

Total No. of Printed Pages:2

SUBJECT CODE NO: H-162
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E. (EEP/EE/EEE)
Testing & Maintenance of Electrical Equipment
(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 questions from remaining in each section
- iii) Solve total 3 questions from each section

Section A

- Q.1 a) Match the pairs 05
- | | |
|-----------------------------|-------------------------|
| i) Wrong placement of coils | A) Radiator choke |
| ii) Leakage current | B) Welding joint cracks |
| iii) Excessive vibrations | C) S. M. testing |
| iv) Leakage from tank | D) Magnetic Im-balance |
| v) Transformer over heating | E) Body winding short |
- b) Write answer in one sentence 05
- i) What do you understand by blue colored silica jell in transformer breather.
 - ii) Transformer has total 5-terminals 3-ch HV side & 2 on LV side what you will understand?
 - iii) What can be the Reason, if transformer under operation is not able to supply with full capacity, but can supply only 85% of it.
 - iv) All the three windings of star connected 3-phase transformer, take 100A each. What will be value of the current passing through the natural?
 - v) There are two wires, without marking on then one is phase & other is neutral. How will you confirm the “phase” wire?
- Q.2 a) Explain concept of “TOLERANCE” in testing? 07
- b) Explain concept of TPM fits significance. 08
- Q.3 a) Clearly distinguish between direct & indirect testing of transformer parameters with example 08
- b) List out the reasons behind development of faults during Assembly of transformer core of cost? 07
- Q.4 a) What are the tests on transformer at site before commissioning? List & explain any one 07
- b) Measurement of earth resistance, procedure explain with neat sketches? 08
- Q.5 Write short notes on any three 15
- a) Magnetic imbalance in 3-ph transformer
 - b) Special tests on transformer
 - c) Type tests on 3-ph power transformer
 - d) Reasons of reduction of power handling capacity of a 3-ph power transformer

Section B

- Q.6 What effects you will observe, when there are problems like: 10
- Winding to body short circuit
 - Over leakage current
 - Magnetic imbalance in stator
 - Wrong placement of coils in stator
 - In sufficient of core lamination in stator stack
- Q.7 a) Describe the “Causes” of “Reasons” behind development of faults during manufacturing of 3-ph. Induction motor. 08
- b) Elaborate I.M. Testing methods as per Indian standard specifications & name the equipment to identify each reason 07
- Q.8 a) Describe the “Causes” of “Reasons” behind development of faults during operation of 3-ph I. M. 07
- b) With neat sketch describe the operations of x-ray system used in industries 08
- Q.9 a) Write with neat sketch the operation & application of ultrasonic flow detecting equipment used in industries. 08
- b) Write down the different uses of megger testing in case of motors with megger test circuits. 07
- Q.10 Write short notes on any three 15
- Heat running test on motor
 - Impregnation of windings with varnish
 - IS standard for testing of elect. Motors
 - Testing of DOL starter for I. M.

Total No. of Printed Pages:3

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

[Time: Three Hours]

[Max.Marks:80]

- N.B Please check whether you have got the right question paper.
- i) Q.No.1 & Q.No.6 are compulsory.
 - ii) Solve any two questions from remaining from each section.
 - iii) Draw appropriate waveforms if required.
 - iv) Assume suitable data if necessary.

Section A

- Q.1 Solve any five. 10
- a) Draw V-I characteristics of TRIAC.
 - b) Give the comparison between GTO & SCR.
 - c) What are the two control technics used in Chopper.
 - d) List the advantages of power MOSFET.
 - e) Draw the voltage-current characteristics of IGBT.
 - f) What are the different classifications of Chopper?
 - g) Compare circulating and non-circulating current mode of dual converter.
 - h) What are different SCR voltage ratings?
- Q.2 a) Draw and explain the dynamic turn-on and off characteristics of SCR. 07
- b) A 3-phase half wave converter is operated from a 3-phase Y connected 220v, 50Hz supply and Load resistance of 10 ohm, If the average output voltage is 25% of maximum possible average voltage. Calculate: Delay angle, RMS and Average output currents, Average and RMS SCR current. Input power factor. 08
- Q.3 a) Explain with neat circuit diagram and waveforms operation of single phase half wave controlled rectifier with effect of free-wheeling diode. 07
- b) For idol type A chopper circuit following conditions are given, duty cycle = 0.4, chopping frequency of 400 Hz, input dc voltage = 220 v and R = 1 ohm L = 3 mH and back emf = 25 V. Calculate the Average output current, min and max values of steady state output current, Input power, power absorbed by Load emf, power loss in R. 08
- Q.4 a) Explain in detail working principle of dual converter. 07
- b) A single quadrant Type – A chopper is operated with the following specifications; on time $t_{on} = 1msec$, off-time $t_{off} = 1.5 msec$ and ideal battery of 220V. Calculate 08
- 1) Average and RMS output voltages
 - 2) Ripple and form factor

