Duration 3hrs   **Total Marks -80**

N.B.:-   (1) Question No.**1** is compulsory.

   (2) **Attempt** any **three** questions out of remaining **five** questions.

   (3) Draw neat diagrams wherever it is necessary.

Q 1.   Answer the following questions.
   A)   Write a short note on phase shift in star-delta transformers.   **05**
   B)   Discuss the phenomenon of corona.   **05**
   C)   Explain the following typical cases of line specifications;   **05**
         1) Open circuited line.
         2) Short circuited line.
   D)   What is tower footing resistance?   **05**

Q 2 a) Explain in brief Selection of circuit breakers and short circuit MVA.   **10**
Q 2 b) Discuss Z_{BUS} building algorithm.   **10**

Q 3 a) Derive the necessary equation to determine the fault current for a line-to-line fault. **10**
             Draw the diagram showing the inter-connection of sequence networks.
Q 3 b) Explain the zero sequence impedance networks of transformer.   **10**

Q 4 a) Discuss the phenomenon of wave reflection and refraction. Derive expressions for **10**
             reflection and refraction coefficients.
Q 4 b) How can Bewely Lattice be drawn? Discuss its use.   **10**

Q 5 a) Define disruptive critical voltage and visual critical voltage. On what factors do they **10**
             depend? Derive the equations for calculating these voltages.
Q 5 b) Discuss the use of ;   **10**
             a) Ground wires.
             b) Surge arrestors.

Q 6 a) Explain surge impedance loading. Also Explain the effect of line length, load **10**
             power and power factor on voltage and reactive power.
Q6   b) Discuss the maximum power transfer and stability considerations in transmission **10**
             line.

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55456

Paper / Subject Code: 36902 / ELECTRICAL MACHINES -III

Time: **3 Hrs**   Marks:**80**

Instructions:

- Question No: 1 is compulsory.
- Answer any three from the remaining five questions.
- Figures to the right indicate full marks.
- Assume any suitable data wherever required but justify the same.
- Answers to questions should be grouped and written together.

Q1 **a)** Derive active and reactive power equation of Salient pole synchronous machine. What is the significance of reluctance power?   **10**

b) By using excitation circle and power circle explain development of V curves and O curves   **10**

Q2 **a)** Explain Steady state analysis of synchronous machine   **10**

b) How armature reaction influences the field distribution of alternator. Illustrate the effect under different power factor   **10**

Q3 **a)** Explain Blondel's two reaction theory   **10**

b) A three phase, 50Hz, 2 pole star connected alternator has 54 slots with 4 conductors per slot. The pitch of the coil is one slot less than the pole pitch. If the machines give 3300 V between lines on open circuit with sinusoidal flux distribution determine the useful flux per pole   **10**

Q4 **a)** A 220 V , 50 Hz 6 pole star connected alternator with ohmic resistance of 0.06 Ω / phase , gave the following data for O.C and S.C characteristics   **12**

Field current If(amp)	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.8	2.2	2.6	3.0	3.4
O.C.voltage Ef (volts)	29	58	87	116	146	172	194	232	261.5	284	300	310
S.C.current Isc (amp)						40			---	---	---	---

Find % voltage regulation at full load current of 40 amp at 0.8 p.f. lagging by EMF method and MMF method

b) Explain with phasor diagram why short circuit characteristics of a generator is a straight line.   **8**

Q5 **a)** Derive the expression for active and reactive power of salient pole synchronous machine. Also plot P-δ curve.   **10**

b) Explain the need and operation of synchronous condenser   **10**

Q6 Write short notes on any two   **20**

a) Synchronizing power and synchronizing torque

b) Synchronous motor starting methods

c) Parallel operation

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55418

Duration – 3 Hours   **Total Marks - 80**

N.B.:- (1) Question No.**1** is compulsory.
    (2) **Attempt** any **three** questions out of remaining **five** questions.
    (3) Assume suitable data if necessary and justify the same.

Q 1.   Answer the following questions.   **20**
    A) What are the advantages of Track Electrification?
    B) Explain the effect of adhesion on train movement.
    C) Draw and explain any two types of photometers.
    D) What are the different configurations of Hybrid Electric Vehicle?

