

SUBJECT CODE NO:- K-27
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(EEP/EE/EEE) Examination Oct/Nov 2016
Power 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) Solve any two questions from remaining each section.
 - iii) Draw neat waveforms where ever necessary.
 - iv) Assume suitable data if required

Section A

- Q.1 Solve any five 10
- a) Compare MOSFET with BJT.
 - b) Why are IGBTs becoming more popular in their applications to controlled converters?
 - c) Draw switching characteristics of SCR during turn off Process. Indicate clearly the various intervals in to which turn off time can be subdivided.
 - d) What are the types of TRC used in chopper control?
 - e) What is inversion mode of controlled rectifier?
 - f) A single phase half wave convertor is operated from 100v, 50 Hz supply & The load resistance is $R=10 \Omega$
The average output voltage is 25% of the maximum possible average output voltage calculate delay angle.
 - g) What is dual converter? Draw circuit diagram of single phase dual converter.
 - h) Why the power factors of semi converter are better than that of full converters?
- Q.2 08
- a) Draw the basic structure of Depletion type MOSFET & explain the principle & working.
 - b) Describe with sketch the effect of gate current on the forward break over voltage of an SCR. 07
- Q.3 08
- a) Explain with neat circuit and wave form to operation of single phase fully controlled bridge rectifier with RL Load. Derive the expression for average output voltage & Current.
 - b) A single phase full bridge rectifier supplying to RLE load. The source voltage is 220v, 50 Hz. The average load current of 10 A is constant over working range For. $R=0.5 \Omega$ & $L=2 \text{ mH}$ compute fire angle for $E=100\text{v}$ & input power factor. 07
- Q.4 07
- a) Explain the principle of step up chopper derive expression for average output voltage.
 - b) A step up chopper has input voltage of 200v and output voltage of 500v. if the conducting time of chopper is 100us. Determine to pulse width of output voltage in case output voltage Pulse width is halved for constant frequency operation find the average value of new output voltage. 08
- Q.5 08
- a) Explain the operation of three phase semi converter with R load.
 - b) Write short note on Dual converter operating principle. 07

Section-B

- Q.6 Solve any five 10
- a) Draw the different circuit configurations for single phase full wave ac voltage controller.
 - b) What will happen if delay angle α is than the load angle θ for a c voltage controller.?
 - c) Draw the circuit diagram of four quadrant 3ph ac volt controller.
 - d) What is power conditioner? Give any one example.
 - e) Compare the buck & boost converter.
 - f) State the applications of PWM convertors.
 - g) What is mean by sinusoidal PWM?
 - h) State the performance parameters PWM inverter.
- Q.7 07
- a) Explain with neat circuit diagram & waveform the operation single phase bridge inverter with R-L load. 08
 - b) The single phase bridge inverter has a resistive load of $R=5 \Omega$. & dc input voltage is $V_s=48 \text{ v}$. Determine
 - i) rms output voltage at fundamental frequency vol.
 - ii) The output power P_o
 - iii) Average peak current of each thyristor.
- Q.8 07
- a) What are the purposes of feedback diodes in inventors? What are the main differences between VSI & CSI. 08
 - b) Explain with neat circuit & waveforms the principle of non simultaneous control of single phase cyclo convertor
- Q.9 10
- a) Explain with neat ckt & waveform the operation of 3 phase AC voltage control for firing delay of $0 \leq \alpha \leq 60^\circ$. 05
 - b) Explain with neat circuit & waveform the principle of boost converter.
- Q.10 07
- a) A boost regulator has an input voltage of $V_s=5\text{v}$. The average output voltage $V_a=10\text{v}$.& average load current $I_a = 0.2\text{A}$ The switching frequency is 25 KH2. if $L=150 \mu \text{ H}$ & $c =220 \mu \text{ F}$. determine i) Duty ratio k ii) Ripple current of inductor ΔI 08
 - b) Compare buck, boost & buck-boost converter on the basis of performance parameters.