- Q.5 a) Explain PWM and FM Technics of chopper used for operation control. 07
- b) A 3-phase semi-converter is connected to a highly inductive load show that the average output voltage is given by 08
- $$V_{o_{avg}} = \frac{3\sqrt{3} V_m}{2\pi} (1 + \cos\alpha)$$
- Where,
 V_m = Peak phase voltage of star connected source.

Section B

- Q.6 Solve any five. 10
- Explain why PWM inverter is superior to a square wave inverter.
 - Draw the circuit diagram of Buck-Boost converter.
 - What is Switching Mode Power Supplies (SMPS)
 - Compare 180° and 120° mode operation of VSI.
 - What is cycloconverter? Give its classifications.
 - What is UPS and power conditioners.
 - Draw circuit diagram of 3-phase to 3-phase cycloconverter.
 - Define Inverter and give its classifications.
- Q.7 a) Draw and explain with neat circuit diagram and wave form, operation of single phase half bridge Voltage Source Inverter (VSI) with RL Load. 07
- b) The buck – converter has an input voltage of $V_{dc} = 14v$. The required average output voltage $v_o = 6v$ 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 08
 2) Filter Inductance 'L'
 3) Filter capacitance 'C'
- Q.8 a) Explain with neat diagram and waveforms operation of 1-phase to 1-phase cycloconverter with R-L Load. 07
- b) For single phase half bridge Inverter, DC input voltage is 200v with 5 ohm resistive load, Calculate 08
 1) RMS output voltage
 2) Output power
 3) PIV
 4) Total Harmonic Distortion

- Q.9 a) Explain working principle of single phase AC voltage controller. 07
- b) An AC Voltage controller has a resistive load of 10 ohm and RMS input voltage is $V_s = 230v, 50Hz$. The SCRs are switched on for $n=25$ cycles and off for $m=75$ cycles. Determine 08
- 1) RMS Output Voltage
 - 2) Input power
 - 3) Average and RMS current ratings of SCR
- Q.10 a) Explain with neat diagram & waveforms working of Buck converter. 07
- b) Explain with neat diagram and waveform, of 120° conduction mode operation of 3-phase bridge Inverter with R-Load. 08

Total No. of Printed Pages:03

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

[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.
- SECTION A**
- | | | | |
|-----|---------|--|----|
| Q.1 | Solve:- | 1) What is the pipelining of 8086.
2) Explain the function of Queue for 8086 microprocessor.
3) Design immediate Addressing mode with example for 8086.
4) What is opcode & operand of an instruction.
5) What is the function of data pointer in 8051 microcontroller.
6) With example explain the function of rotate instruction.
7) How the bit addressing is distinguished from byte addressing. | 14 |
| Q.2 | a) | Draw and explain programming model of 8086 microprocessor. | 07 |
| | b) | Explain in detail generation of 20 – bit physical address of 8086 microprocessor. | 06 |
| Q.3 | a) | Explain the different data transfer instruction of 8086. | 07 |
| | b) | Write ALP to add ten bytes in internal RAM locations. Assume that number are stored starting from location 20 H. store the result (8 – bit) at 30 H. | 06 |
| Q.4 | a) | Explain in detail TCON special function Register of 8051. | 07 |
| | b) | Explain the PSW of 8051 microcontroller. | 06 |

- Q.5 Write a short note on (any three)
- i) Features of 8086 05
 - ii) Overview of 8051 microcontroller family. 04
 - iii) Subroutine 05
 - iv) Comparison of microprocessor & microcontroller. 04

SECTION B

Q.6 Solve:- 14

- 1) Explain the function of ALE PIN in 8051 microcontroller.
- 2) Explain the function of port 0 of 8051 microcontroller.
- 3) Explain the Boolean processor of 8051 microcontroller.
- 4) Explain the function of port 1 of microcontroller 8051.
- 5) Explain the working of timer in 8051 microcontroller.
- 6) Explain the function of $\overline{INT0}$ & $\overline{INT1}$ of microcontroller 8051.
- 7) What is the priority of interrupt.

