Code No: R201214 **R20** SET - 1

I B. Tech I Semester Regular Examinations, September- 2021

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) Cumulatively wound and differentially wound dc machines.
(ii) Long shunt and short shunt dc machines.

b) A 4-pole generator with 400 armature conductors has a useful flux of 0.04 Wb per pole. What is the emf produced if the machine is wave wound and runs at 1200 rpm? What must be the speed at which the machine should be driven to generate the same emf if the machine is lap wound? (7M)

Or

2 a) What is meant by back emf? Explain the principle of torque production in a dc motor. (7M)

b) An 8-pole, 400 V shunt motor has 960 wave connected armature conductors. The Full load armature current is 40 A and the flux per pole is 0.02 Wb. The armature Resistance is 0.1 W and the contact drop is 1 V per brush. Calculate the full load speed of the motor. (7M)

UNIT-II

3 a) Draw and explain the equivalent circuit of a Single-phase transformer. (7M)

b) A single-phase transformer has 400 primary and 1000 secondary turns. The net cross-sectional area of the core is 60 cm^2. The primary winding is connected to a 500 V supply. Find the (i) peak value of the core flux density and the (ii) emf induced in the secondary winding. (7M)

Or

4 The efficiency of a 10 kVA, 2000/400 V single phase transformer at unity power factor is97% at rated load and also at half rated load. Determine the transformer core losses and copper losses. (14M)

UNIT-III

5 a) Distinguish in detail between Salient pole type and Non – salient type of rotor in synchronous machine. (7M)

b) A 2500 V, three-phase star connected synchronous motor has a resistance of 0.35 W per phase and synchronous reactance of 2.2 Ω per phase. The motor is operating at0.75 power factor leading with a line current of 250 A. Determine the excitation voltage per phase. (7M)

Or

6 a) Derive the expression for induced emf in a synchronous machine. (7M)

b) Distinguish in detail between the synchronous motor and Three phase induction motor. (7M)
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UNIT-IV

7 a) Explain the concept behind the production of rotating field in a three-phase induction motor. (7M)

b) The frequency of the emf in the stator of a 4-pole induction motor is 50 Hz, and that in the rotor is 2 Hz. What is the slip and at what speed is the motor running? (7M)

Or

8 a) List the various losses that occur in a three-phase induction motor and explain each one of i. (7M)

b) Explain the need for conducting the brake test on a Three phase induction motor and how it is done. (7M)

UNIT-V

9 a) Distinguish in detail between Single – phase induction motors and Three phase induction motors. (7M)

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

Or

10 a) Discuss the various methods for starting single phase induction motors. (7M)

b) Explain the construction and working principle of AC servo motor with neat diagrams. (7M)