4   a. Explain in detail interrupt structure of 8085   08

        b. Explain addressing modes of 8085   07

Q.5   Write short notes (any three)   15
  a. Concept of looping
  b. Call & RET instruction
  c. Control signals of 8085
  d. Function of RIM and SIM instruction

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Section B

Q.6   Solve any five   10
   a. Mention the purpose of SID and SOD
   b. What happens when following instruction is executed OUTPB.
   c. Enlist different I/O modes of 8255
   d. What is I/O map I/O mode.
   e. Write control format in BSR mode
   f. What are the two modes of DMA execution.
   g. What is use of 8259 PIC.
   h. What is the use of mode 2 in 8255 PPI.

Q.7   a. Explain how you can use an 8253 for generation of time delay .   08

   b. Write short note on MP based protective relays   07

Q.8   a. Draw and explain pin diagram of 8259   08

   b. Write an assembly language program for rolling of LED's interfaced with 8085 using   07
      8255.

Q.9   a. Explain the register organization of 8257.   08

   b. Explain block diagram of 8255.   07

Q.10   Write short notes (any three)   15
   a. DMA controller
   b. DC motor speed control
   c. 8251 USART
   d. Mode O of 8253.

Total No. of Printed Pages:2

SUBJECT CODE NO: H-435
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (EE/EEE/EEP)
Elective – I: Electrical Engineering Materials
(REVISED)

[Time: Three Hours]   **[Max.Marks: 80]**

Please check whether you have got the right question paper.

N.B
    i)   <u>Q.No.1 and Q.No.6 are compulsory</u>.
    ii)   Solve <u>any two</u> form the <u>remaining form each section</u>

Section A

Q.1 Solve <u>any five</u>   10
    a) Define "ionic polarization"
    b) State working principle of PV cell
    c) Define dielectric Breakdown strength
    d) Define anti ferro-magnetism
    e) List various magnetic Recording material
    f) Define loss tangent and its significance
    g) Define dipole moment

Q.2 a) Explain photo conductive and photo emissive cell with diagram   08
    b) What is polarizability? Explain electronic and orientation polarization   07

Q.3 a) Explain the properties of resins. Differentiate between natural and synthetic resins   07
    b) Explain the properties and application of ceramic and Mica.   08

Q.4 a) Give classification of magnetic material in details with properties and application of each   08
    b) Explain the selection criteria of magnetic material for transformer and rotating machines   07

Q.5 Write short notes on (<u>any three</u>)   15
    a) SF_6 gas
    b)   Primary ionization
    c)   Asbestos and varnish
    d)   Compact discs

Section B

Q.6 Attempt <u>any five</u>   10
    a) State properties of aluminium.
    b) Differentiate between high and low resistive materials
    c) State properties of conducting materials
    d) Write any four properties of fuse element material?
    e) State "Hall effect" related to gauss meter
    f) What is type test carried out on capacitor?

1

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Q.7   a) Explain the risk involved in Nano-technology   07
        b) Explain concept of energy band in detail   08

Q.8   a) Explain measurement of tangent of dielectric loss angle by Schering bridge   08
        b) Explain with neat diagram the method of testing of high voltage bushings in details   07

Q.9   a) Explain the application and properties of silver and its alloys   08
        b) Explain various materials used for lamp filament.   07

Q.10 Write a notes on (any three)   15
        a) Carbon Nano tubes
        b) Canthal and Tungsten
        c) Molecular machines
        d) Measurement of flux density by Gauss meter

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-444
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (EEP/EE)
Electrical Engineering Materials
(OLD)

[Time: Three Hours]   [Max.Marks:80]

Please check whether you have got the right question paper.
N.B
       i) Q.No.01 and Q.No.06 are compulsory.
      ii) Solve any two questions from remaining in each section.

Section A

Q.1   Solve any Five   10

    a) Define Electric dipole moment and Polarization.
    b) State the properties of SF6 gas.
    c) State the factors affecting breakdown strength of solid insulating material.
    d) Define Dielectric Loss.
    e) State the properties of transformer oil.
    f) What are ferrites and its properties?
    g) What is Diamagnetism?
    h) Define Photo conductivity.

Q.2   a) Explain the properties of dielectric material.   07
    b) Explain construction, working and application of photo emissive cell.   08

Q.3   a) State and explain the properties of following material.   07
       (i)   Ceramics and
       (ii)   Askarel
       (iii)   Paper
    b) What is meant by magnetism and Distinguish between Ferromagnetism and Anti   08
       ferromagnetism?

Q.4   a) Give the classification of magnetic material on the basis of   07
       (i)   Dipole moment
       (ii)   Permeability
       (iii)   Susceptibility
    b) Describe mechanism of orientation Polarization with neat diagram   08

Q.5   Write a short note on-(Solve any three)   15
    (a) Core of Rotating Machine.
    (b) Soft and Hard Magnetic materials
    (c) Piezoelectricity and pyroelectricity.
    (d) Asbestos and Varnish.

1

Section B

Q.6   Solve any Five   10
   a)   State general properties of conductor
   b)   Give application of nanotubes
   c)   Define Dielectric Strength.
   d)   Name the two materials used for heating element.
   e)   Material used for soldering.
   f)   Define Thermocouple.
   g)   List different types of fuses.

Q.7   a)   Explain the types of nanostructures in detail.   07
        b)   With the neat sketch, explain the concept of nanotubes.   08

Q.8   a)   Explain the measurement of Partial Discharge IS-13585-1994.   07
        b)   Explain the measurement of dielectric strength of high voltage bushing.   08

Q.9   a)   Write short notes on properties of Brass and Bronze in details.   07
        b)   Explain the conducting materials used in transformer and need of glazing of silicon.   08

Q.10   Write a short note on (Any three)   15
   a)   Energy bands
   b)   Single electron transistor
   c)   Mechanism of nanostructure
   d)   Measurement of flux density
   e)   Thermocouple

2

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-281
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (EEP/EE/EEE)
Analog and Integrated Circuits
(REVISED)

[Time: Three Hours] **[Max. Marks: 80]**

Please check whether you have got the right question paper.
N.B
1. Question No.1 and Q. No. 6 are compulsory.
2. Attempt from each section any two Questions from the remaining question.
3. Assume suitable data where necessary.

Section A

Q.1 Answer any five 10
1. Define slew rate of OP-amp?
2. State the specifications of op-amp (IC741)?
3. List out the applications of comparator?
4. What is voltage follower?
5. What is Differentiator?
6. What is 555 timer?
7. What is zero crossing detector?
8. Draw the pin diagram of IC 741?

Q.2 a) Explain in details 'basic block diagram' of op-amp? 07
b) Compare ideal and practical characteristics of op-amp. 08

Q.3 a) With appropriate circuit diagram and waveforms, explain Schmitt trigger using op-amp. 07
b) Explain inverting and non-inverting op-amp with neat circuit diagram & wave forms. 08

Q.4 a) What is peak detector? Explain operation of it with circuit diagram and output wave forms. 07
b) Explain application of op-amp as integrator with circuit diagram and output wave forms. 08

Q.5 Write short notes on (any three) 15
1. Log and antilog multiplier
2. BICMOS technology
3. Voltage to current convertor
4. Noise and frequency compensation in op-amp.

1

Section B

Q.6   Solve any five   10
1. What is difference between active and passive filters?
2. What is PLL?
3. What is band pass filter?
4. What is VCO?
5. What is high pass filters?
6. What are the basic building blocks of PLL?
7. What is the function of voltage regulator?
8. Draw pin diagram of IC 723 voltage regulator?

Q.7   a) Draw the circuit diagram of first order low pass active filter & explain its operation?   07
       b) Design a narrow band -Pass filter with a canter frequency $f_c = 1KHz$ $Q = 5, A_f 8$. change   08
          Centre frequency to 2 KHz, keeping A_f and B_W constant.
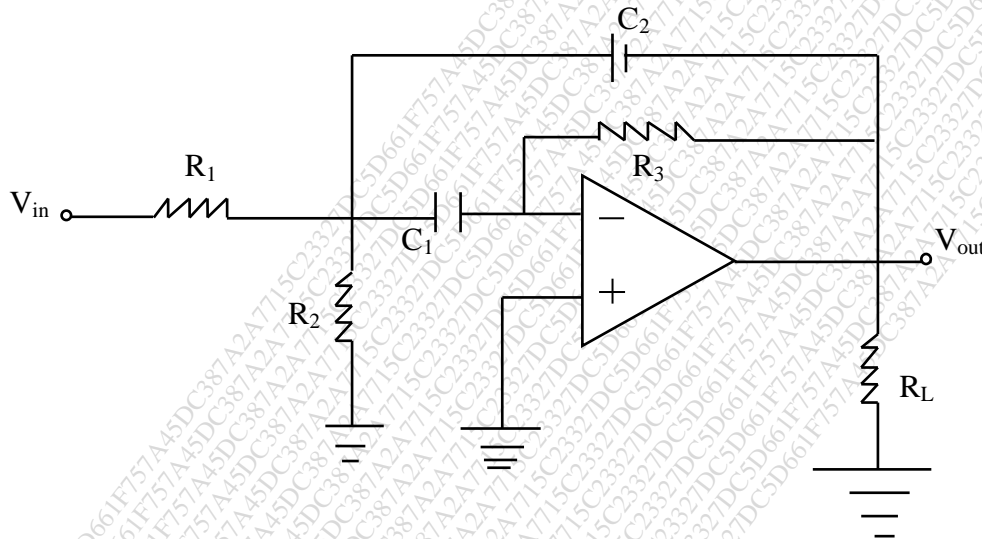
Q.8   a) Explain Monolithic PLL ICSLM 565 block diagram.   07
       b) Describe the application of PLL as frequency demodulator?   08

Q.9   a) Explain in details switching regulator IC 78540 with pin diagram.   07
       b) What is linear voltage regulator? Explain in details.   08

Q,10   Write short notes on(Any three)   15
       a) Active filter
       b) Butterworth filter.
       c) Application of PLL
       d) Op-amp voltage regulator.

2

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-252
FACULTY OF SCIENCE AND TECHNOLOGY
B.E. (EEP/EE/EEE)
Elective-II: Illumination Engineering
(REVISED)

**[Time: Three Hours]**   **[Max.Marks:80]**

Please check whether you have got the right question paper.
N.B   i) Question 1 and Question 6 are compulsory.
              ii) Solve any two questions from remaining questions from Section-A and Section B each.
              iii) Assume suitable data.

Section A

Q.1   Solve any Five   10

(a) What are the advantages of artificial lightening produced electrically.
(b) What is angstrom unit
(c) What is difference between candela and lux
(d) Define luminous intensity.
(e) What are the drawbacks of direct lighting system.
(f) What for an integrating sphere is used.
(g) Why is tungsten selected as the filament material
(h) What is the role of condenser and choke used in fluorescent lamp.

Q.2   (a) State the characteristics of LEDs   08
         (b) Explain Rousseau diagram and its importance in illumination engineering   07

Q.3   (a) Describe the Construction and principle of operation and application of fluorescent lamp.   08
         (b) Explain construction of optical fibre.   07

Q.4   (a) Explain laws of illumination.   08
         (b) Write construction and working of Neon lamp.   07

Q.5   (a) What is photometer? Explain any one type of photometer with suitable diagram.   08
         (b) How quantification of light done.   07

Section B

Q.6   Solve any five   10

         (a) Define waste light factor
         (b) Define Glare
         (c) List measures to reduce glare
         (d) List the factors responsible for interior lighting
         (e) Enumerate recommended illuminance levels.
         (f) What is the use of spectro radiometer
         (g) Write use of reflector and refractors.
         (h) State the lamberts Cosine law.

Q.7   (a) Explain switching Control of lighting   08
         (b) What is energy efficient lighting. Discuss its advantages   07

Q.8   (a) Explain Central System in case of emergency lighting.   08
         (b) Explain problems of point by point method.   07

Q.9   (a) Explain types of lighting fixtures   08
         (b) Explain photovoltaic lighting with suitable diagram.   07

Q.10   (a) Explain the factors to be taken into account for designing schemes for street lighting.   08
         (b) Write short note on maintenance in lighting.   07

Total No. of Printed Pages:5

SUBJECT CODE NO:- H-174
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (EEP/EE/EEE)
Network Analysis
(REVISED)

[Time: Three Hours]   [Max.Marks: 80]

Please check whether you have got the right question paper.

N.B
1. Use & assume suitable data if required.
2. Q.No.1 from section A & Q.No.6 Section B are compulsory.
3. Solve any two questions from the remaining questions in each section A & B.

Section A

Q.1   Solve any five: 10
   a) Define Mutual Inductance.
   b) Explain Unilateral & Bilateral Elements.
   c) Sate the Thevenin's Theorem.
   d) What is dependent sources? Explain Their Types.
   e) Define Unit Step Function & Delayed Step Function.
   f) Give the principal of Duality.
   g) Replace the circuit into single current source and resistor.
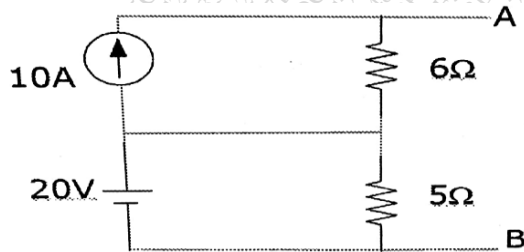
   h) Define convolution integral.

Q.2   a) Explain the concept of Super Mesh & Super Node along with an example.   05

       b) Find the voltage V_{AB} using Mesh analysis.   05
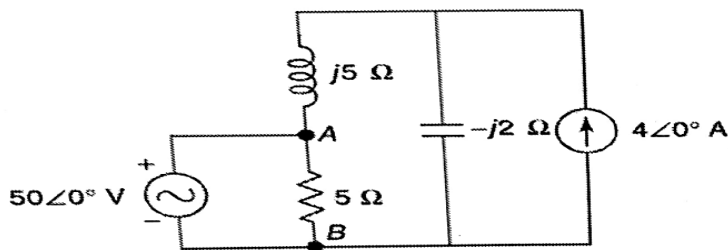

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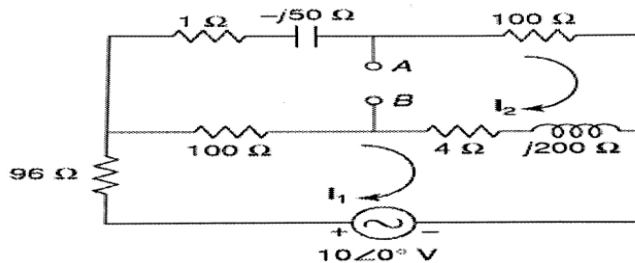
c) Find the voltage V_{AB} in the circuit using nodal analysis.　　　　　　05
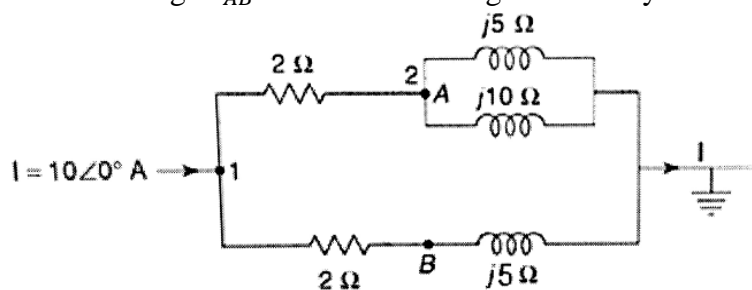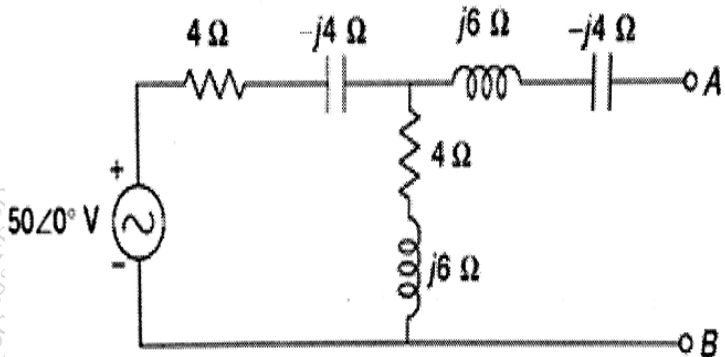

Q.3　　　a) State & explain Reciprocity Theorem in details along with example.　　05
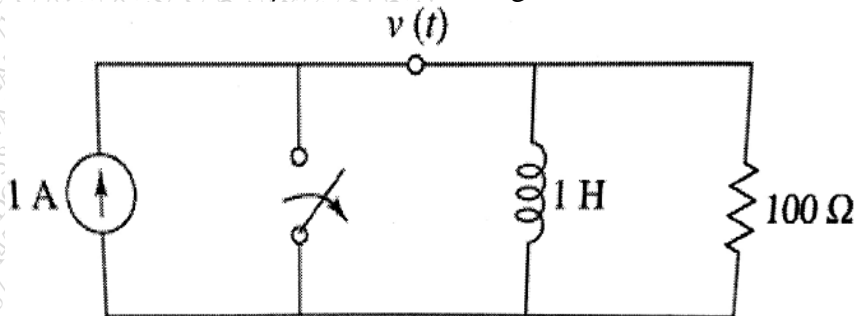
b) Determine the potential difference between A & B using superposition theorem.　　05
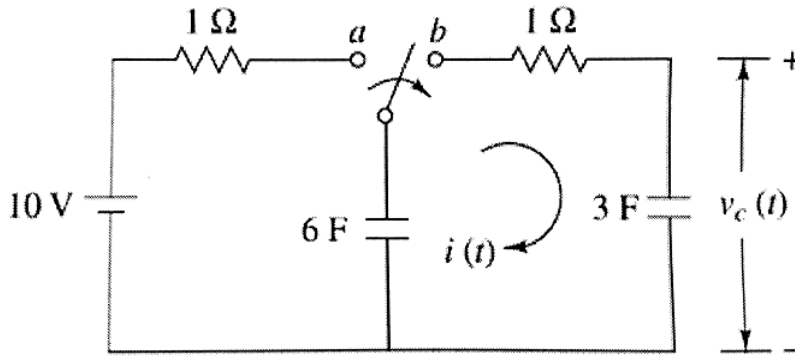

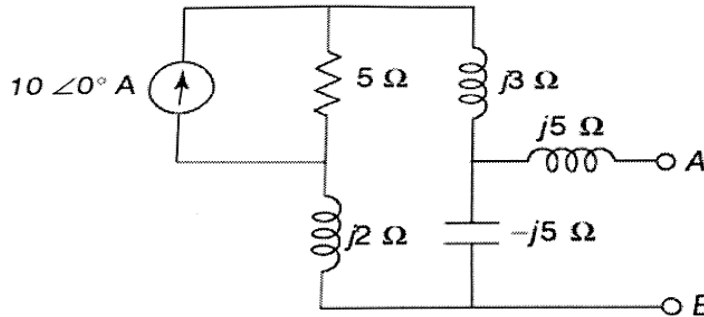c) Obtain Thevenin's Equivalent circuit for terminal A & B.　　05

Q.4　　a) Find v, dv/ dt & d^2v/ dt^2 for following circuit.　　07

2

b) In the given circuit switch is moved from a to b at t=0; determine i(t) 08

Q.5 a) State Norton's theorem and find its equivalent network for given circuit. 07

b) Explain Source transformation in detail with example. 04

c) Explain Source shifting in detail along with example. 04

Section B

Q.6 Solve any five: 10
a) What is two port network?
b) What is reactive power? Give its physical significance.
c) Write Y parameters of two port network.
d) Define Fourier coefficients.
e) What is stability of active network?
f) Draw T network & Ladder Network.
g) What are the application of Fourier transform.
h) Explain restrictions on Pole and Zero Location for transfer functions.