Q.7 a) Write a program to generate a frequency of 1.9 KHZ on P1.2 bit. Use timer 0. 07

b) Explain in detail serial data transmission mode 0 of 8051 microcontroller. 06

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

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

- Q.9 a) It is required to interface 7 – segment display to 8051 microcontroller. Draw the interfacing diagram and write a program to display the BCD digits 0 to 9. 07
- b) Explain in detail interrupt structure of 8051. 06

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

- 1) Serial interface of 8051 microcontroller. 05
- 2) SFRs of 8051 microcontroller. 04
- 3) Port 0 of 8051 microcontroller. 05
- 4) Features of 8051 microcontroller. 04

Total No. of Printed Pages:3

SUBJECT CODE NO:- H-318
FACULTY OF ENGINEERING 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
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.
 5. Figures to the right indicate full marks.

Section A

- | | | |
|-----|---|----------|
| Q.1 | Attempt any five: <ol style="list-style-type: none"> i) State Gauss law. What do you mean by Gaussian surface? ii) What is electric dipole and dipole moment? iii) Give two examples of scalar & vector field iv) Given two vectors
 $A = -a\bar{x} - 3a\bar{y} - 4a\bar{z}$ & $B = 2ax + 2ay + 2az$ find $A \times B$ v) State coulombs law. vi) Relate rectangular co-ordinate (x, y, z) to spherical co-ordinate (ρ, r, θ, ϕ) vii) State the significance of dot product viii) What do you mean by term gradient? | 10 |
| Q.2 | <ol style="list-style-type: none"> a) Derive the expression for electric field intensity due to line charge located along z-axis of infinite extent. b) A infinite line charge $e_L = 2 \text{ nc/m}$ lies along x-axis in free space while point charges of 0.5 nc are located at (0, 0, 2) and (0, 0, -2) find. Electric field intensity at (4, 6, -8) | 08
07 |
| Q.3 | <ol style="list-style-type: none"> a) Apply Gauss Law to unsymmetrical differential volume and derive the expression of divergence. b) If $D = z \sin \phi a\bar{\rho} + z \cos \phi a\bar{\phi} + e \sin \phi a\bar{z}$ in cylindrical co-ordinate. Determine volumetric charge density e_V | 08
07 |

- Q.4 a) Show that $E = -grad V$ 08
- b) Point charges of $1\mu c$ and $-1\mu c$ are located at $(0, 0, 0.5)$ and $(0, 0, -0.5)$. treating these two charges as dipole at origin calculate potential at point $P(3, 0, 4)$ 07
- Q.5 a) Derive the point form of continuity equation of current. 07
- b) Derive the boundary conditions for normal and tangential component of electric field intensity and electric flux density at the interface of two perfect dielectric materials. 08

Section B

- Q.6 Attempt any five: 10
- i) Compare self and mutual inductance.
 - ii) State the properties of perfect metallic conductor.
 - iii) Justify the expression $\nabla \cdot B = 0$
 - iv) Define the term mag filed intensity and permeability.
 - v) What do you mean by displacement current?
 - vi) State faradays law for time varying field
 - vii) State amperes circuital law.
 - viii) What do you mean by magnetic dipole?
- Q.7 a) Derive an expression for magnetic field intensity due to infinite long current carrying filament at any point in free space. 08
- b) Find the incremental field ΔH at point P_2 caused by source at P_1 of $I\Delta L = 2\pi az \mu A/m$ given $P_1(4, 0, 0)$ and $P_2(0, 3, 0)$ 07
- Q.8 a) For steady magnetic field show that $\nabla \times H = J$ 08
- b) Calculate the value of vector current density in Cartesian co-ordinate at point $P(4, 3, 4)$ if $H = x^2z ay - y^2x az$ 07
- Q.9 a) Derive the expression for boundary conditions at the interface of two different magnetic materials. 07
- b) Evaluate closed line integral of H about the rectangular path $P_1(2, 3, 4)$ to $P_2(4, 3, 4)$ to $P_3(4, 3, 1)$ to $P_4(2, 3, 1)$ to P_1 given $H = 3z az - 2x^3az A/m$ 08

