Hall Ticket Number :

R-15

Code: 5G241

II B.Tech. II Semester Supplementary Examinations December 2022
Electrical Machines-II
(Electrical and Electronics Engineering)

Max. Marks: 70   Time: 3 Hours
Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)
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UNIT–I

1. a) Discuss the constructional details of a 1- Transformer.   7M
    b) Explain the principle of operation of a transformer. Derive its EMF equation.   7M

OR

2. Arrive at the phasor diagram of transformer when it is operating under load and explain.   14M

UNIT–II

3. Describe the method of calculating the regulation and efficiency of a single-phase transformer by OC and SC tests?   14M

OR

4. Define all day efficiency of a transformer and Why transformers are rated in KVA but not in KW?   14M

UNIT–III

5. a) Write short notes on three winding transformer.   7M
    b) With the help of connection and vector diagrams how a 2- supply can be obtained from 3- supply.   7M

OR

6. Compare a Three –phase transformer with single phase transformer in detail.   14M

UNIT–IV

7. a) Explain the principle of operation of Induction motor.   7M
    b) Explain why an induction motor will never run at its synchronous speed?   7M

OR

8. a) Describe the constructional details of cage and wound rotor induction machines.   7M
    b) Explain how rotating magnetic field of constant amplitude is produced in 3-phase induction motor.   7M

UNIT–V

9. Explain the principle of operation of Induction generator with the help of torque -speed characteristics. 14M

OR

10. Describe the starting methods of three phase induction motor.   14M

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II B.Tech. II Semester Supplementary Examinations December 2022
Linear Control Systems
(Electrical and Electronics Engineering)

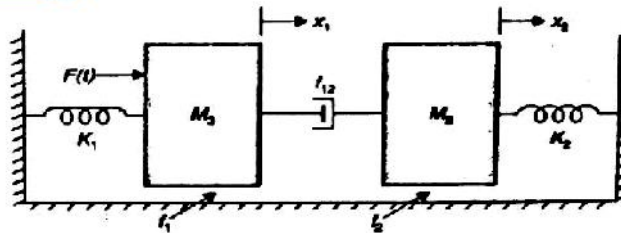Max. Marks: 70   Time: 3 Hours
Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)
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Marks   CO   BL

UNIT–I

1. a) Write the differential equations for the given mechanical system. Also obtain an analogous electrical circuit based on force- current analogy.

                                                                              8M   1   2

   b) Derive the transfer function of an AC servo motor   6M   1   2

OR

2. a) Explain the properties of Signal Flow Graph   7M   1   1

   b) Explain about Synchros with figures   7M   1   1

UNIT–II

3. Derive the time domain specifications of a second order system   14M   2   1

OR

4. Define Transfer Function, Characteristic equation, Poles, Zeros, Type & Order of a System with examples.   14M   2   1

UNIT–III

5. A unity feedback control system has an open loop transfer function of $G(s) = K /s(s^2+4s+3)$. Sketch the root locus   14M   3   2

OR

6. a) By Routh stability criterion determine the stability of the system represented by characteristics equation $9S^5-20S^4+10S^3-S^2-9S-10=0$. Comment on the location of characteristic equation.   10M   3   2

   b) Define stability of a control system   4M   3   1

UNIT–IV

7. Plot the bode diagram for the transfer function $G(S) = K/ S(1+0.4S)(1+0.1S)$. Also obtain the gain and phase cross over frequencies   14M   3   2

OR

8. The open loop transfer function of a unity feedback system is given by $G(s) = K/ S(S+2)(S+1)$. Sketch the Polar plot and Determine gain margin and phase margin   14M   3   2

UNIT–V

9. Design a lead compensator for a system with transfer function $G(s) = k/s^2$ for the specifications: acceleration error constant K_a=10 and phase margin $\varphi PM = 35^o$ 14M   4   2

OR

10. a) Define Observability and explain with an Example   7M   4   2

    b) Define Controllability and explain with an Example   7M   4   2

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