Q.7 a) Find driving point admittance function of the network. 05

3

05

05
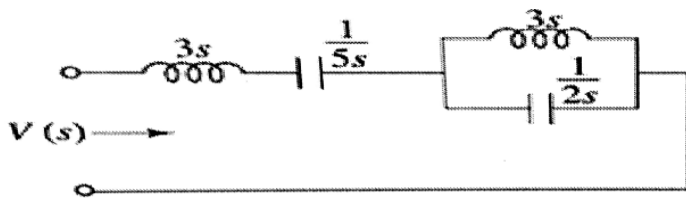
b) Explain the necessary conditions for transfer functions.

c) Determine Transfer Function V_2/V_1
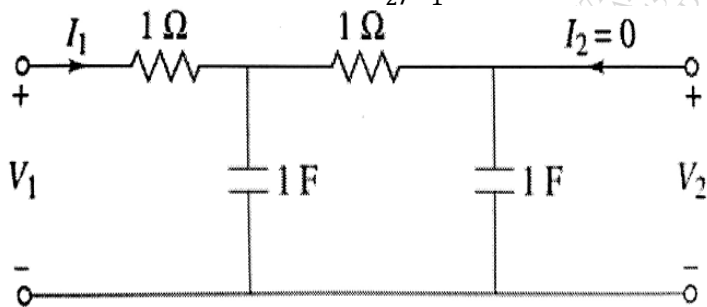
Q.8 a) Draw Pole zero diagram of I_2/I_1. 05
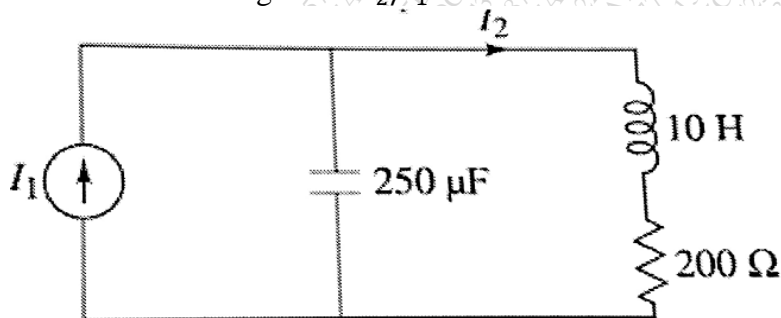
b) State the limitation on pole & zero location in transfer function of two port network. 05

c) Explain Insertion Loss in detail 05

Q.9 a) Find Fourier Coefficient of following waveform. 05
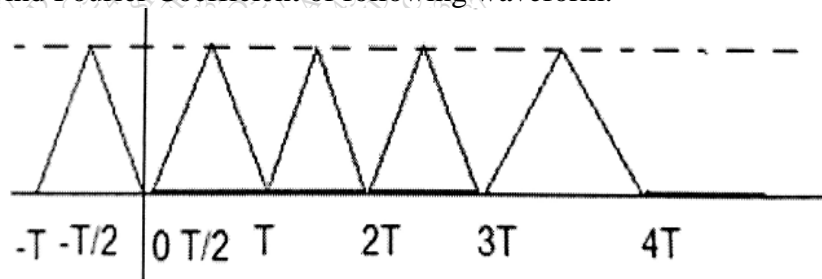
b) Find the Laplace transform of the given waveform. 05

4

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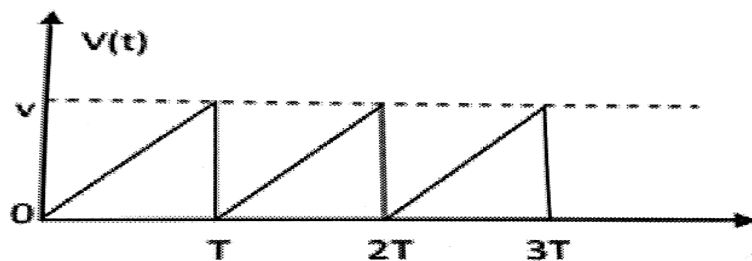
c) Find Inverse Laplace transform of given function.   05

Q.10   a) State different types of interconnection of two port network. And explain any one in detail.   05

b) Derive the complete form representation of Fourier series.   05

c) Find the Fourier series for square wave defined as $f(t) = +A \quad 0 < t < T/2$ 05
$$= -A \quad T/2 < t < T$$

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-494
FACULTY OF SCIENCE AND TECHNOLOGY
B.E. (EEP/EE/EEE)
Elective-I: Neural Network and Fuzzy Logic
(REVISED)

[Time: Three Hours]   [Max.Marks:80]

Please check whether you have got the right question paper.

N.B
i) Q5 and Q10 are compulsory.
ii) Solve any two questions from Q1, Q.2 , Q.3 and Q.4 in section A.
iii) Solve any two questions from Q.6, Q.7, Q.8 and Q.9 in section B
iv) Figures to the right indicate full marks.
v) Assume suitable data wherever necessary and mention it clearly?

Section A

Q.1 (a) List out the differences between artificial neural network and biological network.   04
(b) Explain the significance of weight.   04
(c) What are the different types of training?   04
(d) Explain threshold in a neuron   03

Q.2 (a) What are the different types of learning rules?   04
(b) Explain Back Propagation Network (BPN.)   04
(c) What are merits and demerits of Back propagation Algorithm?   04
(d) Explain briefly neural network.   03

Q.3 (a) State and explain the generalized delta learning rule applied in back propagation algorithm. 07
(b) Compare and contrast artificial neural networks with conventional computer system.   08

Q.4 (a) Explain the properties of crisp sets.   07
(b) Discuss the stopping conditions used to stop the progress of the training algorithm.   08

Q.5   Write short notes on any two   10

(i)   Speed control of DC motors.
(ii)   Models of neuron
(iii)   Hybrid Neuro Fuzzy applications.

1

Section B

Q6   (a) What are the four main steps in back propagation algorithm?   04
    (b) Explain how ANN resembles brain?   04
    (c) State the need for training the neural network   04
    (d) Explain activation function.   03

Q.7   (a) Write the components of a fuzzy logic system and explain them.   07
    (b) What are the advantages and disadvantages of Neural networks.   08

Q.8   (a) What are the optimization technique used in back propagation algorithm?   07
    (b) State differences between supervised and unsupervised learning strategy.   08

Q.9   (a) What are the types of Sigmoidal Function?   04
    (b) Explain bias in a neuron   04
    (c) What is the function of Synaptic gap   04
    (d) Discuss learning of ANN   03

Q.10   Write short notes on any two   10
    i)   Fuzzy associative memories
    ii)   Momentum factor
    iii)   Hidden Neurons

2

Total No. of Printed Pages:1

SUBJECT CODE NO:- H-473
FACULTY OF SCIENCE AND TECHNOLOGY
B.E. (EE)
Elective-I: SAP Production Planning - I
(REVISED)

[Time: Three Hours]   [Max. Marks: 80]

Please check whether you have got the right question paper.
N.B
1. Q.No.1 from section A and Q.No.6 from section B are compulsory.
2. Answer any two from the remaining in each section.

Section A

Q.1	a)	What are different modules in SAP and what there modules represent in actual business?	05
	b)	Explain the key steps in production execution.	05
Q.2	a)	Explain the organizational structure in SAP PP module.	08
	b)	Explain the concept of company code in SAP organizational structure hierarchy.	07
Q.3	a)	Discuss the concept of public holidays in SAP calendar.	08
	b)	What are the types of data in SAP ERP? Explain.	07
Q.4	a)	Describe the classification of material master.	08
	b)	What the key features of work center.	07
Q.5	Write the short note on following		
	a)	Key features related to routing	08
	b)	Uses of phantom assemblies	07

Section B

Q.6	a)	Describe the planning strategies.	05
	b)	Explain transfer of requirement? How it works and configure?	05
Q.7	a)	What are the prerequisites of MRP?	08
	b)	What is the impact of lot size planning?	07
Q.8	a)	What is safety stock in MRP? Explain.	08
	b)	Discuss the structure of MRP list.	07
Q.9	a)	Explain the basic procurement.	08
	b)	Explain purchase requisition.	07
Q.10	Write a short note on:		
	a)	Special procurement	08
	b)	Determination of requirement	07

1

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-558
FACULTY OF SCIENCE AND TECHNOLOGY
T.E.(EEP/EE/EEE)
Elective-II: Communication Engineering
(REVISED)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B
1. Questions No.1 & 6 are compulsory.
2. Attempt from each section any two questions from the remaining questions.
3. Assume suitable data wherever necessary.

Section A

Q.1 Solve any five questions. 10
 a) Give the importance of communication system.
 b) Give simplex mode of data transmission also give the example.
 c) Define modulation.
 d) Define a protocol
 e) List the features of modem.
 f) What is optical fiber communications?

Q.2 a) Explain with neat schematic diagram the operation of the basic communication system. 08

 b) Explain the need of modulation. 07

Q.3 a) Describe the ISO- OSI reference model discuss the function of each layer. 08

 b) Describe packet switching employed in computer network. 07

Q.4 a) What are the advantages of optical fiber communication? Explain in detail. 07

 b) Explain with necessary diagrams the different types of fiber structures. 08

Q.5 Write short note on (any three) 15
 a) AM
 b) Concept of noise
 c) PSK
 d) Propagation in optical fibre

1

Section – B

Q.6   Attempt any five   10
- a) Define Kepler's first law.
- b) What is satellite?
- c) How expensive is PLC?
- d) What does lines of communication mean?
- e) What is fiber optical networks.
- f) What are the classifications of the substations according to its function?

Q.7   a) Explain in detail orbit parameters.   07

       b) Explain in detail protocols of Remote energy metering.   08

Q.8   a) Describe modulation schemes for PLC in detail.   07

       b) Explain fiber optical networks in details.   08

Q.9   a) What is IP? Explain real time data transmission related to IP.   08

       b) Explain WAN based on fiber optical networks in detail.   07

Q.10   Write short note on   15
- a) Overview of satellite communication
- b) Communication in power distribution grid
- c) Zigbee

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-557
FACULTY OF SCIENCE AND TECHNOLOGY
T.E.(EEP/EE/EEE)
Elective-II: Digital Electronics
(REVISED)

[Time: Three Hours]   [Max.Marks:80]

Please check whether you have got the right question paper.

N.B   i) Question no.1 & 6 are compulsory.
             ii) From the remaining, solve any two questions from each section.
             iii) Figures to the right indicate full marks.

Section A

Q.1   Solve any five questions of the following   10
       (a) Define figure of merit.
       (b) Define fan in & fan out.
       (c) Explain Minterm & Maxterm
       (d) Convert the gray code '1011' to binary
       (e) What is the difference between encoder & multiplexer
       (f) Convert 10111_2 to decimal.

Q.2   a) Minimize the following expression using K-map   08
           $Y = \sum m (0,1,5,9,13,14,15) + d (3,4,7,10,11)$ 07
       b) State & prove De-Morgan's theorem.

Q.3   a) Why the NAND & NOR gates are called universal gates are called Universal gates? Explain   07
       b) Explain the working of TTL & CMOS NAND gate with the help of circuit diagram. 08

Q.4   a) Design 2-bit comparator by using decoder   07
       b) Design 16:1 MUX by using only 4:1 MUX & explain its operation.   08

Q.5   Write short note on (any three)   15
       (a) DAC0808
       (b) Half adder
       (c) Basic gates
       (d) NMOS
       (e) ALU

Section B

Q.6   Solve any five from the following   10
       a) State the application of Flip – Flop
       b) What is race around condition in J – K Flip flop.
       c) Explain how the up or down counting selection is done.
       d) What is shift register?
       e) Define state diagram.
       f) What is the primary disadvantage of an asynchronous counter

1

H-557

Q.7	a)	How synchronous counter differ from a synchronous counter	07
	b)	Draw & explain the working of master slave JK flip flop	08

Q.8	a)	Draw & explain the block diagram of Moore model	07
	b)	Draw & explain the block diagram of Mealy model.	08

Q.9	a)	Discuss how excitation tables, state tables & state diagram are used to analyse a synchronous sequential network.	08
	b)	Explain in detail the memory classification used in digital Electronics.	07

Q.10 Write short note on (any three)   15
- a) PROM
- b) Sequential logic ckts
- c) PLA
- d) Memory organization

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-556
FACULTY OF SCIENCE AND TECHNOLOGY
T.E.(EEP/EE/EEE)
Elective-II: Special Purpose Electrical Machines
(Revised)

[Time: Three Hours]   [Max.Marks:80]

Please check whether you have got the right question paper.

N.B
    i.   Q.1 and Q.6 are compulsory.
    ii.   Attempt any two questions from the remaining questions in each section.
    iii.   Assume suitable data, if necessary.

Section A

Q.1	Solve any five.	10
	a) What is the meaning of doubly fed induction machine?	
	b) What are advantages and disadvantages of steppers motor?	
	c) What is switched reluctance motor?	
	d) What are the features of permanent magnet synchronous motor?	
	e) What is the electronic commutator?	
	f) What is the maximum rating of FHP motor?	
Q.2	a) Explain with heat diagram "Doubly fed induction machine".	07
	b) Explain different methods of voltage control in induction generator.	08
Q.3	a) Explain the construction and working principle of switched reluctance motor.	07
	b) Explain the construction and working principle of Brushless dc motor.	08
Q.4	a) Describe linear induction motor in detail.	07
	b) Explain in detail about classification of synchronous reluctance motor.	08
Q.5	Write short note on followings.	15
	a) Fractional horse power synchronous motor	
	b) Hybrid stepper motor	
	c) Permanent magnet synchronous motors	

Section B

Q.6	Solve any five from following	10
	a) Give one example of application of rectifier transformer.	
	b) Define convection of heat.	
	c) Name two gases used in MIG welding.	
	d) What are the special applications of dielectric heating?	
	e) State faraday's first law of electrolysis.	
	f) Why electric heating is preferred over other forms of heating.	

1

Q.7 a) Explain buck boost transformer in detail with application. 07
 b) What are the advantages of electric heating? Give the classification of various electric 08
 heating methods along with brief account of their working principle.

Q.8 a) What is the fundamental difference between electric are welding and resistance welding. 07
 Explain how spot welding is carried out by spot welding machine.
 b) Explain heat process of TI4 welding. Draw neat sketches to support your explanation. 08

Q.9 a) Explain the terms used in electrolytic process. 08
 i) Energy efficiency
 ii) Current efficiency
 iii) Electrochemical equivalent
 iv) Throwing power

 b) Describe with suitable diagram the process of electrodeposition. 07

Q.10 Write short note on following 15
 a) Welding transformer
 b) Resistance heating
 c) Manufacture of chemicals.

Total No. of Printed Pages:03
SUBJECT CODE NO:- H-545
FACULTY OF SCIENCE AND TECHNOLOGY
T.E.(EEP/EE/EEE)
Control System Engineering
(REVISED)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.
N.B
      1) Q.No.1 and Q.No.6 are compulsory.
      2) Solve any two from remaining questions from each section.
      3) Use suitable data if necessary.
Section A

Q.1   Solve any five questions. 10

      a) Define transfer function.
      b) What is feedback? Give the types of feedback.
      c) What is block diagram?
      d) Define damping and damping ratio.
      e) Define Rise time and settling time.
      f) What is acceleration error coefficient?

Q.2   a) For the mechanical system shown in fig.1. Draw the force-voltage and force-current analogous circuits. 08
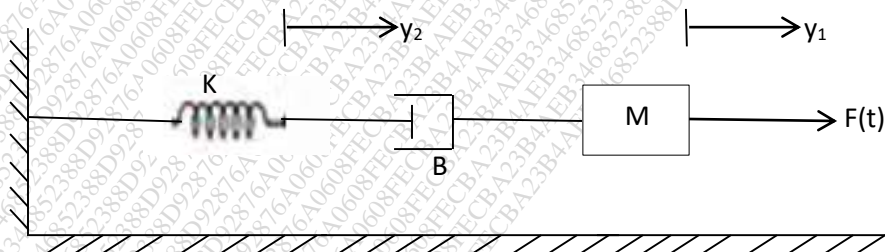
Fig. (1)

      b) Write steps for solving signal flow graph using Mason's gain formula. 07

Q.3   a) Derive the expression for time response of second order system for step input. 08

      b) The open loop transfer function of a servo system with a unity feedback is given by. 07

$$G(S) = \frac{10}{(S+3)(S+6)}$$

Determine the damping ratio, undamped natural frequency of oscillation. What is the percentage over shoot of the response to a unit step input.