Q.10 Attempt any three

- i) State and explain stokes theorem
- ii) Enlist the Maxwell's equations in a point form
- iii) Displacement current and displacement current density
- iv) Explain uniqueness theorem

Total No. of Printed Pages:2

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

[Time: Three Hours]

[Max.Marks:80]

- N.B Please check whether you have got the right question paper.
- i) Q 1 & Q 6 are compulsory.
- ii) Solve any two questions from remaining question from each section.

Section A

- Q.1 Solve any five. 10
- Write minimum angle of step available in stepper motor.
 - What is the meaning of doubly fed induction machine?
 - Why stepper motor called so?
 - Write the application of LIM.
 - What is meant by voltage regulation?
 - What is meant by “Radial Air gap”?
 - Why the induction generator is often called as an asynchronous generator?
 - What is the maximum available power rating of any FHP motor?
- Q.2 a) Explain construction & working of switched reluctance motor. 08
- b) Explain self-excitation requirement in case of induction generator. 07
- Q.3 a) Explain construction working & application of pmsm. 07
- b) What do you mean by DFIG? Explain its operation in generation mode. 08
- Q.4 a) Explain construction & working of BLDC motor. 07
- b) Explain construction & working of variable reluctance stepper motor. 08
- Q.5 a) Explain the difference between radial & axial air gap synchronous reluctance motor. 07
- b) Give the comparative study of three types of stepper motor. 08

Section B

- Q.6 Solve any five. 10
- a) Give the classification of electric welding.
 - b) Why are welding is sometimes called as non – pressure welding?
 - c) Write two ways of extraction of metals.
 - d) What are the various reasons of heating element failure?
 - e) Write two examples of applications of high frequency transformer.
 - f) Define electric welding.
 - g) Define convection of heat.
 - h) List out types of welding equipment.
- Q.7 08
- a) Explain different methods of resistance heating. Also mention their applications.
 - b) What are the types of resistance welding? Explain any one type in detail. 07
- Q.8 07
- a) Explain the factors affecting electro deposition.
 - b) State & explain laws of electrolysis. 08
- Q.9 08
- a) Explain TIG welding process in detail.
 - b) What is isolation transformer? Explain different application of it in detail. 07
- Q.10 Write short note on any two 15
- a) Heating of building
 - b) Manufacture of chemicals
 - c) Buck-Boost Transformer

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-269
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E. (EEP/EE/EEE)
Energy Conservation & Audit
(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 from the remaining each section.

Section A

- | | | |
|-----|--|----------|
| Q.1 | Solve any five | 10 |
| | <ol style="list-style-type: none"> a. What is the role of BEE in achieving energy efficiency in our country? b. Define energy audit as per energy conservation act 200.1 c. State second law of thermodynamics. d. Draw schematic diagram for bottoming cycle cogeneration. e. What is meant by Evaporation ratio in case of steam boiler? f. What is meant by Global-warming potential? g. What is emission trading? h. What is the use of Lux meter & leak detector? | |
| Q.2 | <ol style="list-style-type: none"> a. What are the duties & responsibilities of an energy manager? b. Write down steps involved in energy audit with example. | 08
07 |
| Q.3 | <ol style="list-style-type: none"> a. Explain the steps to calculate boiler efficiency by indirect method. b. What are major heat losses in boiler? Give energy efficiency opportunities in Boilers. | 07
08 |
| Q.4 | <ol style="list-style-type: none"> a. What is cogeneration? With the help of diagram explain back pressure turbine cogeneration system. b. Explain “affinity laws” applicable to pumping systems & list energy conservation opportunities in pumping system in industry. | 08
07 |
| Q.5 | Write a short note on any 3 | 15 |
| | <ol style="list-style-type: none"> i. CDM & its objectives ii. Energy & sustainable development iii. Energy audit in HVAC system iv. KYo To protocol | |