SUBJECT CODE NO:- K-57
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(EEP/EE/EEE) Examination Oct/Nov 2016
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.No.1 & Q.6 are compulsory.
- ii) solve any two question from remaining in each section .
- iii) Assume suitable data if necessary

Section A

- Q.1 a) Define : 1) destructive testing 2) NDT 3) maintenance 06
- b) Fill in the blanks 04
- I. Acidity in a transformer can be resulted in ----- fault
 - II. Resistance of -----winding in a single phase motor is more than other one
 - III. If tap changer of a trans former offers loose contacts then -----winding of a transformer gets heated
 - IV. Insulation failure between core & LV can be predicted by reading of ----- in star to ground connection
- Q.2 a) What routine tests are taken on the 1-PH I.M ? explain any one testing procedure in details 10
- b) Explain effect of frequent switching on the power handling capacity of the transformer 05
- Q.3 a) List out the reasons for development of excessive vibrations in a transformer & describe method of detection for any one reason 08
- b) Write the testing method to find out over leakage current as per IS & write the no. of ISS 07
- Q.4 a) What are the causes for development of coil to coil open circuit fault in the HV winding if a transformer during manufacturing 07
- b) Draw the flow chart of transformer manufacturing processes & indicate various testing during manufacturing by test blocks 08
- Q.5 Write short notes on any three 15
- a) Differences in Routine & type tests on I.M
 - b) Contamination of transfer oil, reasons
 - c) Need of de-hydration of power transformer
 - d) Need of conservator top-up

Section –B

- Q.6 a) Write the application of following to detect the fault & name the fault which can be detected by that test equipment 06
1. Turns ratio testing
 2. Sonography (ultra sound) tasting
 3. Megger testing
- b) Write the effect of fault in one sentence 04
1. Rotor of Sq. cage I.M not dynamically balanced
 2. Polarity of HV & LV winding found exactly same
 3. Yoke of DC motor got racked
 4. Oil acidity in transformer is more than specified limit
- Q.7 a) Explain the procedure of transformer oil in the transformer windings 07
- b) Explain the working of vibration measuring machine (E. M. swinging) 08
- Q.8 a) Diagnose the fault & comment , how will you confirm your judgment? What instrument you will use for your support ? 08
1. Motor is not giving required torque
 2. Only R-phase of transformer gets more heated in balanced load
- b) Enlist the reasons by which there is a winding failure in HV side of a transformer & name the instrument /test method to identify that reason 07
- Q.9 a) Explain what effects will be there on the equipment if following fault is there 08
1. Loose connections at transformer load side terminals
 2. Nuts & bolts got loosened in body part of 3 ØSq cage I.M
- b) Write down the steps invaded in manufacturing of 1-phase induction motor how many test are necessary in Routine test of the motor 07
- Q.10 Write short notes on any three 15
1. ISS for 3-phase Induction motor
 2. Industrial X-ray machine
 3. Heatrun testing
 4. HV with stand test

SUBJECT CODE NO:- K-87
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(EEP/EE/ EEE) Examination Oct/Nov 2016
Microcontrollers & Applications
(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) Draw and explain programming model of 8051. b) With correct bit format, explain program status word of 8051.	07 06
Q.2	a) Explain the function of following pins of 8051 1) PSEN 2) \overline{EA} 3) ALE 4) $\overline{INT0}$ b) Explain various addressing modes with suitable example.	06 07
Q.3	a) Write 8051 based ALP to multiply two 8 bit numbers stored at location 70H & 71H store the result at memory location 52H & 53H. Assume that the least significant byte of result is stored in lower address. b) Interface external memory of 16K-EPROM & 8K-RAM to 8051 microcontroller.	07 06
Q.4	a) Draw and explain programming model of 8086 microprocessor. b) Enlist and explain shift & rotate instructions of 8086 microprocessor.	07 06
Q.5	Write short note on (any two) 1) Addressing modes of 8086 2) Interrupts in 8051 3) Overview of 8051 family.	14
Section B		
Q.6	a) Assume an oscillator running all 11.0592 MHz controls an 8051 microcontroller. Write a program to generate 2KHz square wave on port 1.3 using timer o interrupt b) Draw a neat functional blocks diagram of timer/ counter section of 8051 microcontroller & explain.	07 06
Q.7	a) Explain in detail interrupt structure of 8051 microcontroller including SFRs involved in this operation. b) Interface DAC 08 to 8051 microcontroller. Write a program in assembly language to generate triangular wave.	07 06
Q.8	a) Interface ADC 080810809 to 8051 microcontroller write an ALP for conversion of analog i/p b) Write 8051 ALP to toggle alternate bits of port 1.	07 06