1

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Q.4   a) Explain steady state and static error constant.   07

       b) For servo mechanisms with open loop transfer function $(S) = \frac{20(S+2)}{S(S+1)(S+3)}$, Explain what   08
           type of input signal give rise to a constant steady state error and calculate their values.

Q.5   a) What are the difficulty arises in the Routh's Array? Explain in detail.   07

       b) Determine range of values of 'K' for the system   08
           $S^3 + 3KS^2 + (K + 2)S + 4 = 0$ to be stable.

Section B

Q.6   Answer any five:-   10

           a) What is centroid? How the centroid is calculated?
           b) Define roof locus.
           c) Define gain margin?
           d) What do you mean by angle of departure?
           e) Define the term state, state variable.
           f) Define the term controllability and observability.

Q.7   The open loop transfer function of a unity feedback system is given by,   15

       $G(S) = \frac{K(S+9)}{S(S^2+4S+11))}$, Sketch the roof locus of the system.

Q.8   Sketch Bode plot for the following transfer function and determine the system gain 'K' for the   15
       gain cross over frequency to be 5 rad/sec.
       $G(S) = \frac{KS^2}{(1+0.2s)(1+0.02s)}$

Q.9   a) Determine the state transition matrix for the system.   07
       $\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} -2 & 0 \\ 1 & -1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u$ where u>0

       b) Construct a state model of a system whose transfer function is given as   08
           $\frac{y(S)}{U(S)} = \frac{10}{S^3+4S^2+2S+1}$

2

Q.10   a) Explain the effect of addition of poles and zeros on roof locus.   08

         b) Test the observability of the system described by   07

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} 1 & 1 \\ -3 & -2 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u$$

$$y = \begin{bmatrix} 1 & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

3

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-538
FACULTY OF SCIENCE AND TECHNOLOGY
T.E.(EEP/EE/EEE)
Electromagnetic Fields
(REVISED)

[Time: Three Hours]   [Max.Marks:80]

Please check whether you have got the right question paper.

N.B
   i.   Que. No. 01 & Que no. 06 are compulsory.
   ii.   Attempt any two questions from remaining questions of each section.
   iii. Assume suitable data wherever necessary.

Section A

Q.1   Attempt any five   10

a) Find $|\overline{F}|$ at point $P(-4,3,5)$ if vector field $\overline{F} = 0.4(y-2x)\widehat{a_x} - \frac{200}{x^2+y^2+z^2}\widehat{a_z}$.
b) State coulombs law.
c) Define electric flux density.
d) Define electric potential.
e) The two vectors given $\vec{A} = 2\widehat{ax} - \widehat{az}$ & $\vec{B} = 2\widehat{ax} - \widehat{ay} - 2\widehat{az}$ then find $(\vec{A}.\vec{B})$.
f) Define current & current density.
g) Define vector product.

Q.2   a) Transform vector $\vec{P} = 10\widehat{ax} - 8\widehat{ay} + 6\widehat{az}$ to cylindrical coordinate system at   07
point $P(10,-8,6)$.

b) Define electric field intensity & derive expression for electric field intensity due to volume 08
charge distribution.

Q.3   a) The flux density $\vec{D} = \frac{r}{3}\widehat{ar}\ nc/m^2$ is in the free space   07

    a. Find $\vec{E}$ at $r = 0.2m$
    b. Find the total electric flux leaving the sphere of $r = 0.2m$.

b) State & explain divergence theorem.   08

Q.4   a) State & explain continuity equation of current.   07

b) A current density $\vec{J} = \frac{100\ cos\theta}{r^2+1}\widehat{ar}\ \ A|m^2$ is in the spherical coordinate system. 08

    a. How much current flows through $r = 3m$, $0 < \theta < \pi/6$ & $0 \le \emptyset \le 2\pi$.

1

Q.5   a) Define Polarization & derive the expression for polarization.   07

        b) Derive the boundary conditions between two perfect dielectrics.   08

Section B

Q.6   Attempt any five   10

        a) Define magnetic field intensity.
        b) State Ampere circuital law.
        c) State Laplace's equation for scalar magnetic field.
        d) State Faraday's law.
        e) Define scalar magnetic potential.
        f) Define displacement current.
        g) Define magnetization.

Q.7   a) State & explain the stokes theorem.   07

        b) Derive the expressions for boundary conditions of two different magnetic materials.   08

Q.8   a) A point charge of $Q = -1.2C$ has velocity $\vec{\vartheta} = 5\widehat{ax} + 2\widehat{ay} - 3\widehat{az}\ m|s$. Find the magnitude of force exerted on the charge if   08
           a. $\vec{E} = -18\widehat{ax} + 5\widehat{ay} - 10\widehat{az}\quad v/m$
           b. $\vec{B} = -4\widehat{ax} + 4\widehat{ay} + 3\widehat{az}\quad\quad T$

        b) State & explain Faraday's law.   07

Q.9   a) If $\vec{H}$ due to current source is given by $\vec{H} = [y\cos(\alpha x)]\ \widehat{ax} + (y + e^x)\ \widehat{az}$. Describe the current density over the yz plane.   07

        b) State the Maxwell's equation in differential form in magnetic field.   08

Q.10   Write short note on   15

        a) Self & mutual inductance
        b) Lorentz force
        c) Permeability

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Total No. of Printed Pages:02

SUBJECT CODE NO:- H-531
FACULTY OF SCIENCE AND TECHNOLOGY
T.E.(EEP/EE/EEE)
Microprocessors And Interfacing
(REVISED)

[Time: Three Hours]   [Max.Marks:80]

Please check whether you have got the right question paper.
N.B
          1) Q. No. 1 & Q. No. 6 are compulsory.
          2) Attempt any two questions from the remaining questions in each section.
          3) Assume suitable data & address if necessary.

Section A

Q.1   Solve any five questions:-   10

        a) What is an ALU?
        b) What is need of ALE signal in 8085?
        c) What is opcode and operand?
        d) What is difference in SUB and CMPB instruction?
        e) What is CALL instruction?
        f) What is function of $\overline{RD}$ & $\overline{WR}$ control signal.
        g) Write classification of registers in 8085.
        h) Give functional categories of 8085 instructions.

Q.2   a) With a neat diagram explain the architecture of general microprocessor.   07

        b) Explain the terminologies used in microprocessor and define fetch, decode and execute.   08

Q.3   a) Draw internal architecture of 8085 microprocessor and explain function of each block in brief.   10

        b) Explain addressing modes of 8085 microprocessor.   05

Q.4   a) Write a ALP to sort given 10 numbers from memory location 2200 H in the descending order.   07

        b) Draw and explain brief the flag register of 8085.   08

Q.5   Write a short note on:-   15

        a) Features of intel 8085
        b) Concept of looping
        c) Stack and sub routines

Section B

Q.6 Solve any five questions:- 10

    a) Define A to D & D to A converter.
    b) Features of 8255.
    c) What are the signals used by the DMA controller?
    d) What is USART?
    e) What are the functions performed by 8251?
    f) Mention the purpose of SID & SOD.
    g) Enlist different I/O modes of 8255.
    h) What are the output control signals used in 8259?

Q.7   a) Explain the Block diagram of 8251 USART in detail with neat diagram. 07

       b) Write a program to generate a time delay 10msec using 8253. Assume clock frequency 2MHz. 08

Q.8   a) Draw the interfacing diagram of stepper motor and write ALP to rotate through 180° Clockwise direction. 07

       b) Explain the block diagram of 8279 keyboard/display interface & it's operation. 08

Q.9   a) Explain the pin diagram of 8259 with neat diagram and write function of each pin. 07

       b) Draw the interfacing diagram to interface LED to 8085 through port A & port B of 8255. 08
       Write ALP such that when port A LED's ON , port B LED's are OFF and vice versa.

Q.10 Write a short notes on:- 15

    a) 8257 working
    b) Block diagram of 8253.
    c) ADC 0809 & DAC 0808 interface.

Total No. of Printed Pages:3

SUBJECT CODE NO:- H-524
FACULTY OF SCIENCE AND TECHNOLOGY
T.E.(EEP/EE/EEE)
Power System Analysis
(Revised)

[Time: Three Hours]   **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B   i) Question No.1 and Question No.6 are compulsory.
             ii) Attempt from each section any two questions from remaining questions.
             iii) Assume suitable data wherever necessary.

Section A

Q.1   Solve any five questions from the following   10
       a) What is impedance and reactance diagram?
       b) A single-phase transformer is rated at 110/440V, 2.5 KVA, and its leakage reactance measured
          from L.T. side is 0.06 Ω. Determine the leakage reactance in p.u.
       c) What are different types of load buses?
       d) What is need of slack bus?
       e) Define terms i) tree,   ii) cotree.
       f) Write expression for complex power injected to a bus.
       g) Why is load flow study necessary?
       h) What are advantage of p.u. system.

Q.2   a) Determine per unit impedance of 1-ϕ- transformer   07
       b) Draw the reactance diagram for the power system shown in fig.1. Neglect resistance and use a   08
          base of 100 MVA, 220 KV in 50Ω line. The rating of the generator, motor and transformers are
          given below.
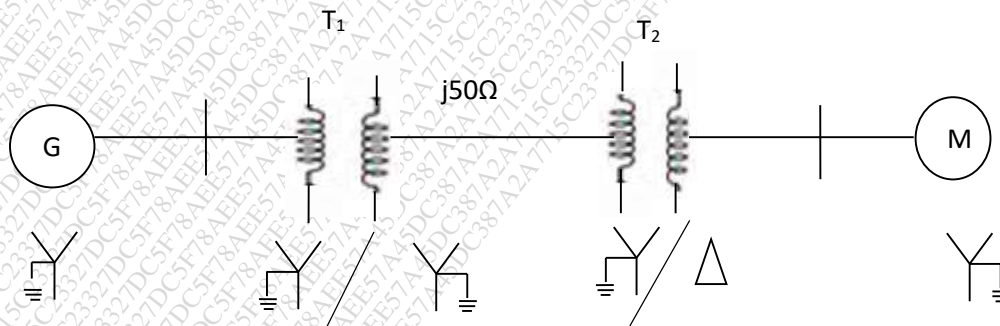
Fig.1

Generator : 40 MVA, 25 KV, $X'' = 20\%$
Motor   : 50 MVA, 11 KV, $X'' = 30\%$
Transformer (T_1): 40 MVA, 33/220 KV, X = 15%
Transformer (T_2): 30 MVA, 11/220 KV, X = 15%

1

H-524

Q.3   a) Prove that $Y_{Bus} = A^T yA$ 07

        b) For a power system shown in figure.2   08
            Obtain A, $\bar{A}$ and C, $\bar{C}$
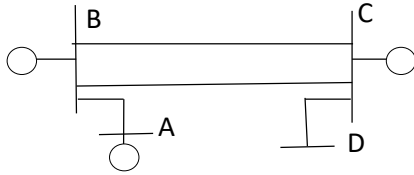
Fig.2

Q.4   a) Write the algorithm for load flow solution using GS method.   07

        b) Fig.3 shows 3 Bus power system   08
            Bus1: Slack bus V=1.05 Lo° p.u.
            Bus2: PV bus V=1.0 p.u. p_9=3.0 p.u.
            Bus 3: PQbus, P_1=4 p.u, Q_1=2 p.u.

Carry out one iteration of solution by G-S method. Neglect limits on reactive power generation
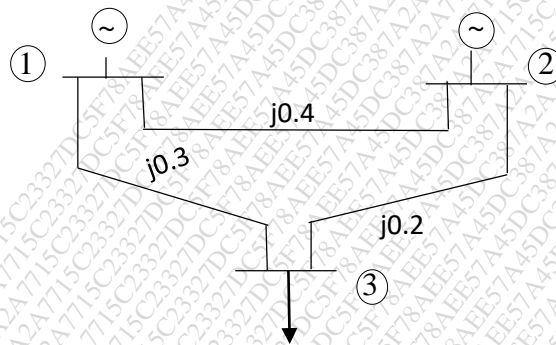
Fig.3

Q.5   a) Write a short note on selection of circuit breaker   07

        b) Explain transient (i.e. short circuit) on a loaded synchronous machine.   08

Section – B

Q.6   Solve any five questions from following   10

        a) Define i) Transient period
                ii) Sub Transient period.
        b) How the faults are classified?
        c) What is meant doubling effect?
        d) What is sequence operator?
        e) What is need for short circuit studies or fault analysis.
        f) What is difference between L-G and L-L faults?
        g) What is sequence impedance and sequence network.
        h) What is synchronous reactance

Q.7   a) Explain sequence impedance of Transmission line   07
      b) In a 3- ϕ and 4 wire system, the current in R_1Y_1 and B lines under abnormal conditions of   08
          loading are under
          $I_R = 100\angle30°$A; $I_y = 50\angle300°$A, $I_B = 30\angle180°$A
          Calculate positive, negative and Zero sequence current in "R" Line and return current in neutral
          wire.

Q.8   a) Explain Z_{bus} building for Type 2 and Type3 modifications   07
      b) For the power system whose line diagram and data shown in figure below. Draw the positive,   08
          negative, and zero sequence network.
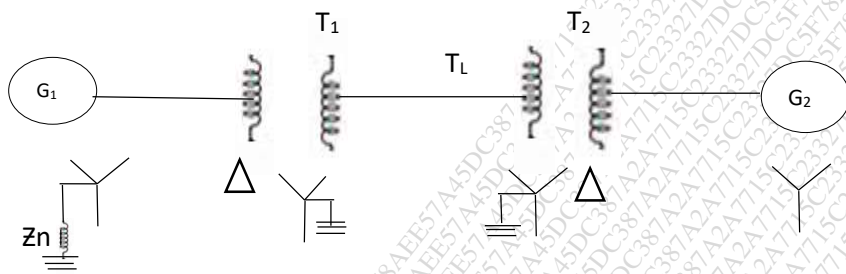
G$_1$: $X_1 = X_2 = j0.2$ p.u, $X_0 = j0.06$p.u, Z_n=0.5 p.u.
G$_2$: $X_1 = X_2 = j0.69$ p.u, $X_0 = j0.164$ p.u,
T$_1$: $X_1 = X_2 = X_0 = j0.08$ p.u,
T$_2$: $X_1 = X_2 = X_0 = j0.08$ p.u,
T$_L$: $X_1 = X_2 = j0.164$ p.u, $X_0 = j0.494$ p.u.

Q.9   a) Derive an expression to determine fault current for L-G fault. Draw the sequence network.   07
      b) Determine the fault current for L-L-G short circuit at the terminals of a star connected
          synchronous generator operating initially on an open circuit voltage of 1.0 p.u. The positive,   08
          negative and zero sequence reactance of the generator are respectively j0.35, j0.25, and j0.20
          p.u. and its star point is isolated from ground.

Q.10 a) Explain open conductor faults   07
      b) Explain the static security analysis at control centers.   08

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-474
FACULTY OF SCIENCE AND TECHNOLOGY
B.E. (EEP/EE/EEE)
Elective-I: Industrial Management
(REVISED)

[Time: Three Hours]   **[Max.Marks:80]**

Please check whether you have got the right question paper.
N.B
1) Question No.1 & 6 are compulsory.
2) Attempt any two Questions from each section from remaining.

Section A

Q.1   Attempt any five from below   10

a) What is manufacturing systems?
b) Define wages & perks.
c) Define Operation Management.
d) List out type of capitals.
e) Define Tax.
f) Define finance in two sentences.
g) What is job specification?
h) What is salary?

Q.2   (a) What are fundamental principles of Management & Explain its importance.   07
        (b) What is function of Manager in organization and what are his different Roles?   08

Q.3   (a) Why Human Resources are to be managed & what are tools required to get proper HR?   07
        (b) What is Financial management & Managerial functions and core activities of F. Manager? 08

Q.4   (a) Describe Production concept and its importance & distinguish between Operation   08
        Management.
        (b) What are sources of finance? Can we consider "Market Goodwill" as a finance? Justify your 07
        answer.

Q.5   (a) Comment and justify that Financial Management is a blood of Management.   07
        (b) Discuss with Examples that Management is Art and Science.   08

1

Section B

Q.6   Attempt any five from the following   10
       (a) What is vision?
       (b) What is mission?
       (c) What is strategic planning?
       (d) What is planning premises?
       (e) What is network concept?
       (f) What are core concept of Marketing?
       (g) What you mean by inventory and its control?
       (h) Define Market research.
       (i) Principles of Good Material Management.

Q.7   (a) Explain meaning of economics & its projection in Engineering.   07
      (b) Write Indian Electricity Act 1910 and its further amendments and its evolution.   08

Q.8   (a) What is Total Quality Management scope; application & principles?   07
      (b) What are the functions of Bank in Industries & how they contribute acceleration in   08
          Industrialization?

Q.9   (a) Design Management Information System & how it adds to holistic management?   07
      (b) Why should I require vendor to be ISO Certified?   08

Q.10   Write short notes on (any three)   15
       a) ISO 9000 series principles standards & approach.
       b) Inventory control & its three models.
       c) ISO 9000 SERIES & ISO 14000 with differentiation.
       d) Write importance of standards & high light testing stds.
       e) What are elements of MIS explain two in brief?

Total No. of Printed Pages:2

SUBJECT CODE NO: H-492
FACULTY OF SCIENCE AND TECHNOLOGY
B.E. (EEP/EE)
Power System Dynamics & Stability
(OLD)

[Time: Three Hours]   [Max.Marks:100]

Please check whether you have got the right question paper.
N.B
i) Attempt <u>any three</u> questions <u>from each section</u>.
ii) Assume suitable additional data wherever necessary.
iii) Draw neat labelled sketch wherever necessary.

Section A

Q.1   a) Define angular momentum & inertia of a synchronous machine. Derive relation between   08
          them.
      b) A synchronous machine having inertia constant H=4.0 MJ/MVA is initially operated at   08
          steady state against an infinite bus with angular displacement of 30 elec degree and
          delivering 1.0pu power. Find the natural frequency oscillation for this machine, assuming
          small perturbation from the operating point.