Section B

- Q.6 Solve any five 10
- i. Define NPV. Mention its formula.
 - ii. What is IRR?
 - iii. What is PI for energy conservation project?
 - iv. Define power factor. Mention the methods to improve it.
 - v. What is meant by TOD-Tariff
 - vi. What is DSM?
 - vii. For light system define room-index.
 - viii. How will you calculate discount factor?
- Q.7 a. Briefly explain simple payback period & mention its advantages & disadvantages. 08
 b. Explain the importance of power factor in energy conservation program. 07
- Q.8 a. Give comparison between NPV & IRR method of financial analysis. 07
 b. It is proposed to install a heat recover device in industry the capital cost is Rs.200000 & after 5 years the salvage value is to be 15000. The saving is as follow determine the NPV after 5 years for a discount rate of 8%. 08
 Year- 1, 2, 3, 4, 5. Saving -> 70000, 60000, 60000, 50000, 50000 Rs respectively.
- Q.9 Explain in detail the procedure to carry out energy audit in thermal power plant. Mention the instruments used. Suggest energy conservation measures to improve performance of thermal power plant. 15
- Q.10 Write a short note on any 3 15
- i. APFC
 - ii. ISO 50001-energy management system.
 - iii. E.A. 2003 of energy sector reforms.
 - iv. Electricity tariff-applicable to industrial consumers.

SUBJECT CODE NO: H-353
FACULTY OF ENGINEERING 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

- 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 indicate full marks.

SECTION – A

Q.1 Solve any five 10

- a) Explain open loop and closed Loop system
- b) What does the term ‘stability’ of a control system imply?
- c) What do you mean by signal flow graph?
- d) Give the important features of feedback?
- e) Define the transfer function of a control system?
- f) Define damping and damping ratio?
- g) What is velocity error coefficient.
- h) List the time domain specification.

Q.2 a) With the help of examples compare open Loop and closed Loop system. 08

b) Explain in details the various block reduction rules. 07

Q.3 a) For the Mechanical system shown in fig (1) draw the force voltage and force – current analogous circuits. 08

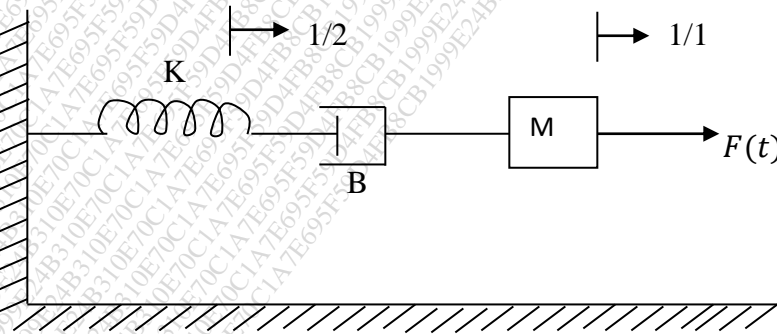


Fig (1)

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

Q.4 a) A unity feedback system has 08
 $G(s) = \frac{K(s+1)}{s^2(s+2)(s+5)}$ using Routh's Hurwitz criteria. Find range of K for the closed loop system to be stable.

b) With the help of neat sketch explain the time domain specifications. 07

Q.5 a) Explain steady state error constant. 08

b) Explain A. C. servo motor in control system. 07

SECTION – B

Q.6 Solve any five 10

a) What is centroid? How the centroid is calculated?

b) What is Bode – plot?

c) Define observability and controllability?

d) What is breakaway and break in point?

e) What do you mean by angle of Departure?

f) State Routh's criterion for stability.

g) What is polar plot?

h) Define relative and absolute stability?

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

$$G(S) = \frac{K(S+9)}{S(S+2)(S+3)}, \text{ sketch the root loci of the system.}$$

Q.8 Plot the Bode diagram for the following transfer function and obtain the gain and phase cross – over 15 frequencies.

$$G(S) = \frac{10}{S(1 + 0.4S)(1 + 0.1S)}$$

Q.9 a) Find state transition Matrix of following system. 07

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

- b) Obtain state space representation of transfer function 08

$$G(s) = \frac{S + 4}{S^3 + 6S^2 + 11S + 6}$$

- Q.10 a) Given the system $\dot{x}(t) = Ax(t) + Bu(t)$, $y(t) = Cx(t)$ 08

Where,

$$A = \begin{bmatrix} 0 & 1 \\ -1 & -3 \end{bmatrix}, \quad B = \begin{bmatrix} 1 \\ 2 \end{bmatrix} \quad \& \quad C = [1 \quad 1]$$

Determine the state and output of controllability.

