R20

SET - 1

I B. Tech I Semester Supplementary Examinations, March- 2022
BASIC ELECTRICAL ENGINEERING
(Com. to ECE, EIE, ECT)

Time: 3 hours   Max. Marks: 70

Answer any five Questions one Question from Each Unit
All Questions Carry Equal Marks
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UNIT-I
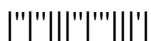
1 a) Distinguish between   (7M)
        (i) self-excited and separately excited dc machines
        (ii) lap connected and wave connected dc machines
   b) A 6-pole lap wound dc generator has 250 armature conductors, a flux of 0.04 Wb   (7M)
        per pole and runs at 1200 rpm. Find the generated emf.
                                                Or
2 a) What is the necessity of a starter in a dc motor? Explain with the help of aneat   (7M)
        sketch the principle of operation of a three-point starter
   b) A shunt wound motor with an armature resistance of 0.2 W is connected across a   (7M)
        400 V supply. The armature current is 40 A and the speed of the motor is 1000
        rpm. Calculate the additional resistance which should be connected in series with
        the armature to reduce its speed to 700 rpm. Assume that the armature current
        remains the same

UNIT-II

3 a) Derive the emf equation of a Single-phase transformer   (7M)

   b) The primary winding of a 50 Hz transformer is supplied from a 440 V, 50 Hz   (7M)
        source and has 200 turns. Find the (i) peak value of flux (ii) voltage induced in the
        secondary winding if it has 50 turns.
                                                Or
4 a) List and explain the various losses that occur in a transformer   (7M)

   b) Find the efficiency of a 150 kVA transformer at 25% full load at0.8 power factor   (7M)
        lagging if copper losses are 1600 W at full load and iron losses are 1400 W.

UNIT-III

5 a) Explain the operating principle of a Synchronous generator   (7M)

   b) Explain the procedure to calculate the voltage regulation of a synchronous   (7M)
        generator by synchronous impedance method
                                                Or
6 a) Explain the terms Coil span or pitch factor and Distribution factor w.r.t   (7M)
        synchronous machine
   b) Explain the constructional aspects of a synchronous motor and also explain its   (7M)
        principle of operation.

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UNIT-IV

7   a)   Explain the construction and principle of operation of a Three phase induction motor   (7M)

    b)   A three-phase, 50 Hz., 6-pole induction motor runs at 950 rpm. Calculate   (7M)
(i) the synchronous speed
(ii) the slip and
(iii) Frequency of the rotor emf.

<div align="center">Or</div>

8   a)   What are the two types of induction motor? Describe the advantages and disadvantages of these motors?   (7M)

    b)   List and explain the various methods of starting the three – phase induction motor   (7M)

UNIT-V

9   a)   Explain the working of Split phase induction motor with a neat schematic diagram   (7M)

    b)   Explain the working of AC Servo motor with necessary diagram   (7M)

<div align="center">Or</div>

10   a)   Explain the working of capacitor start and capacitor run single phase induction motor with a neat schematic diagram   (7M)

    b)   Explain the construction and working principle of a shaded pole motor.   (7M)