Q.2   a) Derive and explain swing equation.   08
      b) Find critical clearing angle for a system having maximum power transfer capacity of 2.0pu   08
          and delivering 1.0p.u. A fault occurred which reduced maximum power transfer capacity by
          0.6pu and after clearing fault the maximum power transferable capacity is 1.5pu.

Q.3   a) Explain the effect of grounding on stability of system.   08
      b) Derive power angle equation and plot power angle curve.   08

Q.4   a) What is effect of clearing time on stability and derive expression for critical clearing time.   08
      b) Explain classical model of multi-machine system. Discuss its limitations.   08

Q.5   Write short notes on   18
      i)   Modelling of synchronous motor & generator
      ii)   Reclosing effect on stability
      iii)   Equal area criterion.

Section B

Q.6   a) Explain the Clarkes diagram to determine steady state stability limit for two synchronous   08
          machine connected through impedance r+jx.
      b) Calculate the steady state stability limit for the system of a generator having an internal   08
          reactance of 0.9pu feed power to an infinite bus over a transmission line, the equivalent Π
          of which has an architecture impedance of j 1.2p.u and pillars of –j 6.0pu each. The
          terminal voltage of the generator & the voltage of the infinite bus are held at 1.1pu and
          1.0pu respectively.

1

Q.7   a)   Describe the excitation system response on stability.   08
         b)   Explain supplementary modulation control of facts devices.   08

Q.8   a)   Explain step by step method of determination of stability.   08
         b)   With neat sketch explain any two excitation configuration.   08

Q.9   a)   Explain with neat diagram AVR.   08
         b)   Find critical clearing angle by using step by step method. Initial power transfer 1pu at   08
             50Hz, maximum power limit under pre fault, during fault and post fault conditions are
             2.6pu, 0.8pu and 2pu respectively. If the inertia constant of generator is 5 MJ/MVA plot the
             curve for a time of 0.3 sec of time interval as 0.05 sec & assume fault occurred at 0 sec and
             cleared at 0.1 sec.

Q.10   Write short note on: 18
         i)   Power system stabilizer
         ii)   Various reactance of synchronous machine
         iii)   Transient stability controller

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-497
FACULTY OF SCIENCE AND TECHNOLOGY
B.E. (EEP/EE/EEE)
Elective-II: Embedded System
(REVISED)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.
N.B   (1) Solve any three questions from each section.
                       (2) Assume suitable data wherever necessary.

Section A

Q.1   a) State components of embedded system hardware. Elaborate the role of program and data   07
          memory.
      b) Express the importance of reset circuit, power-up reset and watch-dog-timer reset in   06
          embedded system.

Q.2   a) Enlist and explain the essential input, output devices of embedded system.   07
      b) With neat block-diagram elaborate the steps for converting an assembly language program   06
          into machine codes and into ROM image.

Q.3   a) Enlist and explain the function of various software tools used for designing an embedded   06
          system.
      b) Explain in detail, what are the challenges in embedded system design.   07

Q.4   a) Explain any one serial communication protocol in detail.   07
      b) Give classification of embedded system and explain features in each case   06

Q.5   Write short note on- (any two)   14
          (1) Thumb instruction set
          (2) Memory management system in ARM
          (3) ARM Core data-flow-model.

Section B

| Q.6 | a) Draw format of 'Program Status Register'. Explain the function of each bit. | 06 |
| | b) State and explain processor modes of ARM. | 07 |

Q.7   a) Explain interrupt system of ARM processor.   07
       b) Explain stack operation of ARM processor.   06

Q.8   a) What is timer? How does a counter performs timers function. Why do we need at least one timer device in an embedded system.   07

       b) What are the advantages and disadvantages of busy and wait transfer mode for the I/O devices.   06

Q.9   a) Draw and explain architecture of kernel.   07
       b) Explain following terms: mailbox, task scheduler, ISR.   06

Q.10   Write short note on – (any two)   14
       (1) RTOS Services
       (2) Intertask Communication in μCOS
       (3) LCD interfacing.

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-500
FACULTY OF SCIENCE AND TECHNOLOGY
B.E. (EEP/EE)
Microcontrollers & Applications
(OLD)

[Time: Three Hours]   **[Max. Marks: 100]**

Please check whether you have got the right question paper.

N.B   1) Solve any three questions from each section.
            2) Figures to the right indicate full marks.
            3) Assume suitable data, if necessary.

Section A

Q.1	a)	With neat sketch explain execution unit of 8086.	08
	b)	Define addressing modes for specifying branch address and identify addressing modes of following instruction.	08

           i.   MOV[BP+SI+5],AH
          ii.   MOV AL,[5036]

Q.2   a) Explain the function of following instruction with example.   08
          i.   LEA
          ii.   DAA
         iii.   IDIV
         iv.   JNGE
     b) Write an assembly language program to add two 16 bit no.   08

Q.3   a) Interface LED with 8086 write a program to blink them alternately.   08
     b) Design 8086 based minimum mode system.   08

Q.4   a) Explain queue status of 8086.   08
     b) Explain lock facility of 8086 based system.   08

Q.5   Write short note on the following(Any Three)   18
        a) Flag of 8086.
        b) 8255 Interfacing.
        c) Stepper motor interfacing.
        d) 8087 Coprocessor.

Section B

Q.6   a) Draw and explain Architecture of 8051.   08
     b) Explain all pins of port 3 which are present in pin diagram of 8051.   08

Q.7   a) Explain various modes of timer operation with diagram.   08
     b) Explain the function of each bit of SCON and PCON register.   08

1

Q.8   a) Write an ALP for multibyte addition.   08

        b) Interface LED with 8051. Write a Program to blink them.   08

Q.9   a) Draw Interfacing diagram of DAC with 8051 microcontroller and write a program to generate a 08
saw tooth waveform using DAC.

        b) Some microcontroller have inbuilt PW M circuitry, Why is this consider as an inbuilt DAC for 08
these chip.

Q.10   Write short note on the following(Any Three)   18
        a) Features of 8051 Microcontroller.
        b) Explain the instruction
            i.   SWAP A
            ii.   DIV AB
        c) Difference between Microprocessor and Microcontroller.
        d) Describe the function of pin-
            i.   PSEN.
            ii.   ALE.

Total No. of Printed Pages:2

SUBJECT CODE NO: H-162
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (EEP/EE/EEE)
Testing & Maintenance of Electrical Equipment
(OLD)

[Time: Three Hours]   [Max.Marks: 80]

Please check whether you have got the right question paper.

N.B
      i)   Q.1 & Q.6 are compulsory
     ii) Solve any Two questions from remaining in each section
    iii) Solve total 3 questions from each section

Section A

Q.1 Solve any five   10
      a) Define testing
      b) Define tolerance
      c) Define fault
      d) Define maintenance
      e) Define type testing
      f) Define routine testing

Q.2 a) How will you identify HV & LV of the transformer & its rating without name plate?   07
      b) Explain various reasons of deterioration of insulating properties of transformer oil   08

Q.3 a) Explain the procedure of dehydration of transformer windings   07
      b) Explain various reasons of bearing jamming in 3-ph induction motor?   08

Q.4 a) Draw the process flow chart of transformer manufacturing with in-process tests   10
      b) Explain reasons of vibrations in the transformer   05

Q.5 Write short note on any three   15
      a) Reasons of transformer over heating
      b) Reasons of transformer excessive vibrations.
      c) Effects of wrong placement of coils
      d) Effects of leakage currents

Section B

Q.6 Answer in one sentence (any five)   10
      a) For what purpose the DGA testing is done?
      b) What is the use of Megger testing?
      c) Why HV withstand test is carried out?
      d) When sonography (ultrasonic) testing is done on EHV motors?
      e) For what the resistance testing is done on windings?
      f) Why radiography is used on electric motors?

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Q.7   a)   Make the list of probable faults, which may occur in manufacturing of 1-ph induction motor?   08
Write down various reasons for development of each fault you write

       b)   Explain with neat sketches the working of S.M. swing (vibration testing) equipment   07

Q.8   a)   Name any four tests, used for the preventive maintenance of 3-ph IM, during working   07
condition & explain with neat sketch any one test in details

       b)   Draw the flow chart of induction motor manufacturing process, including in-process tests.   08

Q.9   a)   The single phase induction motor shows the Jurky (giving Jurks) rotation. What kind of fault   07
could be there? Justify your diagnosis in support. Draw needed sketches?

       b)   What are the probable reasons behind body temperature of motor shoots high? How will you   08
diagnose the probable reasons?

Q.10   Write short notes on <u>any three</u>   15
      i)   Testing of I.M. λ/Δ starter
      ii)   Routine test on 3-ph I.M.
      iii)   Meggering of 3-ph 200 HP motor
      iv)   HV testing setup for HV motors

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-150
FACULTY OF SCIENCE AND TECHNOLOGY
B.E. (EEP/EE/EEE)
Power System Operation & Control
(REVISED)

[Time: Three Hours]   **[Max.Marks: 80]**

Please check whether you have got the right question paper.

N.B
1. Q.No.1 from section A and Q.No.6 from section B are compulsory.
2. Solve any five questions from Q.no 1 and Q no.6
3. Attempt any two questions from the remaining questions in each section
4. Assume suitable data wherever necessary.

Section- A

Q.1   Solve any five.   10

   a.   What is amortisseur circuit in synchronous machines?
   b.   What are the significance of dq0 transformation?
   c.   What is AVR?
   d.   Classify stability of dynamic system?
   e.   What is brushless excitation system?
   f.   Define the small signal stability
   g.   Write down MMF equation for three phases and draw waveforms.

Q.2   a.   Explain physical interpretation of dq0 transformation.   08
        b.   In terms of modeling, explain stator circuit equation, mutual inductance between stator and   07
             rotor.

Q.3   a.   Derive the transfer function for steam turbines   08
        b.   Explain the control and protective functions in excitation systems.   07

Q.4   a.   Explain the state - space representation in stability of dynamic system.   08
        b.   Explain the effect of synchronous machine filled circuit dynamics.   07

Q.5   Write short note on-
        a.   Automatic voltage regular.   05
        b.   Brushless excitation system   05
        c.   Requirement for a transient droop in governor for hydraulic turbine.   05

1

H-150

Section -B

Q.6   Solve any five questions.   10

    a. What is economic load dispatch
    b. What is the incremental cost expression for hydro generating plant?
    c. What is the synchronous condenser?
    d. Define long range hydro scheduling problem
    e. How shunt capacitors providers' reactive power for voltage control?
    f. What is contingency analysis?
    g. What is optimum scheduling of hydrothermal system?

Q.7   a) Explain economic load dispatch problem formulation   07
    b) The incremental fuel costs in rupees per mwh for a plant consisting of two units are   08

$$\frac{dF_1}{dP_{G_1}} = 0.10P_{G_1} + 20$$

$$\frac{dF_2}{dP_{G_2}} = 0.12P_{G_2} + 16$$

The min and max load on each unit is 20 mw & 125mw respectively. determine the incremental fuel cost and allocation of load two units for minimum cost when loads are
      i. 100MW
      ii. 150MW

Determine the saving in fuel cost in Rs/hr for economic distribution of 200 mw load compared with equal distribution of the same total load.

Q.8   a) Explain in brief roles of SCADA system in energy management system   08
    b) Explain the causes of reactive power generation in power system .also explain the absorption   07
    of reactive power.

Q.9   a) Explain in detail energy management system and its implementation steps.   08
    b) Explain the power system security assessment in details.   07

Q.10   Write short note on.
    a) Application of tap changing transformers for transmission systems.   05
    b) Distribution system voltage regulation.   05
    c) Static VAR system.   05

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-139
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (EEP/EE/EEE)
AC Machines
(REVISED)

[Time: Three Hours]   [Max. Marks: 80]

Please check whether you have got the right question paper.

N.B
1. Question no 1 & Question no 6 are compulsory.
2. Attempt from each section <u>any two</u> questions from remaining questions.
3. Assume suitable data whenever necessary.

Section A

Q.1   Solve <u>any five</u> questions of the following.   10

1. Why can not 3 ph Induction motor run at synchronous speed
2. Define the term crawling.
3. Why does slip vary with the load?
4. State different methods of speed control of 3 phase Induction motor
5. A6 pole alternator running at 1000 rpm supplies an 8 pole induction motor. Find the actual speed of motor if the slip is 2.5%
6. Slots of rotor of induction motor skewed why?
7. What is the function of centrifugal starting switch in single phase induction motor
8. What is difference between squirrel cage rotor and wound rotor

Q.2   a)   Draw and explain the torque slip characteristics of 3phase Induction motor   07

        b)   440 v, 3phase,50HZ star connected induction motor has a full load speed of 1425 RPM,   08
               rotor has a impedance of(0.4+j4)Ω per phase and rotor/stator turn ratio is 0.8, calculate
               (1) Full load torque
               (2) Rotor current
               (3) Full load rotor copper loss.

Q.3   a)   Explain the working of star delta starter for 3phase I m.   07

        b)   Draw the equivalent circuit of double cage Induction motor and describe all parameters   08

Q.4   a)   Explain in detail the principal of operation of single phase capacitor start, capacitor run   07
               motor with phasor diagram.

        b)   Derive the torque equation of three phase induction motor   08

Q.5   Write a short note on   15
        1) A.C. servo meter
        2) Speed control of Induction motor by pole charging
        3) Repulsion motor

1

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Section B

Q.6   Solve <u>any five</u> questions of following   10
1) Enlist the different methods of excitation system of alternator.
2) What are advantages of short pitched windings in an alternator?
3) What is meant by pull out torque?
4) Write two differences between salient pole and smooth cylindrical rotor
5) 3 phase, 50 HZ, star connected alternator has 180 conductor per phase and flux per pole is 0.0543wb, find EMF generated per phase and emf generated between line terminals. Assumptions-winding to be full pitched and Distribution factor to be 0.96
6) What are the advantages of synchronous motor?
7) What is meant by phase spread?
8) What is pitch factor?

Q.7   a) Explain the zero power factor method for obtaining voltage regulation in an alternator   07

       b) Derive an EMF equation of alternator   08

Q.8   a) What is synchronous condenser and explain its role in power factor improvement   07

       b) A 3 phase 11kv, 5 MVA, star connected alternator has a synchronous impedance of $(1+j10)\Omega$ Per phase its excitation is such that line EMF is 14kv, The alternator is connected to Infinite bus bar. Determine its maximum output at given excitation when   08
       (1) armature resistance is neglected
       (2) armature resistance is considered

Q.9   a) Explain the construction and working of synchronous motor   07

       b) Explain effect of charging field excitation at constant load with the help of phasor diagrams in synchronous motors   08

Q.10   Write short note on   15

       1) Armature reaction and its effects
       2) Effects of harmonics on pitch factor and distribution factor
       3) Method of synchronising the 3phase alternator

Total No. of Printed Pages:3

SUBJECT CODE NO: H-127
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (EEP/EE/EEE)
Power Electronics
(OLD)

[Time: Three Hours]   [Max.Marks:80]

Please check whether you have got the right question paper.

N.B
1. <u>Q.No.1 & Q.No.6 are compulsory</u>.
2. Solve <u>any two</u> questions <u>from remaining each sections</u>.
3. Draw appropriate waveforms if required.
4. Assume suitable data if necessary.

Section A

Q.1   Solve <u>any five</u>.   10
    a) Define holding current and Latching current as applicable to an SCR.
    b) What do you mean by commutation of SCR? Give the different methods of commutations.
    c) Compare TRIAC with SCR.
    d) List the advantages of power MOSFET.
    e) Draw the circuit diagram of 3 phase full converter.
    f) What are the different classifications of Chopper?
    g) Give the merits and demerits of GTO as compared to conventional SCR.
    h) What are the operation control techniques used in chopper.

Q.2   a) Draw and explain V-I characteristics of SCR.   07

    b) A single phase fully controlled bridge converter supplies an Inductive Load. Assume output   08
    current is virtually constant and equal to I_d. Calculate the following if supply voltage is 230v
    and firing angle $\pi/6$ radian.
    1) Average output voltage
    2) Supply RMS current
    3) Supply fundamental RMS current

Q.3   a) Explain with neat circuit and waveform, operation of single phase fully controlled bridge   07
    rectifier with R-L Load.

    b) A single quadrant type A chopper is operated with following specifications, on time   08
    $t_{on} = 1msec$, off time $t_{off} = 1.5msec$ and ideal battery of 220V.
    Calculate
    1) Average and RMS output voltages
    2) Ripple factor and form factor

Q.4   a) Explain in detail working Principle of Dual converter.   07
    b) Explain principle of step-up chopper and derive expression for average output voltage.   08

1

Q.5   a)   Explain PWM and FM Techniques of Chopper used for operation control.   07

b)   A 3phase half wave converter is operated from a 3-phase Y connected 220 v, 50 Hz, Supply   08
and Load resistance of 10 ohm. If the average output voltage is 25% of maximum possible
average voltage. Determine:
1)   Delay angle
2)   RMS and average output currents
3)   Average and RMS SCR current
4)   Input power factor

Section B

Q.6   Solve <u>any five</u>   10
a)   Define Inverter and give its applications.
b)   Draw circuit diagram of 3φ to 1φ cycloconverter.
c)   Compare 180^0 and 120^0 mode operation of VSI.
d)   What is UPS and power conditioner?
e)   Draw circuit diagram of Buck-boost converter.
f)   List different voltage control and PWM techniques used in single phase Inverter.
g)   What is Switching Mode Power Supplies (SMPS)?
h)   What is cycloconverter? Give its classifications.

Q.7   a)   Draw and explain with neat circuit diagram and waveforms, operation of single phase half   07
bridge Voltage Source Inverter (VSI), with R-L Load.

b)   A single phase full bridge inverter is operated from a 48V battery and is supplying power to a   08
pure resistive load of 15 ohm. Calculate
1)   Fundamental output voltage and first five harmonics
2)   RMS value of output voltage
3)   Output RMS power and fundament power

Q.8   a)   Explain with neat diagram and waveforms operation of single phase to single phase   07
cycloconverter with R-L Load.

b)   The buck converter has an input voltage of 14v. The required average output voltage is 6v,   08
and peak to peak output ripple voltage is 15mv. The switching frequency is 30KHz. If peak to
peak ripple current of Inductor is limited to 0.6 A.
Determine:
1)   Duty cycle
2)   Filter Inductance 'L'
3)   Filter capacitor 'C'

Q.9   a)   Explain working principle of single phase AC voltage controller.   07

b)   Explain with neat diagram and waveform of 180° mode of operation of 3-phase Inverter with   08
R-Load.