- Q.9 a) Interface the stepper motor using port 2 of 8051 micro controller. Write ALP to rotate it through 90° 07
b) With bitwise structure, explain the function of SBUF & SCON register. 06

- Q.10 Write short note on (any two) 14
1) Interfacing of seven-segment LED
2) Interfacing of DC motor
3) Keyboard interfacing

SUBJECT CODE NO:- K-154
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(EEP/EE/EEE) Examination Oct/Nov 2016
Energy Conservation & Audit
(Revised)

[Time: Three Hours]

[Max. Marks:80]

Please check whether you have got the right question paper.

- N.B
- i) Q.No.1 and 6 are compulsory.
 - ii) Attempt two questions each from section A & section B.
 - iii) Assume suitable data if required.

Section A

- Q.1 Attempt any five 10
- a) Which among the following has the lowest global- warming- potential?
 - a) Perfluorocarbon
 - b) CFCS
 - c) Methane
 - d) Nitrous oxide
 - b) Give the classification of the co-generation, on which basis it can be done?
 - c) Write the statement of second law of thermodynamics.
 - d) 440v, 20HP, 30 motor whose full load operates at 88% efficiency with 0.65 P.F. lagging. Find current drawn by motor.
 - e) Which instrument is used to measure air velocity and air flow in a duct?
 - f) Define ton of refrigeration.
 - g) Draw energy management system model for ISO 50001.
 - h) What is the role of BEE in achieving energy efficiency of our country?
- Q.2 a) Explain the ten step methodology for detailed energy audit. 08
b) What is energy conservation act 2001? Write down its important features. 07
- Q.3 a) Explain in detail the steps to calculate boiler efficiency by indirect method. 08
b) What are the principal heat losses that occur in a boiler? What are the energy efficiency opportunities in boilers? 07
- Q.4 a) Write the procedure to carry out energy- audit of compressed air system. 07
b) Explain "Affinity Laws" applicable to pumping system, and list the energy conservation opportunities in pumping system in an industry 08
- Q.5 Write note (any 3) 15
- a) Energy performance assessment of HUAC & refrigeration system
 - b) Emission trading
 - c) Kyoto protocol
 - d) Role of renewable energy sources in energy management of a nation.

Section B

- Q.6 Attempt any five 10
- a) What is LRR?
 - b) For lighting system, define room index.
 - c) What is meant by tod-tariff?
 - d) Define harmonics.
 - e) What is DSM? How it helps in energy management?
 - f) What is PI?
 - g) The name plate of motor shows the motor is rotated at 22 KW its efficiency is 91.1% the actual power is measured was 13K watt estimate % loading of motor.
 - h) Write the formula for FAD- capacity of air compressor in term of system parameters.
- Q.7 a) Briefly explain simple payback period and its advantages and disadvantages. 08
b) Explain in detail the importance of power factor in energy conservation program. 07
- Q.8 a) What are the different methods of automatic power factor controller explain in brief. 08
b) A 10KVAR, 415 V rated, P.F. capacitor was found to be having terminal supply voltage of 440V calculate the capacity of the P.F. capacitor at the operating voltage. 03
c) Explain energy efficiency and optimization. 04
- Q.9 Explain in detail the procedure carry- out the energy audit of a typical thermal power plant. Which instruments are required to evaluate the performance? Suggest energy conservation measures to improve the performance of thermal power plant. 15
- Q.10 Write short notes on any three 15
- a) ISO-50,001- energy management system.
 - b) Advantages of demand side management
 - c) Soft starter
 - d) Energy performance assessment of a typical steel plant.

Total No. of Printed Pages:2

SUBJECT CODE NO:- K-176
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(EEP/EE/EEE) Examination Oct/Nov 2016
Special Purpose Electrical Machines
(Revised)

[Time: Three Hours]

[Max. Marks:80]

Please check whether you have got the right question paper.