- b) Test the observability of the system described by, 07

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

$$y = [1 \quad 0] \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

Total No. of Printed Pages:03

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

[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 from the following 10

- a) What is the need of per unit system?
- b) Define the terms
 - i. Oriented graph
 - ii. Tree
 - iii. Co-tree
 - iv. Link
- c) If the reactance in ohms is 15Ω . Find P.U. value of base of 15MVA, 10KV.
- d) What is bus?
- e) What are sequence impedance & network?
- f) Define voltage controlled bus.
- g) Write expression for complex power injected to a bus.
- h) What is the need of slack bus?

Q.2 a) Prove that per unit impedance of a $1-\phi$ transformer is same whether computed from primary or secondary side. 07
 b) Draw the per unit reactance diagram for $3-\phi$ system shown in fig1. Use base of 20MVA & 66 KV. 08

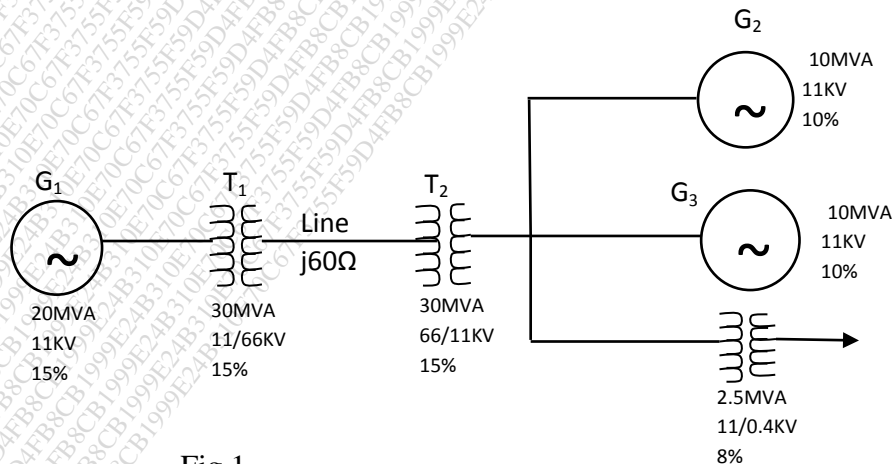


Fig.1

- Q.3 a) Determine the primitive network equation. 07
 b) For the power system shown in fig 2. Find A, \bar{A} & B . 08

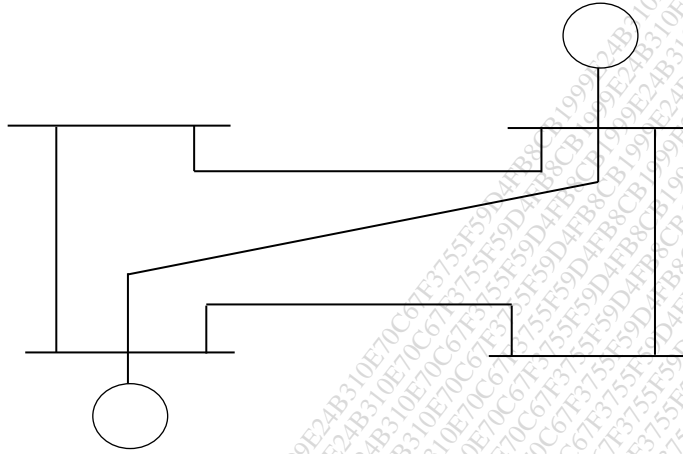


Fig 2.

- Q.4 a) Explain Gauss Siedal algorithm for load flow solution. 07
 b) For the power system shown below compute Y_{Bus} & bus voltage up to one iteration using Gauss-Seidal method for fig3. 08