2

Q.10   a) Explain with neat diagram and waveform operation of Buck converter.   07

       b) An Ac voltage controller has resistive load of 20 ohm and RMS input voltage is 230v, 50Hz. 08
          The SCRs are switched on for n=30 cycles and off for m=70 cycles.
          Determine :
          1) RMS output voltage
          2) Input power
          3) Average and RMS current rating of SCR

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-116
FACULTY OF SCIENCE AND TECHNOLOGY
B.E. (EEP/EE/EEE)
High Voltage Engineering
(REVISED)

[Time: Three Hours]   **[Max.Marks:80]**

Please check whether you have got the right question paper.
N.B
1. Question.No.1 & Question No.6 are compulsory.
2. Attempt any two questions from remaining questions of each section.
3. Assume suitable data wherever necessary.

SECTION A

Q.1   Solve any five.   10
   a) Define the types of collision processes.
   b) Explain in short the term 'electron attachment'.
   c) What are electronegative gases?
   d) State electrical properties of liquid dielectrics.
   e) What are commercial liquid dielectrics?
   f) What are parameters that affect the breakdown strength of liquids?
   g) What do you understand by 'intrinsic strength' of a solid dielectric?
   h) What is composite dielectric?

Q.2   a) Explain the procedure to control electric field intensity in HV equipment.   07
        b) Discuss the 'Charge Simulation Method' for solving Field Problems and estimation of   08
           potential distribution.

Q.3   a) Define Townsend's first and second ionization coefficients. How is the condition for   07
           breakdown obtained in a Townsend discharge?
        b) What is Paschen's law? Explain in details.   08

Q.4   a) Explain the different methods and means for purification of liquid dielectrics.   07
        b) What are the common liquid insulants used in an electrical apparatus? Briefly give their 08
           physical properties.

Q.5   a) Describe the mechanism of short-term breakdown of composite insulation.   07
        b) Explain the phenomenon 'treeing and tracking' in solid insulating materials under   08
           electrical stress. How does it lead to breakdown?

1

"SECTION-B"

Q.6   Solve any five.   10
   a) What are the advantages of CVT measurement in HVAC?
   b) What is Rogowski coil?
   c) List out the components of multistage impulse generator.
   d) Define impulse current.
   e) Draw the circuit diagram of capacitance potential divider.
   f) List out the different theories of charge formation in clouds.
   g) Define creepage distance.
   h) What is loss tangent?

Q.7   a) Describe with a neat sketch, the working of a Van de Graaff generator.   07
       b) What is a Tesla coil? How are damped high-frequency oscillations obtained from the Tesla   08
          coil?

Q.8   a) What is capacitance voltage transformer (CVT)? Explain with phasor diagram how a tuned   07
          CVT can be used for voltage measurements in power systems.
       b) Explain different methods of high current measurements with their relative merits and   08
          demerits.

Q.9   a) What are the causes for switching and power frequency overvoltages? How are they   07
          controlled in power systems?
       b) What is a surge arrestor? Explain its function as a shunt protective device.   08

Q.10   a) Explain the high-voltage Schering-bridge for capacitance measurement of insulators or   07
          bushings.
       b) Discuss the different electrical tests done on isolators and circuit breakers.   08

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-249
FACULTY OF SCIENCE AND TECHNOLOGY
B.E. (EEP/EE/EEE)
Elective-II: Electrical Power Quality
(REVISED)

[Time: Three Hours]   [Max.Marks: 80]

Please check whether you have got the right question paper.
N.B   1) Question one and six are compulsory.
             2) Solve any two questions from each section from remaining.

Section A

Q.1   Solve any five from the following:-   10

a) What is estimating sag performance.
b) What is DC offset.
c) Define votching.
d) What are general classification of P.Q. problems.
e) Noise control for Power Quality.
f) Define active; reactive and apparent power
g) Define sag & its causes.
h) What is wave distortion.

Q.2   a) Explain various types of PQ disturbances.   08

       b) Explain the impact of Power Quality.   07

Q.3   a) What is admissible voltage levels in Power Utility & how equipments has the ability to   07
          ride through capability.

       b) Why there is need for over voltage protection for various equipments in utility and   08
          facility system.

Q.4   a) Explain the evaluation procedure for Power Quality issues and How to locate the area   08
          of focus.

       b) What are the general causes of Harmonics in power system and impact on performance   07
          thereof.

Q.5   a) What is CBEM and ITIC curve. What is its importance. Explain ITIC curve of motor   07
          relay.

       b) Define Ferro-resonance. Explain how it is different from linear resonance.   08

1

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Section B

Q.6   Solve any five from the following:-   10

a) What is proactive monitoring.
b) Write reasons of degradation of reliability.
c) State objectives of P.Q.
d) Define reliability indices.
e) Write function of oscilloscope.
f) THD
g) TDD
h) Data Logger.

Q.7   a) Discuss the power Quality monitoring considerations used.   08

b) State the different power Quality instrument used for monitoring with their   07
fundamental application.

Q.8   a) Perform the modelling of non-linear loads by conventional sources and suggest 08
analysis methods for it.

b) Discuss the number of text locations for power quality measure.   07

Q.9   a) What are basic elements of a properly grounded electrical system.   07

b) Define SAIFI/ SAIDI reliability indices and explain how these are important in   08
monitoring.

Q.10   Write Short notes . (Any Three)   15

a) Flicker meters
b) Devices for voltage regulations in transmission network
c) IEEE 1159 std.
d) IEEE 519 std
e) Principles of Harmonic Suppression in Utility/Facility systems.

Total No. of Printed Pages:02

SUBJECT CODE NO: H-197
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (EEP/EE/EEE)
Microcontrollers & Applications
(OLD)

[Time: Three Hours]   [Max.Marks: 80]

Please check whether you have got the right question paper.

N.B   1) Solve three Questions from each section.
             2) Q.1 & Q.6 are compulsory.
             3) Assume suitable data if necessary.

Q.1   Solve :-   14
        i)   Explain the function of code segment of 8086 microprocessor.
        ii)   Explain the function of Queue in 8086 microprocessor.
        iii)   Define the control flags & explain interrupt enable flag.
        iv)   What is opcode & operand of an instruction?
        v)   In what way is the LCALL instruction differ from A CALL instruction.
        vi)   What are difference in execution of following instructions
                a) mov A, # 28H,
                b) mov A, 28H
        vii)   With example, explain the function of rotate instruction.

Q.2   a) Explain the features of 8086 microprocessor.   07

        b) Explain in detail generation of 20 – bit physical address of 8086 microprocessor.   06

Q.3   a) Explain different addressing modes of 8086 microprocessor.   07

        b) Write ALP to substract the content of two external memory locations 7400 H and 7401 H.   06
            store result at 7402H.

Q.4   a) Explain the program center & data pointer of 8051 microcontroller.   07

        b) Explain in detail port 0 function of 8051 microcontroller.   06

Q.5   Write a short note on (any three)

        i)   Overview of 8051 family.   05

        ii)   Data transfer instruction of 8051   04

        iii)   Comparison of microprocessor & microcontroller.   04

        iv)   I/O mapped I/O & memory mapped I/O   04

1

Q.6   Solve:-   14
a) Explain the function of ALE pin in 8051 microcontroller.

b) What is program and data memories of 8051 microcontroller.

c) Explain the Boolean processor 8051 microcontroller.

d) Does 8051 microcontroller support serial and parallel data transfer? How?

e) Explain the function of R × D & T × D PIN. Of 8051 microcontroller.

f) Explain how bit addressing is distinguished form byte addressing in 8051 microcontroller.

g) What is the function of interrupt control for 8051 microcontroller?

Q.7   a) Write a program to generate 50Hz frequency on pl06 bit. Use timer1.   07

b) Draw the interfacing of ADC 0808/0809 with microcontroller 8051. Analog signal is applied 06
at IN-3 of ADC. Write a program to read byte from IN-3 of ADC and store it at memory
location 1000H.

Q.8   a) Draw the interfacing of stepper motor with 8051 microcontroller. Write a program to rotate   07
the stepper motor in anticlockwise direction continuously by step angle of 1.8°.

b) It is required to interface 8 LEDS to 8051 microcontroller. Draw the interfacing diagram and 06
write a program to blink the LEDS on and off continuously. Use common cathode
configuration.

Q.9   a) Explain in detail interrupts of 8051 microcontroller.   07

b) Explain in detail TMOD Register of 8051 microcontroller.   06

Q.10   Write a short note on (any three)

1) Timer mode 0 of 8051 microcontroller.   04

2) Features of 8051 microcontroller.   05

3) Interfacing of seven segment display.   04

4) Serial interface of 8051   04

2

Total No. of Printed Pages:03

SUBJECT CODE NO:- H-209
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (EEP/EE/EEE)
Electrical Power Trans. and Distri.
(REVISED)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B
1) Solve any 2 questions from section A.
2) Solve any 2 questions from section B.
3) Q.1 and Q.6 are compulsory.

Section A

Q.1 Attempt any five questions. 10
a) Define string efficiency.
b) Classify transmission line on the basis of voltages.
c) Define load factor and demand factor.
d) Draw a single line diagram showing a typical distribution system.
e) Define Skin effect.
f) What is transposition of conductors? Define.
g) State any eight components of a transmission line.
h) Define tariff. List the different types of tariffs.

Q.2 a) Explain the requirement of an ideal distributing system. 05
b) Derive the expression for the flux linkages due to single current carrying conductor. 05
c) Explain any one method of improving string efficiency. 05

Q.3 a) A generating station has a maximum demand of 25 MW, a load factor of 60%, a plant 05
capacity factor of 50% and a plant use factor of 72%. Find:
a) Reserve capacity of the plant
b) The daily energy produced
c) Maximum energy that could be produced daily if the plants while running as per
schedule were fully loaded.
b) What are the different types of insulators? Write a note on pin type of insulator with a 05
neat sketch.
c) Show that in a string of suspension insulators, the disc nearest to the conductor has the 05
highest voltage across it.

Q.4 a) Compare EHVAC and HVDC transmission system. 05
b) Derive the expression for nominal T method. 05
c) In a 33 KV OHL, there are 03 units in a string of insulators. If the capacitance between 05
each insulator pin and earth is 11% of self-capacitance of each insulator, find:
a) The distribution of voltage over the three insulators
b) String efficiency

1

Q.5   Write short notes. Attempt any three.   15
   a) GMR and GMD
   b) Ferranti effect
   c) Ring main and radial distribution system
   d) Storage batteries in substation

Section B

Q.6   Attempt any five: 10
   a) What is a cable? State its necessity.
   b) State any two facts in underground cables.
   c) Why is the concept of self MD not applicable for capacitance?
   d) Compare the merits and demerits of underground system versus overhead system.
   e) State the effect of low P.F. on
        a. Efficiency of transmission line
        b. Regulation of transmission line
   f) What is the function of armouring and lead sheath in a cable?
   g) Write any four differences between nominal T and nominal π method.
   h) What is dielectric stress?

Q.7   a) Derive the expression for capacitance of 3 phase line with equilateral spacing   05
        b) State the values of generalized circuit constant ABCD in case of   05
        i.   T- equivalent circuit
        ii. π- Equivalent circuit of a medium transmission line.
        c) A single three phase line operated at 50Hz is arranged unequally as D_{12}=1.5m, D_{23}=3m,   05
        D_{31}=2.6m. The conductor diameter is 8mm and the line is regularly transposed.
        Determine the inductance & capacitance per KM.

Q.8   a) Using rigorous method, derive the expression for sending end voltage and current for a   05
        long transmission line.
        b) A single core cable for use on 11KV, 50Hz system has a conductor area of 0.645 Cm^2 05
        and internal diameter of the sheath is 2.18 cm. the permittivity of the dielectric used in
        the cable is 3.5. find:
                a) Maximum electrostatic stress in the cable
                b) Minimum electrostatic stress in the cable
                c) Capacitance of cable per km length
                d) Charging current
        c) Write a note on classification of cables.   05

Q.9   a) Draw a neat sketch of underground cable explain its construction.   05
        b) Discuss the various types of line supports.   05
        c) Explain with neat sketches the methods of laying underground cables in special locations. 05

2

Q.10   Write short notes: 15
   a) XLPE cable
   b) Methods of locating cable fault
   c) Calculation of sag at equal and unequal levels.

3

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-210
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (EEP/EE/EEE)
A.C. Machines
(OLD)

[Time: Three Hours]   [Max.Marks: 80]

Please check whether you have got the right question paper.

N.B
1. Question No.1 & 6 are compulsory.
2. Attempt from each section any two questions from remaining questions
3. Assume suitable data if required

Section A

Q.1   Solve any five   10
1) Define slip and write its expression
2) Why are induction motors called asynchronous?
3) State the necessity of starting in 3 phase induction motor & enlist the different starters used
4) Enlist various methods for speed control of an Induction motor
5) What is meant by single phasing?
6) Mention any two application of hysteresis motor
7) A 3 phase, 4 pole , 50H$_Z$, Im runs at 1400rpm. Determine its percentage slip

Q.2   a) Derive expression for Induction motor torque equation   07
        b) With neat diagram explain working of star delta starter for 3 phase induction motor. 08

Q.3   a) A 6 pole , 50 H$_Z$, 3 phase Im running on full load develops a useful torque of 150NM at a 08
           rotor frequency of 1.5H$_Z$, calculate shaft power output if the mechanical torque lost in
           friction be 10NM, determine
           i)   Rotor copper loss   b) input to the motor   c) efficiency where total stator loss is
                   700mw

        b) Explain in detail principle of operation of single phase inductor start induction run motor 07

Q.4   a) Draw phasor diagram of single phase induction motor with load & explain.   07
        b) Explain with diagram working of double cage induction motor   08

Q.5   Write short note on   15
1) AC servo motor
2) Hysteresis motor
3) Speed control of induction motor by supply frequency control method

1

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Section B

Q.6   Solve any five   10
     a) Draw equivalent circuit of synchronous motor
     b) Define hunting of synchronous motor
     c) What is meant by armature reaction of synchronous motor
     d) Why a 3 phase synchronous motor will always run at synchronous speed
     e) What is a exciter?
     f) What are losses that take place in synchronous generator
     g) Describe armature leakage reactance

Q.7   a) Derive emf equation of alternator   08
     b) Find value of Kd for an alternator with 9 slots per pole for following cases   07
       1) One winding in all slots
       2) One winding using only first 2/3 of the slots per pole
       3) Three equal windings placed sequentially in 60° group

Q.8   a) Explain voltage regulation by synchronous impedance method in synchronous generator   07
     b) Explain working principle of synchronous motor & write its application   08

Q.9   a) Explain effect of excitation on power factor in synchronous motor   07
     b) Explain in detail different torques of synchronous motor   08

Q.10   Write short note (any three)   15
     1) Power angle equation
     2) Methods of synchronizing alternator
     3) Describe synchronous condenser
     4) V curves

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-175
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (EEP/EE/EEE)
Electrical Power Transmission & Dist.
(OLD)

[Time: Three Hours]   **[Max.Marks: 80]**

Please check whether you have got the right question paper.

N.B   i.   Q.No.1 and Q.No.6 are compulsory.
            ii.   Answer any two questions from Q.no2 to Q.no 5 from section A.
            iii.   Answer any two questions from Q.no 7 to Q.no 10 from section B.

<u>Section -A</u>

Q.1   Attempt any five.   10
            A. Classify transmission line on the basis of voltages.
            B. Draw a single line diagram showing a typical distribution system.
            C. State any eight components of transmission line.
            D. What is interconnected system of distributing?
            E. Define tariff. List different types of tariffs.
            F. Define the minimum demand & demand factor.
            G. List the major electrical equipments in transmission substation.

Q.2   A. What are surge arresters? Where & why do we use these equipment.   05
            B. Compare EHVAC and HVDC transmission system   05
            C. Explain any two types of A.C. distribution system.   05

Q.3   A. Explain what is GMR and GMD.   05
            B. Derive an expression for loop inductance of a single phase line   05
            C. A short three phase overhead transmission line with independence per phase 5+j20-2,   05
            When sending end and receiving end voltages are 46.85 Kv & 33Kv respectively. At 0.8
            pf lagging. Calculate voltage regulation and transmission efficiency.

Q.4   A. A single phase transmission line has two parallel conductors 3m apart ,the radius of cash   05
            conductor being 1 cm .calculate the loop inductance per km length of the line of the
            material of the conductor is
                 i)   Cooper.
                 ii)   Steel with relative permeability of 100.

            B. What is skin effect? Why is it absent in the D.C system? Explain.   05
            C. Find an expression for the flux linkages due to single current carrying conductor. 05

Q.5   Write short note on   15
            i.   Types of insulators
            ii.   Method of improving string efficiency
            iii.   Ring mains and radio distribution.

1

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Section -B

Q.6   Attempt any five: 10
        a) What is meant by transposition of conductor explain with neat sketch.
        b) State two assumption made while drawing equivalent circuits of nominal T network of medium transmission line
        c) What is effect of capacitance on transmission line
        d) What is mean by short, medium and long transmission line
        e) State any two faults in under- ground cable
        f) What is main purpose of armoring
        g) What is concept of self EMD is not applicable for capacitance
        h) What are ABCD constants

Q.7   A) Draw equivalent circuit and vector diagram for medium transmission line –state   05
        assumptions made
      B) What is corona? What are the factors affecting it?   05
      C) A tree phase 50 Hz, 132kv, over-head line has conductors place in horizontal plane 4.56   05
      meter a part conductor dia is 22.4mm. If line length is 100 kms. Calculate the charging
      current per phase. Assuming complete transposition & capacitance per KM.