- N.B
- i) Question 1& 5 are compulsory.
 - ii) Solve any two question from remaining of each section.

'Section A'

- Q.1 Solve any five from the following – 10
- a) What are main application of Linear Induction Motor.
 - b) Why fractional horse power motors are used in day to day life.
 - c) What is meant by voltage regulation?
 - d) Write the two application of Reluctance motor.
 - e) Why Stepper motor called so?
 - f) Why the Induction Generator is often called as an asynchronous generator?
 - g) What are the main advantages of BLDC motor?
 - h) Draw the equivalent circuit of self-excited Induction Generator.
- Q.2
- a) Explain application of Induction Generator for grid connected wind and mini/micro hydel system. 08
 - b) Explain different methods of Voltage control in Induction Generator. 07
- Q.3
- a) Explain construction and working of hybrid stepper motor. 08
 - b) Describe the construction and working of Linear Induction motor. 07
- Q.4
- a) Give the comparative study of three types of stepper motor. 08
 - b) Explain operation of PMSM motor. 07
- Q.5
- a) Explain the self-excitation requirement in case of Induction generator. 08
 - b) Describe construction and working of BLDC motor. 07

'Section B'

- Q.6 Solve any five - 10
- a) What is high frequency transformer and its applications?
 - b) What is buck-boost transformer?
 - c) Why electric heating is preferred over other form of heating?
 - d) Define convection of heat.
 - e) Name two gases used in MIG welding.
 - f) What is butt welding?
 - g) Why arc welding is sometimes called the non-pressure welding?
 - h) State Faraday's first law of electrolysis?
- Q.7 a) How does a buck boost transformer differ from an isolating transformer? Can buck-boost transformers be used to power low voltage circuit? 08
- b) Explain Rectifier transformer in detail with application. 07
- Q.8 a) Explain different methods of Induction heating. Give some application of Induction heating. 08
- b) What is dielectric heating? Explain the factors on which dielectric loss in dielectric material depend. 07
- Q.9 a) Describe briefly the various types of arc welding process using industry. 08
- b) Explain MIG welding in detail? 07
- Q.10 a) Explain the refining process metal using law of Electrolysis. 08
- b) Explain in brief the principle of Electro deposition. Define current efficiency in electrolytic process. 07

SUBJECT CODE NO:- K-301
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(EEP/EE/EEE) Examination Oct/Nov 2016
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 and Q.No.6 are compulsory.
 - ii) Attempt from each section, any two questions from the remaining questions.
 - iii) Assume suitable data wherever necessary.

Section A

Q.1 Solve any five questions of the following. 10

- (i) What are the advantages of per unit computations?
- (ii) If the reactance in ohms is 15Ω find the p. u. Value for a base of 15 KvA and 10 Kv.
- (iii) What are the approximations made in reactance diagram?
- (iv) What is bus impedance matrix?
- (v) What is load flow study?
- (vi) What is need of slack bus?
- (vii) Define terms: Oriental graph, cotree.
- (viii) What are symmetrical components?

Q.2 a) For a 3 ϕ power system, the ratings are as below. 08

- $G_1: 60 \text{ MVA}, 20 \text{ KV}, x = 9\%$
- $T_1: 50 \text{ MVA}, 20/200\text{kv}, x = 10\%$
- $T_2: 50\text{MVA}, 20/200\text{KV}, X=10\%$
- $M: 43.2 \text{ MVA}, 18 \text{ kv}, x = 8\%$
- $\text{Line}: 200\text{kv}, z = 120 + j200\Omega$

Draw impedance diagram showing all impedances in p. u on a 100 MVA base. Choose 20 kv as the voltages base for generator. 07

- b) Derive the expression for complex power in 3 ϕ balance load.