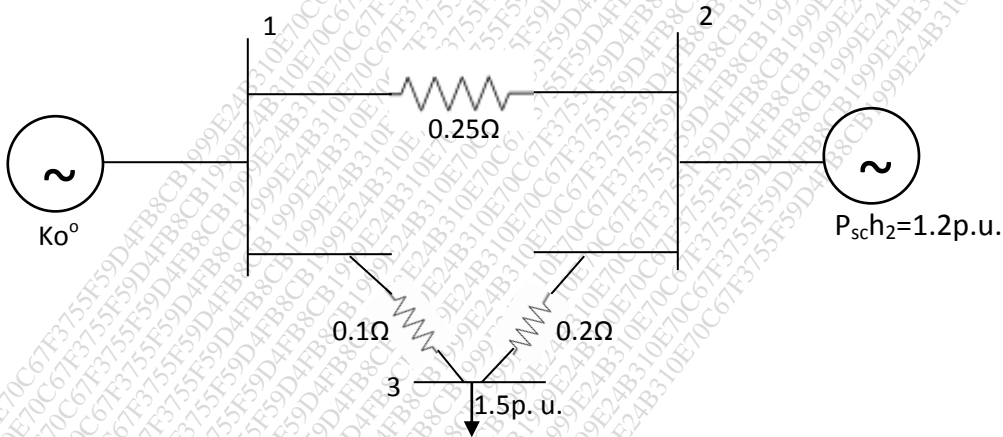


Fig 3.

- Q.5 a) Write a short note on selection of circuit Breaker. 08
 b) Explain transient (i.e. short circuit) on a loaded synchronous machine. 07

Section B

- Q.6 Solve any five questions from following 10
- a) Explain operator ‘a’ in short.
 - b) What is synchronous reactance?
 - c) Define:
 - i. Transient period.
 - ii. Sub Transient period.
 - d) What do you mean by contingency analysis?
 - e) What is meant by doubling effect?
 - f) Define sub-transient reactance.
 - g) Give the classification of faults occurs on system.
 - h) What is meant by fault?
- Q.7 a) Derive an expression to determine fault current for line to line fault & draw the sequence network. 07
- b) A 3- ϕ 11KV, 20MVA generator with positive, negative & zero sequence reactance’s as $0.4pu, 0.4 pu$ & $0.1pu$. respectively, is grounded through a reactance of 0.6Ω calculate the fault current for a single-line to ground fault. 08
- Q.8 a) Derive an expression for general vector phasor & symmetrical components i.e $V_p = A V_s$. 07
- b) Determine the symmetrical components of currents of 3 wire system, currents in the line a, b & c under abnormal condition of loading were as follows. 08
- $I_a = 100 \angle 30^\circ A$ $I_b = 50 \angle 300^\circ A$ & $I_c = 30 \angle 180^\circ A$
- Q.9 a) Explain sequence impedances & networks of transformer. 08
- b) Explain Z bus building for type 2 & type 3 modification. 07
- Q.10 a) Explain open conductor fault. 07
- b) Explain sequence impedance of transmission lines. 08

Total No. of Printed Pages:02

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

[Time: Three Hours]

[Max. Marks: 80]

- N.B Please check whether you have got the right question paper.
- i) Q. No 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

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|-----|--|----------|
| Q.1 | Solve any five | 10 |
| | <ol style="list-style-type: none"> a. What is an ALU? b. What do you mean by address bus . c. What is need of ALE signal in 8085. d. What is call instruction. e. What is opcode and operand. f. Define T. state. g. What is difference in SUB and CMPB instruction. h. What is function of DAA instruction. | |
| Q.2 | <ol style="list-style-type: none"> a. Draw and explain brief the flag register of 8085. b. Draw the interrupt structure of 8085 and explain in brief . | 08
07 |
| Q.3 | <ol style="list-style-type: none"> a. Draw internal architecture of 8085 microprocessor and explain function of each block in brief. b. Explain addressing modes of 8085. | 08
07 |
| Q.4 | <ol style="list-style-type: none"> a. Write an assembly language program to find out the largest number from the given unordered array of 8 bit numbers stored in location from D200H. b. Draw and explain the timing diagram of memory write cycle. | 08
07 |
| Q.5 | <ol style="list-style-type: none"> a. Write a 8085 ALP to generate time delay of 100ms. b. What is subroutine? Explain (CALL & RET instruction) | 08
07 |