Q.8   A) Derive the expression for capacitance of single-phase with earth effect & without earth   05
      effect.
      B) What is the effect of load pioneer factor on regulation &efficiency of a transmission line? 05
      Explain.
      C) State the values of generalized circuit constant of A,B,C&D in case of   05
        i) T-equivalent circuit
        ii) TT equivalent CKT of medium transmission line

Q.9
      A. Discuss the various types of line supports   05
      B. Explain any four factors affecting corona   05
      C. Discuss the suitability of various types of overhead lines.   05

Q.10   Write a short notes on any <u>three:</u>   15

      A   grading of cables
      B   XLPE cables
      C   ABCD parameters
      D   Circuit breaker & Insulator

Total No. of Printed Pages:04

SUBJECT CODE NO:- H-140
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (EEP/EE/EEE)
Network Analysis
(OLD)

[Time: Three Hours]   [Max. Marks: 80]

Please check whether you have got the right question paper.

N.B   i) Q. No. 1 from Section A & Q.No.6 from Section B are compulsory.
               ii) Attempt any two questions from the remaining questions in each section.
               iii) Assume suitable data, if necessary.

Section A

Q.1   Solve any five.   10
          1. Write the features of Laplace transform.
          2. State the superposition theorem.
          3. Define convolution integral
          4. Define & explain characteristics of unit step & ramp function.
          5. Determine the initial value $F(O^+)$ if $F(s) = \frac{2(s+1)}{s^2+2s+5}$ by using final value theorem.
          6. Define duality of a network.
          7. Define
             1) Bilateral network.
             2) Unilateral network
          8. What is super mesh?

Q.2   a. Explain in detail the nodal analysis with an example.   07

          b. Find mesh currents I_1 & I_2 in the network of fig 1.   08

Fig. 1

1

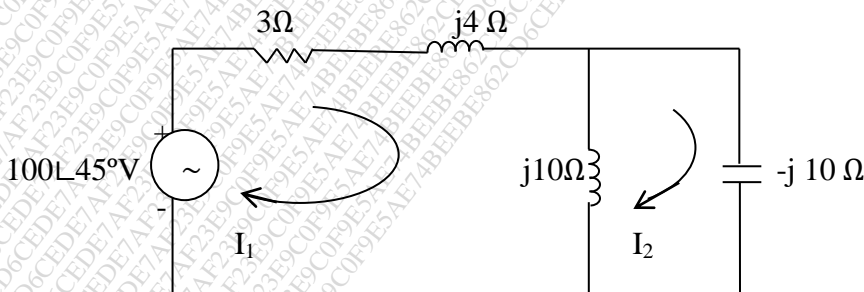Q.3   a. Obtain Thevenins equivalent network for the fig.2   07
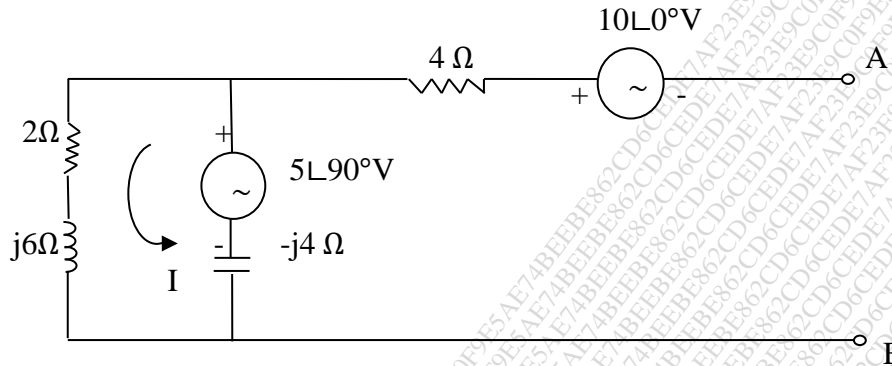

Fig. 2

b. Determine the voltage across the $(2 + j5)\Omega$ impedance. For the network shown in fig.3.   08
   Using Superposition theorem.
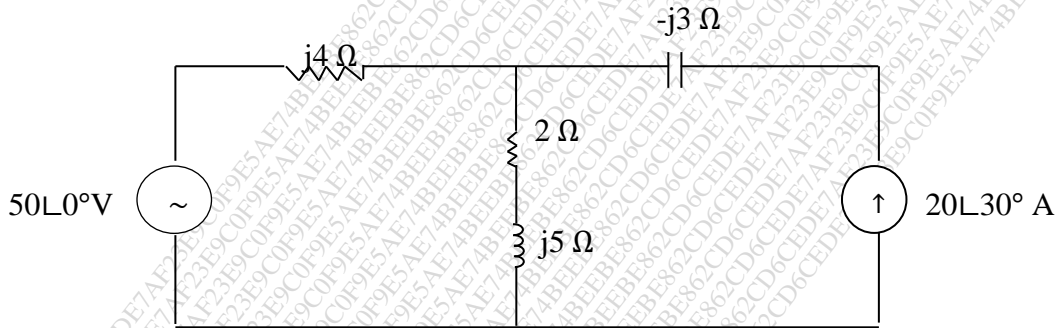
fig. 3

Q.4   a) State & prove millman's theorem.   07

       b) Find the voltage across 5Ω resistor using Mesh analysis. For fig.4.   08

Fig.4

2
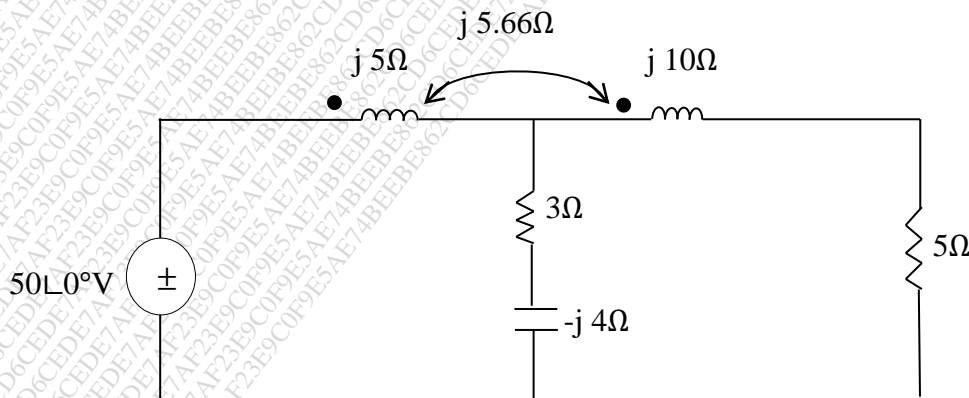
Q.5   a) Find the Laplace transform for the function in fig.5.   07
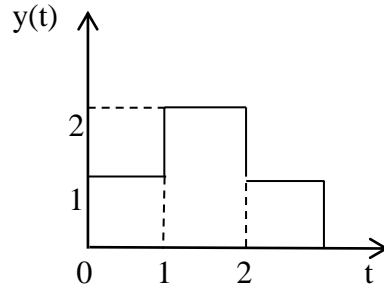
fig. 5

b) Find the Laplace transform for the non-periodic function in fig.6.   08
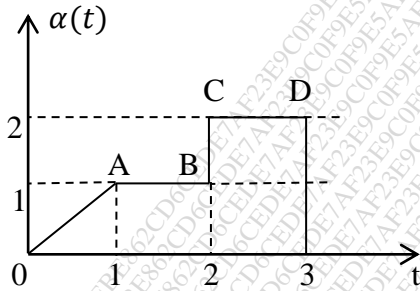
fig. 6

Section B

Q.6   Solve <u>any five</u>:-   10

a) What is a two port network?
b) Write the Y parameters for the two port network.
c) Write Z parameters in terms of Y parameters.
d) What is Fourier series? What are the applications of Fourier transform.
e) State the Dirichlet's conditions.
f) Define insertion loss.
g) Prove that AD-BC =1, where ABC & n are transmission parameters.
h) Define odd & even symmetry of the wave form.

Q.7   a) State all the instructions on pole zero locations for transfer function.   07

b) Determine z(s) in the network shown in fig.7 find out poles & zero's of z(s) & plot them   08
    on S-plane.

Fig. 7

3
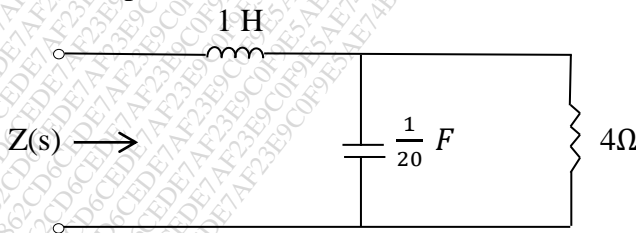
Q.8   a)   Find the transmission parameters for the network shown in fig. 8.   08
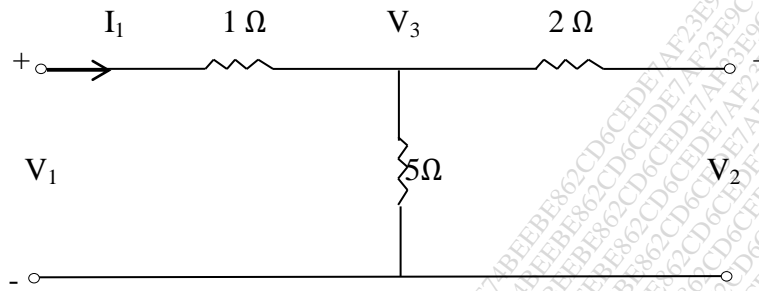
Fig.8

     b)   Explain in detail the conversion of Z parameters into Y parameters.   07

Q.9   a)   Explain in detail the concept of even and odd functions.   07

     b)   For the given network function draw pole zero plot & obtain time response i(t).   08

$$I(S) = \frac{2S}{(S+1)(S+2)}$$

Q.10   Write short note on the following:-   15

     a)   Steady state response to periodic signals.
     b)   Problems in optimizing power transfer.
     c)   Stability of active networks.

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-107
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (EEP/EE/EEE)
Electrical Machine Design
(REVISED)

[Time: Three Hours]   [Max.Marks: 80]

Please check whether you have got the right question paper.

N.B   1. Q.No.1 and Q.No.6 are compulsory.
       2. Attempt any two questions from Q.No.2 to Q.No.5.
       3. Attempt any two questions from Q.No.7 to Q.No.10.
       4. Assume suitable data wherever necessary.

Section -A

Q.1   Attempt any five: 10
       a) Define real and apparent flux density.
       b) What do you mean by Gap contraction factor?
       c) Explain the significance of carter's coefficient.
       d) Explain the magnetic leakage & fringing.
       e) Explain Simpson's rule to find mmf for teeth.
       f) Explain the specific magnetic loading & specific electric loading.
       g) Give the purpose of conservator & breather in transformer.
       h) Where and how core loss occurs in electrical machines.

Q.2   a) What are the factors governing the design of electrical machine.   07
       b) What are the limitations in electrical machine design and enlist its factors also.   08

Q.3   a) Explain in detail various factors for choice of stator slots in induction motor.   07
       b) Determine the apparent flux density in the teeth of D.C machine when the real flux density is 08
           2.15 wb/m^2. Slot pitch 28mm slot width 10mm & gross core length 0.35m. The no of
           ventilating ducts is 4, each 10mm wide. The magnetic force for the flux density of 2.15 wb/m^2
           is 55000 A/m. the iron staking factor is 0.9.

Q.4   a) Explain the thermal circuit for electrical machine.   08
       b) Design 50kw, 4 pole, 6000 rpm dc shunt generator, whose full load terminal voltage = 220V 07
           if $B_{max} = 0.83\ wb/m^2$ for gap and ac per meter = 30,000. Then calculate suitable
           dimensions of armature core of square pole face. Assume armature voltage drop = 3% of Vt
           & ratio of pole arc to pole pitch = 0.67.

Q.5   Attempt any three   15
       a) Modern trend in electrical machine design
       b) Design of end ring 3ph induction motor
       c) Window space factor.
       d) Calculations of mmf for iron path.

1

Section -B

Q.6   Attempt any five: 10

      a) Define heating time constant & cooling time constant.
      b) Distribution transformer & power transformer. Give two comparisons.
      c) Enlist the various losses in transformer.
      d) Explain the causes of temperature rise in transformer.
      e) List out the method of cooling of transformer.
      f) List out the advantages of stepped core of transformer.
      g) What are the factors to be considered in design of rotating machine?
      h) Cogging and crawling of induction motor.

Q.7   a) For a transformer show that emf per turn E_t is given as $E_t = K\sqrt{Q}$.   07
      b) State the methods of cooling used for dry and oil immersed type of transformer   08

Q.8   a) Explain in detail the steps for determination of main dimensions for core, window & yoke.   07

      b) Calculate the core and window area required for 1000 KVA, 6600/400V, 50Hz single phase   08
      core type transformer. Assume max flux density of 1.2 wb/m^2 & current density of 2.5
      A/mm^2. Voltage per turn =30 volts & window space factor =0.32.

Q.9   a) Explain the various force in transformer under short ckt condition.   07

      b) A 3ph, 50 Hz, oil immersed core type transformer has following dimensions.   08
      Distance between core centres = 0.2m
      Height of window = 0.24m
      Dia of circumscribing circle =0.14m
      $B_M = 1.25\ wb/m^2$, $\delta = 2.5\ A/mm^2$. Estimate the KVA rating. Assume $K_w = 0.2$, $At = 0.56\ d^2$ 2 stepped core.

Q.10 Attempt any three.   15
      a) Design of choke coil
      b) Explain evaluation of resistance in transformer.
      c) What are the components of no-load current in transformer
      d) Necessity of cooling tubes in transformer tank.

Total No. of Printed Pages:3

SUBJECT CODE NO:- H-318
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (EEP/EE/EEE)
Electromagnetic Fields
(OLD)

[Time: Three Hours]   [Max.Marks:80]

Please check whether you have got the right question paper.

N.B   1. Q.No.1 & Q.No.6 are compulsory.
           2. Attempt any two questions from Q.No.2 to Q.No.5.
           3. Attempt any two questions from Q.No.7 to Q.No.10.
           4. Assume suitable data wherever necessary.

Section A

Q.1   Attempt any five: 10
   i)   Define scalar and vector field? Give its two examples.
   ii)   State continuity equation of current in integral and differential form.
   iii)   Define electric potential. Write down the relation between potential and electric field.

   iv)   A charge of $4\mu c$ located at the centre of sphere of radius 6 cm. what is the flux passing through the sphere.

   v)   Two vectors are represented by
          $\overline{A} = 2ax + 2ay - 2az$
          $\overline{B} = 3ax + 4ay - 6az$
          Find $\bar{A} \times \bar{B}$
   vi)   Define the term gradient.
   vii)   Give the expressions of differential vector length in Cartesian and spherical co-ordinate system.

   viii) Define dipole moment and state its unit.

Q.2   a) Derive the expression for electric field intensity due to infinite sheet of charge located in $x = 0$ plane.   07

         b) Transfer vector $A = 8ax - 6ay - 2az$ to cylindrical co-ordinate at the point (4, 6, 9)   08

Q.3   a) State and explain divergence theorem.   06

         b) Let $D = \frac{0.1\,cos\theta}{r}\, a\theta\; c/m^2$. Within the truncated cone defined by   09
             $2 \le r \le 5, 0 \le \theta \le \frac{\pi}{4}, 0 \le \emptyset \le 2\pi$. Determine total charge within the conical region by evaluating both the sides of divergence theorem.

1

Q.4   a) Derive the expression for potential and electric field due to electric dipole.   07

     b) Given the potential field   08
$V = 80\ r^2\ cos\theta$ and a point $P(2.5, 30^0, 60^0)$ in free space find at point P.
     i)   V
     ii) $\overline{E}$
     iii) $\overline{D}$

Q.5   a) Derive the point form of continuity equation of current.   07

     b) The vector current density is given by $j = \left(\frac{4}{r^2}\right) \cos\theta\ ar + 20e^{-2r} \sin\theta\ a\theta -$ 08
$r \sin\theta \cos\emptyset\ a\emptyset$ find.
     i)   J at $(3, 0^0, \pi^0)$
     ii)   Find the total current passing through the spherical cap
        $r = 3, 0 \leq \theta \leq 20^0, 0 \leq \emptyset \leq 2\pi$

Section B

Q.6   Attempt any five: 10
     i)   State Amperes circuital law.
     ii)   State faraday's law of electromagnetic induction.
     iii)   What do you mean by displacement current density?
     iv)   Define magnetic dipole and dipole moment.
     v)   What are the properties of perfect metallic conductor?
     vi)   What do you mean by capacitance? Write the expression for capacitance of parallel plate capacitor.
     vii)   Define polarization in dielectric.
     viii)   Define self and mutual inductance.

Q.7   a) Show that tangential component of electric field and normal component of flux densities   07
are continuous at the boundary between two dielectrics.

     b) A current element $I\Delta l = 2\pi(0.6ax - 0.8\ ay)\mu A$ is situated at point (4, -2, 3) find the   08
incremental field ΔH at point (1, 3, 2)

Q.8   a) For steady magnetic field show that Curl H =J.   07

     b) Given the field $H = 20\varsigma^2 a\emptyset\ A/m$ 08
     i)   Determine the current density J
     ii)   Integral J over the circular surface $\varsigma = 1$ $0 \leq \emptyset \leq 2\pi,\ z = 0$ to determine the current passing through surface in az direction.

2

Q.9   a) For time varying field show that   07

$$\nabla \times E = -\frac{\partial B}{\partial t}$$

b) Derive the boundary conditions on B & H at the interface of two different magnetic   08
materials.

Q.10   Attempt any three   15
      i)   Maxwell's equations in point form
      ii)   Biot savart law
      iii)   Stokes theorem
      iv)   Vector magnetic potential
      v)   Polarization in dielectric material

3

Total No. of Printed Pages:3

SUBJECT CODE NO:- H-307
FACULTY OF SCIENCE AND TECHNOLOGY
B.E. (EEP/EE/EEE)
Electrical Drives
(REVISED)

[Time: Three Hours]   [Max.Marks: 80]

Please check whether you have got the right question paper.

N.B
1) Q.1 and Q.6 are compulsory.
2) Solve any two questions from Q.2 to Q.5 and any two questions from Q.7 to Q.10.
3) Assume suitable data if required.