Q.3 a) Explain major problems encountered in load flow studies. 08

- b) For the power system shown in fig. 2 find A, \hat{A} , \hat{B} & K 07

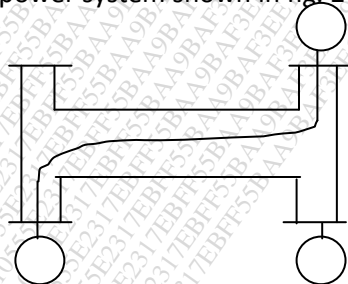


Fig. No. 2

Q.4 a) Explain fast decoupled method algorithm for load flow study. 08

- b) Find the bus admittance matrix for the given network as shown in Fig 3. Determine the reduced admittance matrix by eliminating node 4. The values are marked in per unit. 07

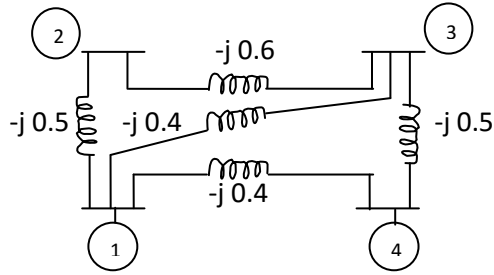


Fig. 3

- 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 are $200\angle 0^\circ$, $100\angle 255.5^\circ$ and $200\angle 151^\circ V$. Find the line currents from the symmetrical components of the line voltages. 07

Section-B

- Q.6 Solve any five questions of the following. 10
- (i) What are symmetrical components complex number operator properties?
 - (ii) Define short circuit interrupting MVA of a circuit breaker?
 - (iii) Give the classification of faults occurs on system.
 - (iv) What are sequence impedance and the sequence network?
 - (v) What is the reason for transient during short circuits?
 - (vi) Define sub transient reactance.
 - (vii) Why the C.B. interrupting current is asymmetrical?
 - (viii) What is different between L-G & L-L fault?
- Q.7 a) Explain the sequence impedance and networks of synchronous machine. 08
 (i) Positive sequence Impedance and network.
 (ii) Negative sequence Impedance & network.
 b) A transmission line of inductance 0.1 H and resistance $5\ \Omega$ is suddenly short circuited at $t=0$ at the bar end as shown in Fig. 4. Find approximately the value of the first current maximum. 07

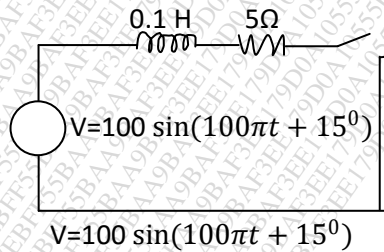


Fig. 4

- Q.8 a) Explain bus building for type 2 and types 3 modifications. 08
 b) Determine the symmetrical components of the three currents. 07
 $I_a = 10\angle 0^\circ$, $I_b = 10\angle 230^\circ$ and $I_c = 10\angle 130^\circ\text{ AMP}$

- Q.9 a) Derive an expression to determine fault current for L-G fault. Draw the sequence network. 08
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 10 p. u. The positive, negative and zero sequence reactance of the generator are respectively, $j 0.35$, $j 0.25$, and $j 0.20$ p.u and its star point is isolated from ground. 07
- Q.10 a) Explain the contingency selection. 08
b) Explain the basic concept and system security functions in energy control centre. 07

Subject Code : 06

FACULTY OF ENGINEERING & TECHNOLOGY
T.E. (EEP/EE/EEE) Rev. Examination
NOVEMBER/DECEMBER, 2016
Electrical Machine Design

Time: Three Hours

Max. Marks : 80

“Please check whether you have got the right the question paper”