Q 2 a)   What are different methods of approximation of speed-time curves?   **10**

Q 2 b)   Write a detailed note on tractive effort.   **10**

Q 3 a)   Explain working principle of Incandescent Lamps. Compare Incandescent Lamps   **10**
    with Fluorescent Lamps.
Q 3 b)   Write short notes on different methods of electric welding.   **10**

Q 4 a)   Draw and explain different types of refrigeration cycle.   **10**
Q 4 b)   Draw and explain speed control methods for traction purpose   **10**

Q 5 a)   Write a short note on specific energy consumption of traction.   **10**
Q 5 b)   Explain and Compare the types of motors used for traction in EV/HEV   **10**

Q 6 a)   Draw and explain the electric circuit of a domestic refrigerator.   **10**
Q 6 b)   Explain and the working principle of arc furnace with emphasis on power supply   **10**
    requirements for the same.

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57261

Q.P. CODE: 38390

Time: 3 Hours   **Marks: 80**

Note:
- Question No. 1 is compulsory.
- Answer any **three** from the remaining five questions.
- Assume suitable data if necessary and justify the same.

Q. 1   **Answer any FOUR of the following**   20

a.   What is the significance of gain margin and phase margin of a system?
b.   Define break-away point and break-in point in root locus plot of a system.
c.   Represent the given system in phase variable form of state space representation. Also draw SFG.

$$G(s) = \frac{s^2 + 35s + 120}{(s + 8)(s + 9)(s + 7)}$$

d.   Compare open loop and closed loop control systems with the help of suitable example.
e.   Obtain series electrical analog of the following system.
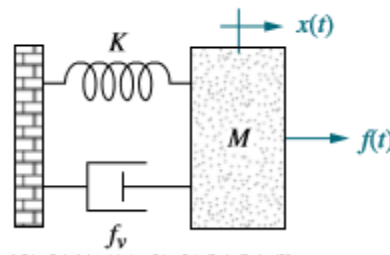
Q.2   a.   Reduce the block diagram shown below to a single block representing the   10
transfer function, G(s) = C(s)/R(s)
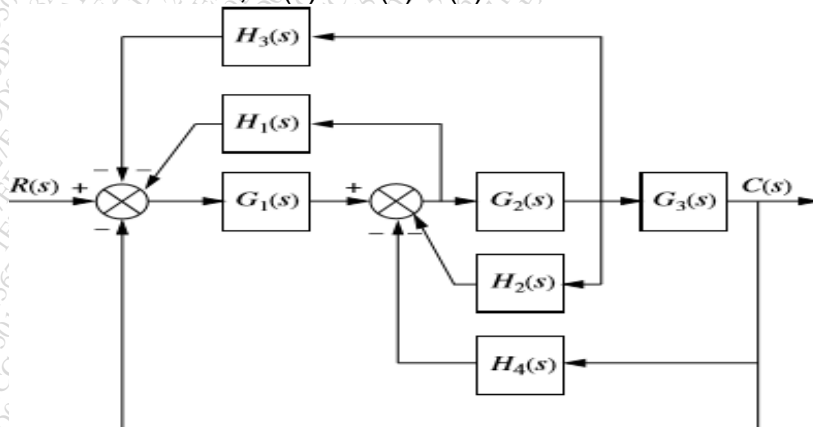
b. Draw Bode plot for the following unity feedback system, determine ω_{gc}, ω_{pc},PM, GM and comment on the stability of the system. **10**

$$G(s) = \frac{(s+3)}{(s+2)\,(s^2+2s+25)}$$

Q.3 a. Using Mason's rule, find the transfer function, G(s)=C(s)/R(s) for the system represented by **10**
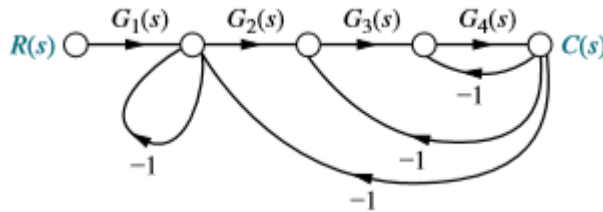
b. Given the system represented in state space as follows: **10**

$$\dot{x} = \begin{bmatrix} 1 & -1 & 1 \\ 2 & 1 & 3 \\ -2 & -1 & -3 \end{bmatrix} x + \begin{bmatrix} 7 \\ 1 \\ -2 \end{bmatrix} u$$

$$y = \begin{bmatrix} 1 & -3 & 4 \end{bmatrix} x$$

Convert the system to one where the new state vector, z is

$$z = \begin{bmatrix} 4 & -1 & 0 \\ 2 & 3 & -2 \\ 8 & 5 & 1 \end{bmatrix} x$$

Q.4 a. For the following unity feedback system, using Routh Hurwitz criteria determine the range of K to ensure stability. What should the value of K for the system response to oscillate, and determine the frequency of oscillation. **10**

$$G(s) = \frac{K(s^2+1)}{(s+1)(s+2)}$$

b. Obtain Laplace transform solution of the following system. Consider unit step signal as input to the system **10**

$$\dot{x} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -1 & -2 & -3 \end{bmatrix} x + \begin{bmatrix} 10 \\ 0 \\ 0 \end{bmatrix} u$$