Section A

Q.1   Attempt any Five.   10
   a) What are drives and electrical drives.
   b) Mention the motors commonly used in electrical drives.
   c) What are the disadvantages of electric drives?
   d) What are the three components of Load torque?
   e) What is braking in DC motor drive? Mention its types.
   f) What are the drawbacks of rectifier fed dc drives.

Q.2   a) Explain the multiquadrant operation of an electric motor driving a hoist load.   08
        b) What are the advantages of closed loop control of drives and explain current limit   07
           control with block diagram.

Q.3   a) Derive the expression to find the equivalent load torque and equivalent inertia of loads 08
           in translational and rotational motion.
        b) The drive has the following parameters $T=150-0.1N$, N-m, where N is the speed in   07
           rpm.
           Load Torque $T_1=100$, N-m. Initially the drive is operating in steady state. The
           characteristics of the load torque are changed to $T_1=-100$, N-m. Calculate initial and
           final equilibrium speeds.

Q.4   a) Explain the operation of single phase fully controlled rectifier fed separately excited 07
           DC motor for continuous conduction.
        b) A 220v, 1500rpm, 10A separately excited d.c. motor is fed from a single phase fully   08
           controlled rectifier with an a.c source voltage of 230V, 50Hz, $R_a=2\Omega$. Conduction can
           be assumed to be continuous. Calculate firing angles for
           i.   Half the rated Motor torque and 500rpm.
           ii.   Rated Motor torque and (-1000) rpm.

1

H-307

Q.5   Write short notes.
      a) Chopper Fed dc drives.   05
      b) Recent trends in D.C. drive control.   05
      c) Industrial application of D.C. Motor drive.   05

Section B

Q.6   Attempt any Five.   10
      a) Why the control of a three-phase induction motor is more difficult than D.C. motor.
      b) What is meant by V/F control?
      c) For which applications the stator voltage control method is suitable.
      d) What is Slip power recovery scheme?
      e) What are the advantages of brushless D.C. motor?
      f) Give some applications of load-commutated inverter fed synchronous motor drive.

Q.7   a) Explain using a power circuit how the speed of Induction motor drive can be controlled 07
       by using voltage source Inverter.
    b) Explain using power circuit the working of a static Kramer drive system.   08

Q.8   a) Explain in detail true synchronous mode and self-control mode for variable frequency 07
       control of synchronous motor.
    b) A 2.8kw, 400v, 50Hz, 4pole, 1370rpm, delta connected squirrel Cage Induction motor 08
       has the following parameters referred to the stator.

$$R_s = 2\Omega, R_r' = 5\Omega, X_s = X_r' = 5\Omega, X_m = 80\Omega.$$

Motor speed is controlled by stator voltage control. When driving a fan load it runs at
rated speed at rated voltage. Calculate
      i.   Motor terminal voltage.
      ii.   Motor current.
      iii. Motor Torque.
          For motor speed of 1200rpm.

Q.9   a) Explain in detail, why the load commutated inverter fed synchronous motor drive is 07
       found suitable for high power applications.
    b) A 20kw, 3phase, 440v, 4pole, delta connected permanent magnet synchronous motor 08
       has following parameters.
$X_s = 5\Omega, R_s = 0\Omega,$ Rated p.f.=1.0 machine is controlled by variable frequency control
at a constant (V/F) ratio. Calculate
      i.   Armature current.
      ii.   Torque angle.
      iii. Power factor.
          For half full load torque and 750rpm.

Q.10   Write short notes.
            a) V/F control of Induction Motor Drive.   05
            b) Industrial Applications of A.C.drives.   05
            c) Brushless d.c.motor drives.   05

Total No. of Printed Pages:02

SUBJECT CODE NO: H-282
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (EEP/EE/EEE)
Analog & Digital Circuits
(OLD)

[Time: Three Hours]   [Max.Marks:80]

Please check whether you have got the right question paper.

N.B
      i) <u>Question No.1 and Q.No.6 are compulsory</u>.
      ii) Attempt from each section <u>any two</u> questions <u>from the remaining questions</u>.
      iii) Assume suitable data where necessary.
      iv) Figures to the right indicate full mark.

Section A

Q.1   Answer <u>any five.</u>   10
      A. What is Schmitt trigger?
      B. List applications of comparator.
      C. Draw the circuit diagram of integrator.
      D. Define Slew rate of op amp.
      E. Define biasing BJT.
      F. Define Load Line.
      G. Draw the input characteristics of common base mode and define its output resistance.

Q.2   A) Draw the circuit diagram of first order low – pass filter and explain the operation.   08
    B) With the neat diagram explain the working of two-stage Rc-coupled amplifier.   07

Q.3   A) A certain transistor has $\alpha = 0.98$, $IC = 5\mu A$ and $IB = 100\mu A$. Find the values of β and 07
      emitter currents.
    B) Describe the ideal characteristics of op-amp.   08

Q.4   A) Explain mono stable Multivibrator using IC555.   07
    B) With the neat diagram explain the class B push. Pull amplifier?   08

Q.5   Write short note on (<u>any three</u>)   15
      I.   78XX IC
     II.   FET Characteristics
    III.   V to I convertor
    IV.   Op amp as differentiator

1

Section B

Q.6　Answer <u>any five</u>　　　　　　　　　　　　　　　　　　　　　　　　　　　10
  A.　Realizing using logic gates given Boolean function. $y = ABC + B\bar{C}D + \bar{A}BC$.
  B.　Give the truth table and graphic symbol of D-flip-flop.
  C.　Convert following from gray to binary. (110110)
  D.　Convert hexadecimal no. AFC.25 into octal no. Define biasing BJT.
  E.　Find 2's compliment of $(11001100)_2$
  F.　Define shift registers.
  G.　What are logic gates?

Q.7　A)　With the help of neat sketch explain 8:1 multiplexer with truth table.　　08
  B)　Explain the operation of 4 bit binary counter with neat diagram.　　　07

Q.8　A)　Explain the operation of PROMS and EPROMS.　　　　　　　　　　07
  B)　What are the advantages and disadvantages of Dual slope ADC? Comment on their major　08
   applications.

Q.9　A)　Construct AND, OR and NOT logic using NOR gate.　　　　　　　　07
  B)　Explain edge triggered J K Flip-flop in detail.　　　　　　　　　　08

Q.10　Write short note on (<u>any three</u>)　　　　　　　　　　　　　　　　　15
  I.　　J-K master slave F-F
  II.　　N-module counters
  III.　　ADC and DAC
  IV.　　Sop and pos form

Total No. of Printed Pages:2
SUBJECT CODE NO:- H-289
FACULTY OF SCIENCE AND TECHNOLOGY
B.E. (EEP/EE/EEE)
Elective-II: Control System – II
(REVISED)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.
N.B
      1. Q. No. 1 and Q. No.6 are compulsory.
      2. Attempt any Two questions from remaining Section A & Section B.

Q.1   Answer any five.   10
    a. Explain state transition matrix?
    b. What is meant by diagonalization ?
    c. Write the properties of state transition matrix.
    d. What is state observer?
    e. What are the merits and demerits of sampled data control systems?
    f. Write the state model of nth order system.

Q.2   a) For a given matrix   08

$$A = \begin{bmatrix} 0 & 2 & 0 \\ 4 & 0 & 1 \\ -48 & -34 & -9 \end{bmatrix}$$

Determine
    a) Characteristic equation
    b) Eigen value
    c) Eigen vector

    b) Describe Krasovskkis method and variable gradient method of constructing Lyapunov 07
    function

Q.3   a) Obtain Eigen value, Eigen vector and Model matrix for the matrix. 08

$$A = \begin{bmatrix} 4 & 0 & 0 \\ -2 & 1 & 0 \\ 5 & 3 & 4 \end{bmatrix}$$

    b) What is the effect of pole placement by state feedback? 07

Q.4   a) Enumerate basic elements of a digital control system and show the diagram representation 08
    of such a system. Also discuss briefly about it.

    b) Define stability of a digital control system and discuss how is Jury-stability criterion applied 07
    for stability investigation for such systems.

1

Q.5   Write short note on   15
        a) Necessary and sufficient conditions for arbitrary pole placement.
        b) State Regulator Design.
        c) Need of Digital Control System

Q.6   Answer any Five   10

        a) What is Saturation?
        b) Differentiate classical and fuzzy set.
        c) List the properties of crisp sets?
        d) Define fuzzification?
        e) List the fuzzy set operations?
        f) What is meant by feedback network?

Q.7   (a) Explain in detail common physical non Linearities.   08
        (b) State Lyapunov's stability theorem.   07

Q.8   (a) Explain Biological Neuron Model and compare it with artificial neural network.   08
        (b) Explain supervised an unsupervised Learning.   07

Q.9   15

Using perceptron learning rule updates the weights for $W_1 = \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}$ and the input

vectors as below $\times_1 = \begin{bmatrix} 2 \\ 1 \\ -1 \end{bmatrix}$; $\times_2 = \begin{bmatrix} 0 \\ -1 \\ -1 \end{bmatrix}$

use c=1, d_1=-1, d_2=1 and f(net)=sgn(net)

Q.10   Answer any THREE   15

        a) Jump Resonance
        b) Fuzzy set Theory and operations
        c) Different types of activation function.

2

Total No. of Printed Pages:2

SUBJECT CODE NO: H-297
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (EEP/EE/EEE)
Special Purpose Electrical Machines
(OLD)

[Time: Three Hours]   [Max.Marks:80]

Please check whether you have got the right question paper.

N.B   i) Q 1 & Q 6 are compulsory.
              ii) Solve any two questions from remaining questions.

Section A

Q.1   Solve any five.   10
        a) List applications for synchronous reluctance motor.

        b) Write two applications of LIM.

        c) Define stepping angle.

        d) Draw equivalent circuit of self excited induction generator.

        e)   Give the difference between single stack & multi stack stepping motor.

        f) What is meant by "Axial Air gap"?

        g) Why the induction generator is often called as an asynchronous generator?

        h) What is the maximum available power rating of any FHP motor?

Q.2   a) Justify the statement "BLDC motor is called as Electronically commutated motor".   08
        b) Explain different methods of voltage control in induction generator.   07

Q.3   a) Explain application of induction generator for mini & micro hydel system with neat sketch. 07
        b) Describe construction & working of Linear Induction Motor.   08

Q.4   a) Explain construction, working & application of PMSM.   07
        b) Explain construction & working of hybrid stepper in detail.   08

Q.5   a) Explain self-excitation requirement in case of induction generator.   08
        b) Give comparative study of axial & radial air gap synchronous reluctance motor.   07

1

H-297

Section B

Q.6   Solve <u>any five.</u>   10
a) Write two ways of extraction of metal.

b) What is ARC Blow?

c) Write four applications of resistance oven.

d) Give the reasons for failure of heating element.

e) Name two gases used in MIG welding.

f) State faradays first law of Electrolysis.

g) Define convection of heat.

h) List out types of welding equipment.

Q.7   a) Explain different methods of induction heating with applications.   08
b) What is dielectric heating? Explain the factors on which dielectric loss depends.   07

Q.8   a) Explain the factors affecting electro-deposition.   08
b) Describe in detail application of electrolytic process used for metal extraction.   07

Q.9   a) Explain construction, working & applications of welding transformers in detail.   07
b) Give the classification of welding processes. Explain spot welding in detail.   08

Q.10   a) Write the process of induction heating & give example of its applications also draw a   08
sketch of process execution.
b) Explain construction working & application of rectifier transformer in detail.   07

Total No. of Printed Pages:02

SUBJECT CODE NO: H-250
FACULTY OF SCIENCE AND TECHNOLOGY
B.E. (EEP/EE/EEE)
Elective-II: Electric Traction & Utilization
(REVISED)

[Time: Three Hours]   **[Max. Marks: 80]**

Please check whether you have got the right question paper.

N.B
- i) Q. 1 & Q. 6 are compulsory
- ii) Solve any two from section A & B excluding compulsory questions
- iii) Assume suitable data

Section A

Q.1   Attempt any five   10
- a) Define traction
- b) Give the function of flywheel
- c) Give the function of SCR
- d) Define sag and tension
- e) Give the principle of DC generator
- f) Give the function of current collectors
- g) Give the difference between DC generator and DC motor
- h) Draw the block diagram of AC electric locomotive

Q.2   a) Explain hybrid drive system   08
        b) Explain single phase high frequency AC system   07

Q.3   a) Explain working principle of linear-induction motor   08
        b) Explain signaling interference in telecommunication circuits   07

Q.4   a) Explain feeding and distributing system   08
        b) Give the difference between electrical and mechanical breaking system 07

Q.5   a) Write a short note on characteristics of traction motors   08
        b) Write a short note on choice traction system   07

Section B

Q.6   Attempt any five   10
- a) Define duty cycle
- b) What is regeneration
- c) What are the factors affecting electric traction motor speed
- d) What are the different components of substation
- e) What are the different types of controllers
- f) What is the use of Metadyne
- g) Give the function of braking
- h) What is the use of interlocks

1

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Q.7	a)	Explain schedule speed and factors affecting it.	08
	b)	Explain master controllers	07
Q.8	a)	Explain room air conditioners.	08
	b)	Explain magnetic track braking system?	07
Q.9	a)	Explain Rheostatic braking system?	08
	b)	Explain water cooler system	07
Q.10	a)	Write a short note on average acceleration and speed	08
	b)	Write a short note on multiple unit control?	07

2

Total No. of Printed Pages:02
SUBJECT CODE NO:- H-251
FACULTY OF SCIENCE AND TECHNOLOGY
B.E. (EEP/EE/EEE)
Elective-II: Electrical System Planning & Design
(REVISED)

[Time: Three Hours]   [Max.Marks: 80]

Please check whether you have got the right question paper.
N.B   i) Answer to the sections must be written in same answer book.
                      ii) Question no 1 and questions 6 are compulsory
                      iii) Attempt any two questions from remaining question of each section.

Section A

Q.1   Solve <u>any five</u> question   10
          a)   What are the needs of electrical symbols as per ISI?
          b)   Give the difference between joint box system and looping in system.
          c)   Define the following a) wiring diagram   b) Circuit diagram
          d)   Give the difference between ground, neutral and earth wire.
          e)   Enlist the points to be considered for installations of fittings
          f)   Define luminous intensity and luminous fluid.
          g)   What are main types of light source?

Q.2   a) Explain electrical diagrams according to their system of representing.   08
          b) Give brief Explanations of alarm circuit with relays and without relays.   07

Q.3   a) Explain the general requirements of Earthing.   08
          b) Explain the process of testing of electrical installations.   07

Q.4   a) Explain with aid of a circuit diagram the operation of a sodium vapour lamp.   08
          b) An illumination of 50 lux is to be produced on the floor of a room 12m × 9m. 36 lamps are 07
              required to produce this illumination in the room, if 50% of emitted light falls on the floor.
              What is power of the lamp in candela?

Q.5   Write short note on
          a) Laws if illumination   05
          b) Advantages of CT_S and PT_S 05
          c) State meaning of following term.   05
              1) Maintenance factor
              2) Coefficient of utilizations

1

Section B

Q.6 Answer any five questions   10
  a) List out the types of substations.
  b) How to calculate the labor cost for the electrical installations?
  c) Give the details of HT and LT metering.
  d) Define No and NC contacts.
  e) What are PFC and APFC?
  f) Define ferruling in electrical system planning and why this is useful.
  g) Define inter locking where it is required.

Q.7 a) Estimate the quantity of material required for the erection of a 200 KVA pole mounting   08
      substations.
  b) An outdoor pole mounted 11 KV/ 415 V substations has to be installed for supply to   07
      residential area having a load of 63 KVA. Estimate the quantity of material required.

Q.8 a) Explain the general requirements of electrical installation in small industries.   08
  b) Write a short note on sub circuits.   07

Q.9 a) With neat diagram explain the manual star / delta starter.   08
  b) Explain in brief for overload relays, push-buttons, contractors and fuses for motor control   07
      circuit.

Q.10 Write short note on
  a) Limit switches and float switches and their uses.   05
  b) Jogging or Inching circuit for 3- Ø induction motor and its application.   05
  c) Auxiliary contact inter locking?   05

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-269
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (EEP/EE/EEE)
Energy Conservation & Audit
(OLD)

[Time: Three Hours]   [Max. Marks:80]

Please check whether you have got the right question paper.
N.B   i) Q.1 and Q.6 are compulsory.
               ii) Attempt any two questions from remaining questions from each section.

Section A

Q.1   Solve any five   10
       i.   Define ton of refrigeration.
       ii.   State second law of thermodynamic.
       iii.   How to measure air velocity & air flow in a duct?
       iv.   What is evaporation ratio in case of steam boiler?
       v.   Draw schematic diagram for bottoming cycle of cogeneration.
       vi.   What is meant by global warming potential?
       vii.   Write the applications for bottoming cycle.
       viii. Define energy Audit.

Q.2   a. Explain ten step methodologies for detailed energy audit.   08
       b. Explain important features of energy conservation act 2001.   07

Q.3   a. List out energy conservation opportunities in boiler plant of TPS?   07
       b. What is cogeneration? With the help of diagram explain back pressure turbine cogeneration   08
           system.

Q.4   a. Write the procedure to carry out energy audit of compressed air system.   07
       b. Explain "affinity laws" applicable to pumping system. List energy conservation opportunities   08
           in pumping system in industry.

Q.5   Write note (any 3)   15
       i.   Energy performance assessment of HVAC & refrigeration system.
       ii.   Emission trading.
       iii.   KYoTo protocol.
       iv.   Role of renewable energy management of a nation.

1

Section B

Q.6   Solve any five   10
- i.   What are different methods of financial evaluation?
- ii.   What is PI?
- iii.   What is power factor? How to improve it.
- iv.   What is meant by TOD tariff?
- v.   What is OSM?
- vi.   Define room index for lighting systems.
- vii.   Define harmonics.
- viii.   List out energy efficient devices.

