Code No: R201211 **R20** SET - 1

I B. Tech II Semester Supplementary Examinations, March- 2022

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

(ME, AME, Min E, Pet E, Food E, Pharm. E)

Time: 3 hours Max. Marks: 70

Answer any five Questions one Question from Each Unit
All Questions Carry Equal Marks

Unit I

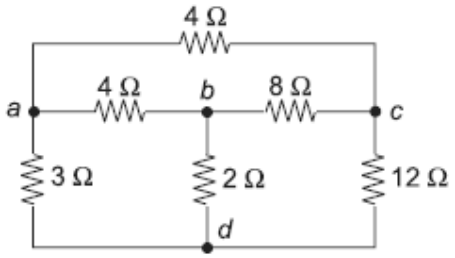
1 a) Derive an expression for the equivalent inductance when the inductances are connected in series. (7M)

b) A resistance of 10 ohms is connected in series with a combination of two resistances arranged in parallel each of value 20 ohms. Determine the resistance R_3 which should be shunted across the parallel combination so that current drawn by the circuit is 1.5 A with applied voltage of 20 V. (7M)

Or

2 a) State and explain Ohms law. (4M)

b) Obtain the equivalent resistance across 'ad' for the following circuit: (10M)



Unit II

3 a) Derive the emf equation of a DC machine. (8M)

b) A 6-pole 2 circuit wave connected armature has 250 conductors and runs at 1200 rpm. The electromotive force generated on open circuit is 600V. Determine the useful flux per pole. (6M)

Or

4 a) Explain how the speed of a DC Shunt motor can be controlled and classify the methods. (7M)

b) Swinburne test gave the following results on a de shunt motor: (7M)
Supply voltage 500 V, no load current 5 A, Armature resistance 0.5 Ω and Field resistance250 Ω. Determine the efficiency of the machine (i) as a generator delivering 100 A at 500 V (ii) as a motor having a line current of 100 A at 500 V Neglect temperature rise during operation. Assume stray losses at 1 % of output.

Unit III

5 a) Enumerate the various losses in a Single-phase transformer and how these can be minimized (7M)

b) A single-phase transformer has 400 primary and 1000 secondary turns. The net cross-sectional area of core is 60 cm^2. If the primary winding be connected to 50 Hz supply at 520 V, calculate (i)the peak value of flux density in the core; (ii) the voltage induced in the secondary winding. (7M)

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Or

6 a) Explain the difference between salient pole and cylindrical pole type of rotor used in alternators. (7M)

b) A four-pole, three-phase, 50 Hz induction motor rotates at a speed of 1440 rpm. Calculate its slipin percentage. Also calculate the frequency of the induced EMF in the rotor circuit. (7M)

Unit IV

7 a) What is a p – n junction and how it is formed and explain the significance of forward biased and reverse biased. (7M)

b) Explain the operation of half wave rectifier circuit with corresponding circuit diagram and necessary input and output waveforms. (7M)

Or

8 a) Explain the operation of op – amp as a non - inverting amplifier. (7M)

b) Explain how an op – amp can be used as a Differential amplifier (Subtractor). (7M)

Unit V

9 a) Explain the working of a n – p – n transistor with necessary diagrams. (7M)

b) Illustrate the input and output characteristics of transistor in CE configuration. (7M)

Or

10 a) Explain how transistor is used as an amplifier with necessary diagram. (7M)

b) Distinguish the significance between Active region, cut- off region and saturation region from the output characteristics of any configuration. (7M)