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

Q.5 a. Derive and explain Nyquist stability criteria. **10**

b. For each pair of second order system specifications that follows, find the location of the second order pair of poles. **10**
   a. %OS = 15%; Ts=0.6 sec
   b. %OS = 10%; Ts=4 sec

Q.6 a. A unity feedback system has an open-loop transfer function   10
$$G(s) = \frac{K(s + 1)}{s(s - 1)}$$
Sketch the root locus and determine the range of K for the system to be stable.

   b. A unity feedback system has the following forward path transfer function: 10
$$G(s) = \frac{1000(s + 8)}{(s + 7)(s + 9)}$$

   a. Evaluate system type, K_p, K_v and K_a.
   b. Use answer in (a) to find steady state errors for standard step, ramp and parabolic inputs
   c. Explain how many integrations in the forward path are required to get zero steady state error for standard step, ramp and parabolic inputs.

(3 Hours) [Total Marks:80]

N.B. **(1)** Question no.1 is compulsory.
      (2) Attempt any three from the rest.
      (3) Make any suitable assumption wherever required.

Q.1   Answer any four.
  (a) What is timer roll over in PIC 18? What happens after roll over?   5M
  (b) Explain the Status Register of PIC18 Microcontroller.   5M
  (c) Explain the pipelining concept in PIC18 Microcontroller   5M
  (d) What is the difference between interrupt and polling?   5M
  (e) What are the steps taken by the microcontroller when an interrupt is activated?   5M

Q.2 **(a)** Which are the different addressing modes of PIC18 Microcontroller?   10M
  (b) Explain the memory organization (Program and Data Memory) of PIC18 Microcontroller.   10M

Q.3 **(a)** Explain stack and subroutine. Also explain the instructions associated with them.   10M
  (b) Write a C18 program to transmit message "YES" serially at 9600 baud rate, 8 bit data and 1 stop bit. Do this continuously.   10M

Q.4 **(a)** Explain the following terminology related to PIC18   10M
      1) USART   2) SPBRG
      3) TXSTA   4) RCSTA
  (b) Write an Assembly language program using Timer 0 to generate a square wave of 200Hz frequency on Port A pin RA0. Use 16 bit programming technique with 64 prescaler. The internal frequency is 10MHz.   10M

Q.5 **(a)** Explain Global Interrupt Enable (GIE) and Peripheral Interrupt Enable (PEIE) concept with appropriate logical diagram. Also explain INTCON resister.   10M
  (b) Write an Assembly language program to rotate the stepper Motor by monitoring the status of switch connected to pin RC2 and do the following   10M
      (1) If switch = 0, the stepper motor moves clockwise.
      (2) If switch =1, the stepper motor moves anticlockwise.
  Also draw the interfacing diagram.

Q.6   Write a short note on any two
  (a) Seven segment LED interfacing with PIC 18 Microcontroller.   10M
  (b) LCD interfacing with PIC 18 Microcontroller.   10M
  (c) CCP modules of PIC 18 Microcontroller.   10M

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Paper / Subject Code: 36906 / PROJECT MANAGEMENT

[Time: 3 Hours]   [Marks:80]

Please check whether you have got the right question paper.

N.B: 1.   Question No.1 is compulsory.

2.   Attempt **any three** questions out of remaining **six** questions.

3.   Assume suitable data if necessary and justify the same.

Q.1   Attempt **any four** of the following.   **20**
 a)   What happens if the projects are not managed properly?
 b)   What is the difference between functional manager and project manager?
 c)   Explain the Maslow's hierarchy of motivation.
 d)   What is the importance of resource allocation in projects?
 e)   Differentiate bet CPM and PERT.

Q.2   a)   Explain the planning phase of a project in detail.   **10**
 b)   Explain the profitability calculation methods used in PM.   **10**

Q.3   a)   Why it is important to consider social cost benefits in project?   **10**
 b)   Write a detailed note on types of communication required in projects.   **10**

Q.4   a)   What is meant by risk analysis? How it is done?   **10**
 b)   What are the sources of finance in projects?   **10**

Q.5   a)   What is the process of crashing the activities in project? Explain.   **10**
 b)   Explain the importance of SWOT analysis and how it is done?   **10**

Q.6   a)   What is meant by market and demand? Explain.   **10**
 b)   Explain how contract management is done?   **10**

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55593