- Note: i) *Q.No. 1 and Q.No. 6 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 : 2x5=10
- (a) What do you mean by electrical machine design?
 - (b) Enlist the limitations in design.
 - (c) What do you mean by magnetic leakage and fringing?
 - (d) What are advantages of semienclosed slots provided in stator of induction motor.
 - (e) What do you mean by output coefficient in rotating machine?
 - (f) What do you mean by magnetic circuit calculations?
 - (g) What happen if air gap length is doubled in rotating machine?
 - (h) What do you mean by specific magnetic loading?
- Q.2 (a) Derive an expression for mmf required for air gap an armature with slots and ducts. 07
- (b) Determine the apparent flux density in the teeth of D.C. machine when real flux density is 2.15 wb/m slot pitch 28 mm, slot width 10mm and gross core length 0.35 m, the number of ventilatin. Duets is 4, each 10mm wide. The magnetizing force for a flux density of 2.15 wb/m² 55000 A/m. The iron stacking factor is 0.9. 08
- Q.3 (a) Explain in detail various types of slots used in stator of 3-ph induction motor. 07
- (b) Estimate the main dimensions, air gap length no of stator slots for 3-ph. 20 Hp, 400v, 6pole, 50 Hz, 970 rpm induction motor suitable for star/Delta starting. Assume $B_{av}=0.45$ wb/m² $a_c=23000$ ac/m full load efficiency 0.88 and $pf=0.89$ lagg. 08
- Q.4 (a) Explain the variants factors for selection of air gap length in induction motor. 07
- (b) A 11 kW, 3 phase, 6 pole, 50 Hz, 220 V, star connected induction motor has 54 stator slots, each containing 9 conductors, calculate the value of bar current and endring current, the no of rotor bar is 64 the machine has efficiency of 0.86 and power factor of 0.85. The rotor mmf may be assumed as 85% of stator mmf. 08
- Q.5 Attempt any three : 5x3=15
- (a) Different approaches and electrical machine design.
 - (b) Carter's coefficient and its significance.
 - (c) Choice of specific loadings in 3-ph induction motor.
 - (d) Output equation of a.c. machines.

P.T.O.

K – 2016

Subject Code : 06

-2-

SECTION-B

- Q.6 Attempt any Five : 2x5=10
- (a) What do you mean by heating and cooling cycle of transformer?
 - (b) State the advantages of stepped core in transformer.
 - (c) Define heating time constant.
 - (d) Give two comparisons of distribution and power transformer.
 - (e) Explain why L.V. winding is placed near to the core of transformer.
 - (f) Enlist the various cooling methods provided for transformer.
 - (g) Define window space factor.
 - (h) What is the range of flux density in the design of transformer as per the standards.
- Q.7 (a) Derive the output equation of 3-phase transformer. 07
- (b) A 3-ph, 50 Hz, oil cooled core type transformer has following 08
dimensions. Distance between core centres = 0.2m, Height of window = 0.24 m, Dia of circumscribing circle=0.14 m.
 $B_m = 1.25 \text{ wb/m}^2$
 $\delta = 2.5 \text{ A/mm}^2$
Estimate the KVA rating.
Assume $k_w = 0.2$, $A_i = 0.56d^2$ for two stepped core.
- Q.8 (a) For a 3-phase transformer derive the relation $E_t = K\sqrt{Q}$. 07
- (b) The ratio flux to full load mmf in a 400 KVA, 50 Hz, single phase core 08
type power transformer is 2.4×10^{-6} . Calculate the net iron area and the window area of the transformer. Maximum flux density in the core is 1.3 wb/m^2 . Current density 2.7 A/mm^2 and window space factor 0.26. also calculate the full load mmf.
- Q.9 (a) Derive the expression for calculation of no. of cooling tubes provided on 07
surface and transformer tank.
- (b) A 250 KVA, 6600 / 400 V, 3-phase core type transformer has a total 08
loss of 4800 watts at full load. The transformer tank is 1.25 m height and 1m x 0.5m in plan. Design a suitable scheme for tubes if average temp. rise is to be limited to 35°C . The diameter of tube is 50mm and are spaced 75mm from each other. The average height of tube is 1.05m.
Specific heat dissipation due to radiation and convection is respectively 6 and $6.5 \text{ W/m}^2\text{-}^\circ\text{C}$. Assume that convection is improved by 35 percent due to provision to tubes.
- Q.10 Attempt any three : 5x3=10
- (a) Function of conservator and breather in transformer.
 - (b) Types and mechanical forces developed under short circuit condition in transformer.
 - (c) Design of choke coil.
 - (d) Window space factor and its significance in transformer.

K – 2016

SUBJECT CODE NO:- K-234
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(EEP/EE/EEE) Examination Oct/Nov 2016
Control System Engineering
(Revised)

[Time: Three Hours]

[Max. Marks:80]

Please check whether you have got the right question paper.

