Code No: **R201220** **R20** **SET - 1**

I B. Tech II Semester Regular/Supplementary Examinations, July/August- 2023

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

(Common To CSE-CS&T, CSE-CS, CSE-IOT&CS Incl BCT, CSE-CS&BS, CSE-IOT, Cyber Security)

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

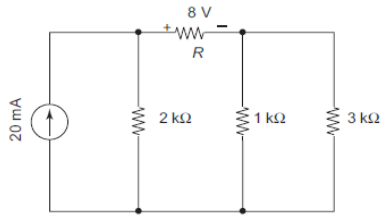
1 a) Explain the conditions to be satisfied for resistances in series. [7M]

b) Consider a 230V,100W in candescent lamp. Determine: (i) the lamp resistance, (ii) the lamp current, and (iii) the energy consumed by the lamp in 8 hours [7M]

(OR)

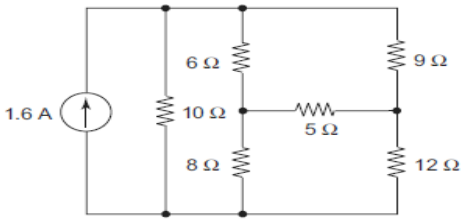
2 a) Distinguish in detail between independent sources and Dependent sources. [7M]

b) Determine the power dissipated in resistor R. [7M]



UNIT-II

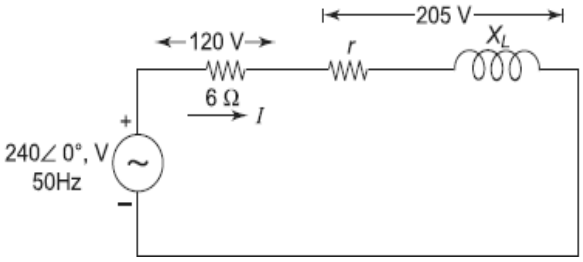
3 Calculate the current in the 50Ω resistance for the following circuit. [14M]



(OR)

4 a) State and explain maximum power transfer theorem. [7M]

b) A resistance of 6 Ω is connected in series with a choke having a resistance r and inductance L connected in series across a voltage source of voltage 240 V, 50 Hz. The voltage drop across the resistance is 120 V and across choke coil is 205 V. Calculate resistance, inductance and impedance of the choke coil. [7M]



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UNIT-III

5 a) Explain in detail about the Shunt generator and series generator and distinguish between them in detail. [7M]

b) A four-pole dc generator having wave-wound armature winding has 51 slots, each slot containing 20 conductors. Calculate the voltage generated in the armature when driven at 1500 rpm. Assume flux per pole to be 0.5 mWb. [7M]

(OR)

6 a) Explain in detail about the Core type and Shell type transformers and also distinguish between them. [7M]

b) Enlist various applications of DC machines. [7M]

UNIT-IV

7 a) Explain the torque-speed characteristic of a three-phase induction motor. [7M]

b) The frequency of the rotor-induced EMF of 400 V, three-phase, 50 Hz, six-pole induction motor is 2 Hz. Calculate the speed of the motor. [7M]

(OR)

8 a) Explain the constructional details of the Synchronous machine. [7M]

b) What is meant by synchronous speed? Derive the relation Ns = 120f/P, where Ns is the synchronous speed, f is the frequency, and P is the number of poles. [7M]

UNIT-V

9 a) Explain the working of a n – P – n transistor with a neat diagram. [7M]

b) Explain how an op – amp can be used as a differential amplifier circuit. [7M]

(OR)

10 a) Explain the common emitter configuration of n- p – n transistor with a neat circuit diagram. [7M]

b) Explain the significance of Feedback amplifier. [7M]

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Time: 3 hours Max. Marks: 70

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

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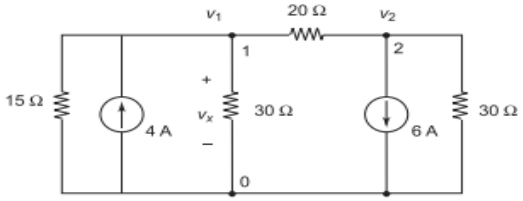
UNIT-I

1 For the following circuit, determine V_x using Nodal Analysis. [14M]



(OR)

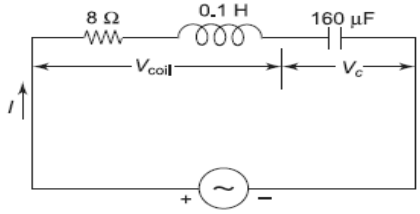
2 a) Explain Kirchhoff's current law and Kirchhoff's voltage law with necessary examples. [7M]

b) Explain the differences between Serial and parallel circuits with example [7M]

UNIT-II

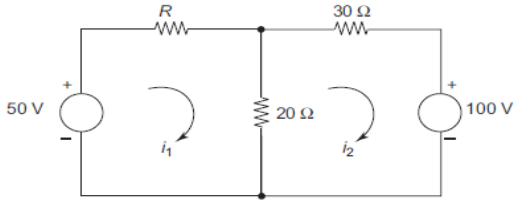
3 a) Derive the condition for energy stored in Capacitance. [7M]

b) A coil of 8Ω resistance and 0.1 H inductance is connected in series with a condenser of 160 µF capacitance across a230 V, 50 Hz supply Calculate (i) the inductive reactance, (ii) the capacitive reactance, (iii) the circuit impedance, current and the power factor. [7M]



(OR)

4 Determine the value of R such that $i_1 = 0.37A$ for the following circuit [14M]



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UNIT-III

5 a) Derive the emf equation of a DC Machine. [7M]

b) A six-pole, lap-connected dc generator has a total of 650 conductors. The flux per pole is 0·05 Wb. Calculate the speed at which the armature is to be driven to generate an EMF of 220 V. [7M]

(OR)

6 a) Derive the emf equation of a Single-Phase transformer. [7M]

b) Draw and explain the equivalent circuit of a Single-phase transformer. [7M]

UNIT-IV

7 a) What are the various losses in an induction motor? State the factors on which they depend. [7M]

b) A 3 hp, three-phase, four-pole, 400 V, 50 Hz induction motor runs at 1440 rpm. What will be the frequency of the rotor-induced EMF? [7M]

(OR)

8 a) Distinguish in detail between salient – pole type synchronous machine and cylindrical -type synchronous machine. [7M]

b) Explain the principle of working of a Synchronous motor. [7M]

UNIT-V

9 Explain the following Diode parameters and Diode ratings: [14M]
i) Forward voltage drop ii) Reverse breakdown voltage iii) Dynamic resistance
iv) Reverse saturation current v) maximum forward current

(OR)

10 a) Explain the common Collector configuration of n- p – n transistor with a neat circuit diagram. [7M]

b) Explain how an op – amp can be used as a Summing amplifier. [7M]

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