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

I B. Tech II Semester Supplementary Examinations, January/February - 2023

BASIC ELECTRICAL ENGINEERING

(Common 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) Draw a neat sketch of a dc machine showing the different parts. State the function of each part. [7M]

b) The armature of a 4-pole 230 V wave wound generator has 400 conductors and run sat 400 rpm. Calculate the useful flux per pole. [7M]

(OR)

2 a) Derive the equation of torque for a dc motor. [7M]

b) A 480 V, 20 kW shunt motor takes 2.5 A when running at no load. Taking the armature resistance to be 0.6 Ω, field resistance to be 800 W and brush drop 2 V, find the full load efficiency. [7M]

UNIT - II

3 a) Explain the constructional aspects of a Single – phase transformer and also distinguish between a step- up and a step-down transformer [7M]

b) A 200 kVA single-phase transformer has 1000 turns in the primary and 600 turns on the secondary. The primary winding is supplied from a 440 V, 50 Hz source. Find the (i) secondary voltage at no load and (ii) primary and secondary currents at the full load. [7M]

(OR)

4 a) Explain the working of transformer under lagging Load conditions with relevant phasor diagrams [7M]

b) A 8 kVA, 440/2000 V, 50 Hz single-phase transformer gave the following test results: [7M]
No load test: 440 V, 0.8 A, 80 W.
Short circuit test: 50 V, 3 A, 20 W.
Calculate the efficiency on full load at 0.85 lagging power factor.

UNIT - III

5 a) Explain how a synchronous machine can be used / realized as an alternator and as a synchronous motor. [7M]

b) A three-phase, 50 Hz. Alternator has 90 turns per phase. The flux per pole is 0.1 Weber. Calculate (i) the emf induced per phase and (ii) emf between the line terminals with star connection. Take distribution factor equal to 0.96 and assume full pitch winding. [7M]

(OR)

6 a) Derive the expression for frequency of an alternator [7M]

b) Explain the principle of operation of a synchronous motor [7M]

UNIT - IV

7 a) Distinguish in detail between Squirrel cage Induction motor and Phase Wound Induction motor [7M]

b) The voltage applied to the stator of a three-phase, 4-pole induction motor has a frequency of 50 Hz. The frequency of the emf induced in the rotor is 1.5 Hz. Determine slip and speed at which motor is running. [7M]
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(OR)

8 a) Explain the concept of Slip and why it is a very useful quantity in studying induction motors. [7M]

b) Draw and explain the slip-torque characteristics of synchronous motor? [7M]

UNIT - V

9 a) A three-phase induction motor develops a starting torque, but a single phase induction motor does not. Why? [7M]

b) Explain the working of Capacitor start capacitor run motor with a neat diagram. [7M]

(OR)

10 a) Discuss the procedure to determine the parameters of an equivalent circuit of a single-phase induction motor. [7M]

b) Explain the constructional aspects of the AC servo motor and also give its applications. [7M]

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