N.B

- i) Attempt any Three questions from each section.
- ii) Question No.1 and Q. No.6 are compulsory.
- iii) Solve any two questions from remaining from each section.

Section A

- Q.1 Solve any five. 10
- a) Give the important features of feedback.
 - b) Give the advantages of transfer function.
 - c) What do you mean by linear and non linear system?
 - d) What is the need for block diagram reduction?
 - e) Define node and branch in signal flow graph.
 - f) Define settling time and Peak overshoot.
 - g) What is velocity error coefficient.
 - h) Define damping and damping ratio.
- Q.2 a) Determine the overall transfer function $C(s)/R(s)$ for the system shown in fig 1. 08

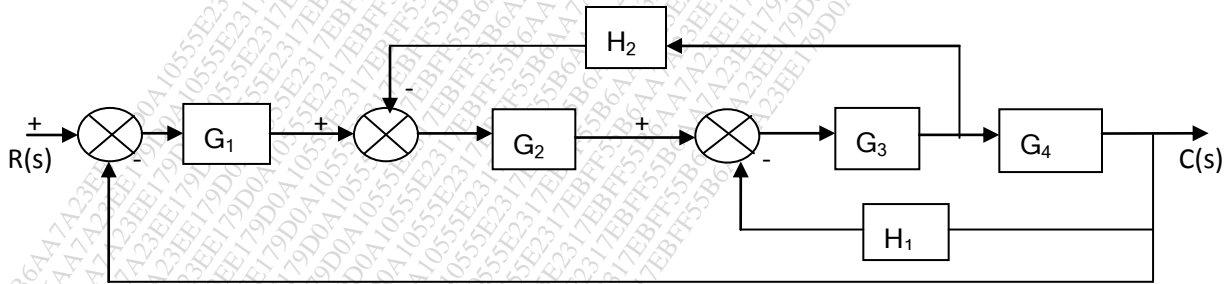


Fig 1.

- b) For the mechanical system as shown in fig 2 draw the F-V and F-I analogous circuit. 07

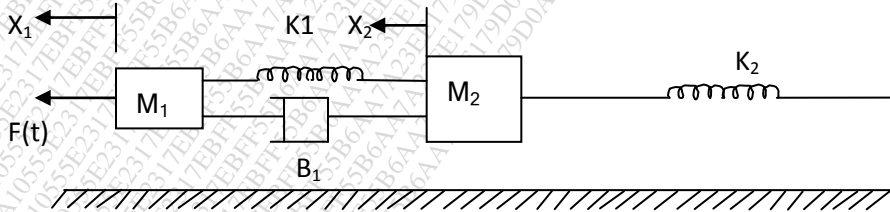


Fig 2.

- Q.3 a) Derive the expression for time response of second order system for step input. 08
 b) Consider the system as shown in fig 3. Determine the value of a such that the damping ratio 0.5. Also 07
 obtain the values of rise time and maximum overshoot M_p in its step response.

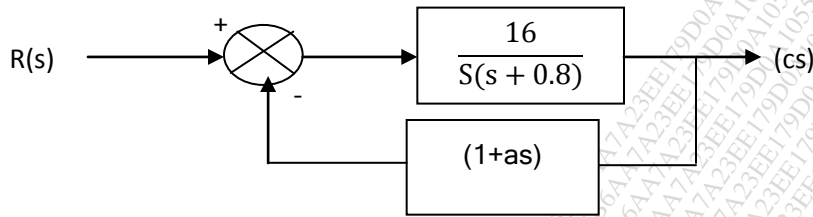


Fig 3.

- Q.4 a) Explain the synchros and its types. 08
 b) Find the static error coefficient for a system whose. 07

$$G(s)H(s) = \frac{10}{s(1+s)(1+2s)}$$

also find the steady state error for $r(t) = 1 + t + t^2/2$.

- Q.5 a) The open loop transfer function of a unity feedback control system is given by 08

$$G(s) = \frac{K}{(s+2)(s+4)(s^2+6s+25)}$$

Determine the value of K and corresponding oscillation frequency

- b) draw the polar plot of 07

$$G(S) = \frac{10}{s(s+1)(s+2)}$$

Section B

- Q.6 Solve any Five. 10

- Define the phase margin.
- What is mean by gain crossover frequency and phase cross over frequency?
- What is meant by frequency response of system?
- What is sensitivity?
- What are Compensators?
- What is lag Compensator?
- Define BIBO stability.
- What is centroid? How the centroid is calculated?