Q.7   a.   Explain simple payback period mention its advantages and disadvantages.   08
      b.   Explain in detail importance of power factor in energy conservation program.   07

Q.8   a.   Explain working of APFC Panel & energy efficient transformers.   08
      b.   Explain the terms:- IRR, PI of sensitivity analysis.   07

Q.9   c.   Explain in detail the procedure carried out for energy audit for cement industry.   07
      a.   Explain the detailed procedure for carrying out energy audit for the textile industry.   08

Q.10   Write short notes on (any 3)   15
- i.   Soft starter.
- ii.   T&D losses, harmonics.
- iii.   Electricity act 2003.
- iv.   Energy efficient motors.

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Total No. of Printed Pages:2

SUBJECT CODE NO:- H-187
FACULTY OF SCIENCE AND TECHNOLOGY
B.E. (EEP/EE/EEE)
Renewable Energy
(REVISED)

[Time: Three Hours]   [Max.Marks: 80]

Please check whether you have got the right question paper.
N.B   i) Q.No.1 from section A and Q.No.6 from section B are compulsory.
             ii) Attempt any two questions from the remaining questions in each section
             iii) Assume suitable data, if necessary.

Section A

Q.1   Solve any five.   10

        a) List any two conventional sources of energy.
        b) Define tilt angle.
        c) What is solar constant ? state it.
        d) How solar cells are connected in solar panels. Why?
        e) What are the limitations of solar energy?
        f) Explain construction of solar cell
        g) Give the classification of energy resources.

Q.2   a) Distinguish between renewable and non-renewable sources of energy   07
        b) Define solar radiation and explain in details measurement of solar radiation.   08

Q.3   a) Write a short note on historical development of wind power.   08
        b) Describe vertical axis wind turbine machine.   07

Q.4   a) What are fuel cells? Describe electrical characteristics of fuel cells   08
        b) What is thermionic converter? Explain in detail.   07

Q.5   a) Explain the principle of photovoltaic cell. Draw v1 characteristics of solar cell.   08
        b) Explain the concept of active &passive heating of buildings.   07

1

Section B

Q.6   Solve any five.   10

     a) What is geothermal resource?
     b) Differentiate between biomass biogas.
     c) What are the advantages &disadvantages of geothermal energy?
     d) What is fuel cells?
     e) What is wave energy and tidal energy?
     f) Write any four applications of biomass energy.
     g) What is see back thermoelectric effect

Q.7   a) What is geothermal energy? How can geothermal energy is utilized for electric power   07
       generation.
     b) What is the main applications of gasifier?   08

Q.8   a) Explain biomass conversion process with various methods.   08
     b) Explain classification of biogas plant.   07

Q.9   a) Explain the OTEC open cycle.   08
     b) Explain in brief about tidal energy generation.   07

Q.10   a) What is MHD generator? Explain its working principle.   08
     b) Explain the working of a thermo electric generator.   07

Total No. of Printed Pages:03

SUBJECT CODE NO: H-353
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (EEP/EE/EEE)
Control System Engineering
(OLD)

[Time: Three Hours]   [Max.Marks:80]

Please check whether you have got the right question paper.
N.B   i) Question No.1 and Q.No.06 are compulsory.
             ii) Solve any two questions from remaining from each section.
             iii) Figures to the right indicates full marks.

SECTION – A

Q.1   Solve any five.   10

        a) Name the components of Block diagram.

        b) Define damping ratio

        c) Distinguish between linear and non – linear control systems.

        d) List the time domain specification

        e) State Mason's Gain Formula.

        f) What are the two types of mechanical system.

        g) Define transfer function

        h) Define settling time and peak overshoot.

Q.2   a) Explain in detail Mathematical modelling of physical system.   07
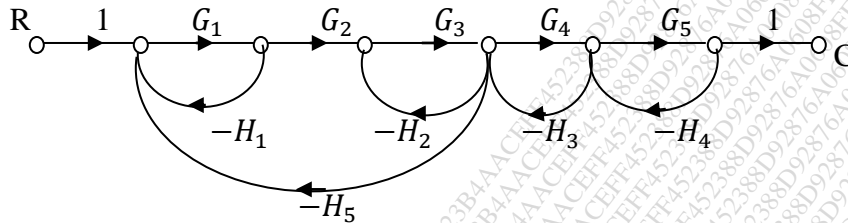
        b) Find the transfer function of given system by block diagram reduction Technique.   08

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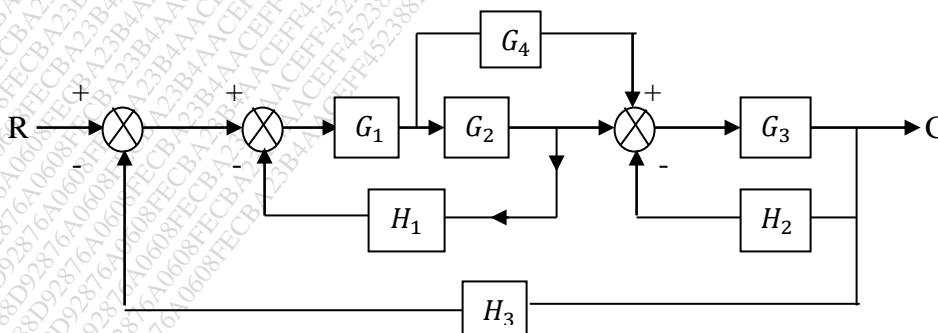
Q.3 a) Find transfer function of given signal flow graph. 08

b) Distinguish between open – loop and closed loop – system. 07

Q.4 a) Explain A.C. Servo motor in control system. 07

b) The forward path transfer function of a unity feedback control system is given by 08

$$G(s) = \frac{5(s^2 + 2s + 100)}{s^2(s + 5)(s^2 + 3s + 10)}$$

Determine K_p, K_v & K_a. Also determine the types of system.

Q.5 a) Find the dynamic error coefficient of the unity feedback system forward path transfer 08
function.
$G(s) = \frac{10}{s(s+1)}$
Find the steady state error to the input $r(t) = P_0 + P_1 t + P_2 t^2$

b) For a system 07
$S^4 + 20S^3 + 15S^2 + 2S + K = 0$
Find the range of K & frequency of sustained oscillations.

SECTION – B

Q.6 Solve <u>any five</u>. 10

a) What is polar plot.

b) What are asymptotes? Give the formula to calculate the angle of asymptotes.

c) State Routh's criterion for stability.

d) Define observability and controllability.

e) What is Bode – Plot.

f) Define i) State ii) State variable

2

g) Define D.C. Servo motor

h) What is Lag Compensator

Q.7 A Unity feedback control system has an open loop transfer function.   15
$G(s) = \frac{K}{S(S^2+4S+13)}$ Sketch the root Locus.

Q.8 Plot the bode diagram for the following transfer function and the gain and phase cross over   15
frequencies.
$$G(s) = \frac{40(s+7)}{s(s+10)(s+2)}$$

Q.9 a) Explain synchros in detail with neat sketch.   08

b) Find state transition matrix $\emptyset(t)$ of the following system.   07

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} 3 & 0 \\ 0 & -3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u$$

Where $u > 0$.

Q.10 a) Test for controllability and observability for given system.   08
$$\dot{x}(t) = \begin{bmatrix} -1 & 0 & 0 \\ 0 & -5 & 0 \\ 0 & 0 & -6 \end{bmatrix} x(t) + \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix} u$$
$$y = \begin{bmatrix} 1 & 0 & 2 \end{bmatrix} x(t)$$

b) Explain the effect of addition of poles and zeros on Root Locus.   07

3

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-399
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (EEP/EE/EEE)
Electrical Power Generation & its Economics
(OLD)

[Time: Three Hours]   [Max. Marks: 80]

Please check whether you have got the right question paper.

N.B   1. Q.No.1 and 6 are compulsory.
        2. Attempt any two questions from remaining four questions from each section.
        3. Assume suitable data if necessary.
        4. Figure to the right indicates full marks.

Section A

Q.1   Solve any five questions: 10
       a) What is meant by chain reaction & nuclear fission?
       b) What are advantages of diesel power plant?
       c) Write short note on water hammer.
       d) What are the components evolved in feed water & its treatment.
       e) What are the required equipment's in coal unloading?

       f) What is the function of
           i)   Moderator
           ii)   Control rods

       g) What are the factors considered while selecting a site for nuclear power plant?
       h) What is meant by storage and pondage in hydro power plant?

Q.2   a) Draw the general layout of thermal power plant.   07
       b) With a neat diagram explain water tube boiler.   08

Q.3   a) Write the function and use of draught systems.   07

       b) The discharge through a mansoon stream may be taken as follows.   08

Month	Discharge in m^3/sec	Month	Discharge in m^3/sec
Jan	08	July	16
Feb	10	August	20
March	12	Sept	24
April	06	Oct	12
May	04	Nov	08
June	03	Dec	09

1

Draw a hydrograph & find:
1) Average discharge
2) The power developed if the working head is 15 meter & turbine generator set efficiency is 85%.

Q.4   a) Draw a neat diagram of a diesel power plant showing all the systems. Briefly the function of each system.   07

      b) What are the factors considered while selecting site selection of nuclear power plant?   08

Q.5   Write a short notes on: (any three)
      a) Selection of coal for thermal power plant   05
      b) Nuclear reactor   05
      c) Site selection of coal for thermal power plant   05
      d) Explain the classification of nuclear reactor   05

Section B

Q.6   Solve any five questions: 10
      a) What are the components of gas turbine plant?
      b) What are the basic requirements for locating a wind power plant?
      c) What are the different sources of geothermal energy?
      d) List the methods used for finding out the depreciation cost.
      e) What are the factors affecting the cost of generation?
      f) What are the types of wind mills?
      g) What is meant by base load plant?
      h) What are the forms of geothermal energy?

Q.7   a) Write short note on open cycle gas turbine plant.   07

      b) What are methods for improving thermal efficiency of gas turbine plant? Explain all methods in short.   08

Q.8   a) Explain the various functions of horizontal axis wind mill.   07
      b) Explain solar power.   08

Q.9   a) Discuss the basic requirements of peak load plants.   07
      b) Write a short note on constraints on economic generation.   08

Q.10   Write a short notes on: (any three)
      a) MHD plant   05
      b) Fuels for gas turbine plants   05
      c) Draw the neat sketch of wind power station   05
      d) Explain base load and peak load plant   05

Total No. of Printed Pages:3

SUBJECT CODE NO:- H-400
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (EE/EEE/EEP)
Electrical Power Generation & its Economics
(REVISED)

[Time: Three Hours]   [Max.Marks: 80]

Please check whether you have got the right question paper.

N.B
1. Q.no.1 from section A and Q.no.6 from section B are compulsory.
2. Attempt any two questions from the remaining questions in each section.
3. Assume suitable data if necessary.
4. Figure to the right indicate full marks.

Section A

Q.1	Solve any five questions:	10
	a) What is the function of storage and pondage in hydro power plant?	
	b) Explain condenser used in steam power plant.	
	c) What is the function of gate?	
	d) What is the use of steam turbine in thermal power plant?	
	e) Write the types of boilers .	
	f) Write the function of electro static precipitation.	
	g) What is the importance of coal crushing?	
	h) Define hydrology.	
Q.2	a) Describe how coal is handled starting from delivery of coal to final combustion stage.	05
	b) Draw the steam station layout.	05
	c) Write short note on condensers.	05
Q.3	a) Write prospectus and development of nuclear power plant in India.	05
	b) Discuss function of	05
	1) Surge tank	
	2) Penstock	
	3) Spill way	
	4) Dam	
	c) What are the factors considered for site selection of thermal power station?	05

1

H-400

Q.4   a) Write the working of hydro power plant.   05

        b) Explain any one water turbine briefly.   05

        c) Write short note on water hammer and surge tank.   05

Q.5   a) Write the main components with their function in diesel power plant.   05

        b) The mean monthly discharge for 12 months at a particular site of a river is given below.   05

Month	Discharge in million's m^3/ month
A	500
B	200
C	1500
D	2000
E	1000
F	500
G	200
H	100
I	200
J	500
K	1000
L	2000

Draw the hydrograph for the given discharge and find the average.

        c) Write short note on diesel power plant.   05

Section B

Q.6   Solve any five questions: 10
    a) Write some geothermal regions
    b) Define a fuel cell.
    c) Write the working principle of MHD.
    d) Write the methods of finding out the depreciation cost.
    e) Draw sketch of incremental fuel cost curve.
    f) Write application where solar energy used.
    g) What is meant by base load plant?
    h) Write various sources of energy.

Q.7	a)	Write method of improving efficiency of gas power plant.	05
	b)	Write the components of gas power plant with their functions.	05
	c)	Write use of inter cooler, regenerator and reheater in gas turbine plant.	05

Q.8	a)	Draw only the arrangement of a closed cycle gas turbine plant.	05
	b)	Explain the MHD plant.	05
	c)	Write short note on Tidal power generation.	05

Q.9	a)	List the various constraints of economic generation.	05
	b)	What are the drawbacks in selecting a single unit to meet maximum demand?	05
	c)	Explain how is reduction of cost done by using interconnecting generators.	05

Q.10	a)	Write short note on cost of electrical energy.	05
	b)	Explain comparison of all power plants.	05
	c)	What is the importance of solar power in the present energy uses in the world?	05

Total No. of Printed Pages:2

SUBJECT CODE NO: H-410
FACULTY OF SCIENCE AND TECHNOLOGY
B.E. (EEP/EE/EEE)
Industrial Automation
(REVISED)

[Time: Three Hours]   [Max.Marks:80]

Please check whether you have got the right question paper.

N.B
1. <u>Q.1 & Q.6 are compulsory</u>.
2. Solve <u>any two</u> questions from <u>remaining for each section</u>.
3. Solve total 3 – questions in each section.

Section A

Q.1   Solve <u>any five</u>:   10
   a) Define industrial automation.
   b) What is discrete variable?
   c) Draw basic control cycle diagram.
   d) How actuators are categorized?
   e) What is ladder diagram?
   f) What is role of actuator in automation?

Q.2   a) Explain Hierarchy of automation in details.   07

   b) Differentiate between machine automation & process automation, giving examples.   08

Q.3   a) How PLC can be used to protect AC motor from over loading? Explain with neat sketch.   07

   b) Describe features of SCADA system in details.   08

Q.4   a) Explain with example discrete process control.   07

   b) Explain significance of trending function of SCADA in automation.   08

Q.5   Write short notes <u>on any three</u>   15

   a) Pneumatic actuators
   b) RS232 & RS485
   c) MOD bus
   d) Gear Box actuators.

1

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Section B

Q.6　Solve <u>any five:</u>　　　　　　　　　　　　　　　　　　　　　　　　　　　　　10
　　　a) What do you mean by H /W & S/W type interfaces?
　　　b) How displays are categorized in DCS?
　　　c) What is communication protocol?
　　　d) What alarm functions are used in SCADA for substation?
　　　e) Name the control technologies used in automation.
　　　f) What are field buses in DCS?

Q.7　a) Explain how　　　　　　　　　　　　　　　　　　　　　　　　　　　　　07
　　　　　i)　Tangible user interface &
　　　　　ii)　Tactile interface are functioning?
　　　　　iii)　Explain working of multiplexes & their role in SCADA.

　　　b) Explain working of multiplexes & their role in SCADA.　　　　　　　　　　08

Q.8　a) Explain working of HMI with neat sketches.　　　　　　　　　　　　　　07

　　　b) Explain SCADA communication. What are standard communication protocols? Discuss any　08
　　　　one.

Q.9　a) What is meant by distributed control system? Compare it with traditional control system?　07

　　　b) What is significance of Data High Ways in DCS? Explain in details.　　　　　08

Q.10　Write short notes <u>on any three</u>　　　　　　　　　　　　　　　　　　　　15

　　　a) Data Acquisition
　　　b) Graphical user interface.
　　　c) High Speed Inputs
　　　d) Trending & archiving in SCADA.

Total No. of Printed Pages: 2

SUBJECT CODE NO:- H-475
FACULTY OF SCIENCE AND TECHNOLOGY
B.E. (EEP/EE/EEE)
Elective-I: Flexible AC Transmission System
(REVISED)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B
(i) Q. No.1 & Q.No.6 are compulsory.
(ii) Attempt any two questions from each section from the remaining questions.
(iii) Assume suitable data wherever necessary.

Section A

Q.1 Solve any FIVE questions. 10
    (i) What are the objectives of FACTS?
    (ii) Define SVC & STATCOM.
    (iii) What limit the loading capability?
    (iv) What is TCSC &TCR?
    (v) What are different types of losses in STATCOM?
    (vi) What is the cause for voltage instability?
    (vii) What types of harmonics present in the output of 3-Ø bridge converter?
    (viii) What is the necessity of compensation?

Q.2 (a) Explain the need of transmission line interconnection. 07
    (b) Explain the power flow in parallel and meshed system. 08

Q.3 (a) Explain the construction and working of 3-Ø full wave bridge type FACTS converter. 08
    (b) Explain the working of FC-TCR with neat diagram & wave form. 07

Q.4 a) Explain the midpoint voltage regulation for line segmentation of shunt compensator. 08
    b) Explain basic types of FACTS controllers. 07

Q.5 Write a short note on
    a) Static VAR system 05
    b) UPFC 05
    c) Opportunities of FACTS. 05

1

Section B

Q.6   Solve any FIVE questions.   10
     (i)   What is UPFC &IPFC?
     (ii)   What is bang-bang control?
     (iii)   What is the use of braking resistor?
     (iv)   What do you mean by load compensation?
     (v)   What are the drawbacks of continuously controllable tap changers?
     (vi)   Define Active & passive VAR control.
     (vii)   List different constraints available on UPFC.
     (viii)   What are the advantages of TCSC?

Q.7   a) Explain the working of GCSC with diagram and wave form.   07
     b) Explain the objective of static series compensators.   08

Q.8   a) Explain the hybrid phase angle regulator.   07
     b) Explain how power oscillation damping can be achieved by using voltage and phase angle   08
       regulation.

Q.9   a) Differentiate clearly between UPFC & IPFC.   07
     b) Explain the basic control of TCBR.   08

Q.10   Write short note on

     a) Functional control scheme for SSSC   05
     b) TSSC   05
     c) Power flow control by phase angle regulators   05

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