- Q.6 Solve any five 10
- a. What is SIM.
 - b. What is USART.
 - c. What is the use of stepper motor.
 - d. Write the features of mode 0 of 8255.
 - e. Define A to D and D to A converter.
 - f. Enlist different register of 8259.
 - g. What is use of 8253 PIT.
 - h. Define memory mapped I/O.
- Q.7 a. Draw the neat block diagram of 8279 KBD/display controller and explain the function of each block. 08
- b. Interface stepper motor to 8085 write an ALP to rotate a motor through 90^0 07
- Q.8 a. With the help of neat diagram explain ADC 0809 interfacing with 8085. 08
- b. Write a program to generate a time delay 5 sec . using 8253. Assume clock frequency 1MHZ. 07
- Q.9 a. With the help of block diagram explain the use of interrupt explain the use of interrupt controller 8259. 08
- b. What are the different schemes available of speed control of DC motor . explain speed control using microprocessor. 07
- Q.10 a. Give scheme of voltage measurement with the help of 8085 microprocessor. 08
- b. A DAC 0808 is to be interfaced with 8085 using 8255 . Draw interfacing diagram and write a program for generation of square waveform. 07

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-107
FACULTY OF ENGINEERING 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) Enlist the various design limitations.
 - b) Enlist the design factors considered in electrical machine design.
 - c) What is leakage flux? Define leakage coefficient.
 - d) State Simpson's rule for calculation of mmf.
 - e) Explain the significance of o/p co-efficient in rotating machine.
 - f) Explain window space factor.
 - g) Define gap contraction factor.
 - h) Explain if air gap length of induction motor is doubled.
- Q.2 07
- a) What do you mean by real and apparent flux density? Derive the relation between them. 07
 - b) Calculate the m.m.f required for the air gap of machine having core length 0.32m including 4 ducts & 10mm each, pole arc = 0.20m. Slot pitch 61mm slot opening 6 mm, air gap length 5mm flux per pole 52 mwb. Given carter's co-efficient is 0.18 for opening/ gap =1 and 0.25 opening/ gap =2. 08
- Q.3 07
- a) Derive the output equation of 3ph induction motor. 07
 - b) In the design of 30kw, 3ph, 440v, 50Hz delta connected induction motor. Assume the specific electric loading of 21000 ac/m, specific magnetic loading of 0.40 wb/m² full load efficiency 90% and p.f 0.88 winding factor 0.896. Estimate the starter core dimensions, no of slots and winding turns. 08
- Q.4 07
- a) Describe the factors determining the choice of rotor slots in induction motor. 07
 - b) Find the current in the rotor bar & end ring of cage rotor of 6 poles, 3 phase, I.M having 72 stator slots with 15 conductors is each slot. The stator current per phase is 25A. rotor slots are 55. 08

- Q.5 Attempt the following any three 15
- Calculations of m. m. f for iron path
 - Choice of specific magnetic loading
 - Phenomenon of crawling & cogging in induction motor.
 - Design of end ring 3ph I.M.

Section -B

- Q.6 Attempt any five: 10
- Define heating cycle of transformer.
 - Define heating & cooling time constant.
 - Why rotor slots of squirrel cage induction motor are skewed.
 - What are the causes of temp rise in transformer?
 - Explain why LV winding is placed near to the core of a transformer.
 - Give two comparisons of distribution & power transformer.
 - Main dimensions of an induction motor.
 - What are the different design ckts of rotating machine.
- Q.7 a) Derive the expression for emf per turn $k\sqrt{KVA}$ rating & also explain the significance of factor k. 07
- b) Estimate the main core dimensions for 50Hz, 3ph, 200 KVA, 6600/500 volts star/ delta core type transformer. Use the following data's. 08
 4 stepped core for which area factor = 0.62
 Window space factor = 0.27
 $H_w/W_w = 2$, current density = 2.8 A/mm².
 Volts per turn = 8.5, max flux density = 1.25 wb/m².
- Q.8 a) Give in detail the steps for LV & HV winding design of transformer. 07
- b) A 250 KVA, 200V/400V, 50Hz, 1-phase core type power transformer with following data. 08
 $E_t = 15V$, $B_m = 1.25 \text{ wb/m}^2$, $\delta = 2.75 \text{ A/mm}^2$, $K_w = 0.3$, $\frac{H_w}{W_w} = 3$, determine the main dimensions & core & yoke.
- Q.9 a) Explain in detail the various cooling methods of transformer. 07
- b) Explain with a neat sketch of conservator and breather used in transformer 08
- Q.10 Attempt any three. 15
- Design to choke coil
 - Output equation of 3ph transformer
 - Derive the expression for calculating no of cooling tubes
 - Explain how the mechanical force developed in transformer winding