- Q.7 Sketch the root locus of the system has an open loop transfer function 15

$$G(S) = \frac{K}{s(s+4)(s^2+4s+20)}$$

- Q.8 Sketch the Bode plot and hence find Gain crossover frequency, phase crossover frequency, Gain margin and phase margin. 15

$$G(S) = \frac{10(1+0.1s)}{s(1+0.01s)(1+s)}$$

Q.9 a) A system is given by the following equations

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

$$y(t) = \begin{bmatrix} 1 & 2 \\ 1 & 0 \\ 1 & 1 \end{bmatrix} x(t)$$

Find the transfer functions of system.

b) Find the state transition matrix for

$$\begin{aligned} \dot{x}_1 &= x_2 \\ \dot{x}_2 &= -6x_1 - 5x_2 \end{aligned}$$

Q.10 a) Determine the controllability of the equation.

$$\dot{x} = \begin{bmatrix} 1 & 1 & 0 \\ 0 & 1 & 0 \\ 0 & 1 & 1 \end{bmatrix} x + \begin{bmatrix} 0 & 1 \\ 1 & 0 \\ 0 & 1 \end{bmatrix} u$$

$$y = [1 \ 1 \ 1] x$$

b) Explain the procedure for lag-lead Compensation.

08

07

07

08

SUBJECT CODE NO:- K-266
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(EEP/EE/EEE) Examination Oct/Nov 2016
Microprocessor & Interfacing
(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. Solve any two questions from remaining questions from each section A and B.

Section A

- Q.1 Solve Any five: 10
- a. What do you mean by address bus?
 - b. What is the function of accumulator?
 - c. What is a flag?
 - d. Define opcode and operand.
 - e. Write the instructions that perform the logical operations.
 - f. Define two byte instruction with one example.
 - g. What is the CALL instruction?
 - h. Write the control and status signals.
- Q.2
- a) Explain the Pin diagram of 8085. 08
 - b) Explain the direct addressing modes and indirect addressing modes of 8085. 07
- Q.3
- a) Write a ALP to multiply two 8 bit numbers stored in memory location 2200H and 2201H store the result in memory location 2300H and 2301H. 08
 - b) Explain 8085 stack in detail. 07
- Q.4
- a) Write an ALP to add 16 bit number in memory locations 4000H and 4001H to a 16 bit number in memory locations 4002 and 4003H. The most significant 8 bits of the two numbers to be added are in memory locations 4001H and 4003H. Store the result in memory location 4004H and 4005H with the most significant byte in memory location 4005H. 08
 - b) With suitable examples explain 8085 instruction set in detail. 07
- Q.5
- a) Write a 8085 ALP to convert the hexadecimal value to decimal value. 08
 - b) Write short note on memory interfacing. 07

Section B

- Q.6 Solve any five. 10
- a. Mention the purpose of SID and SOD lines.
 - b. What is the use of stepper motor?
 - c. What is USART?
 - d. What are the functions performed by 8251.
 - e. What is the output mode used in 8279?

- f. What are the modes of operations used in 8253? 08
 - g. Write the features of mode 0 in 8255. 07
 - h. Draw and write the register organization of 8257. 08
- Q.7
- a) Describe a scheme to demultiplex the multiplexed AD₀ – AD₇ bus of 8085. 08
 - b) Explain the block diagram and the functions of each block of 8251 USART. 07
- Q.8
- a) Explain the functional Pin diagram of 8051 microcontroller. 08
 - b) Discuss the register set of 8051. 07
- Q.9
- a) Explain the block diagram of the 8279 keyboard / Display interface and its operation. 08
 - b) Discuss the architecture and working of 8253 timer. 07
- Q.10
- a) Explain the register organization of 8257. 07
 - b) Write short note on. 08
 - 1) Machine cycle.
 - 2) Instruction cycle.