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GIET UNIVERSITY, GUNUPUR – 765022

B. Tech (First Semester – Regular) Examinations, April/May – 2021

BESBS1032 - Basics of Electrical & Electronics Engineering

Time: 2 hrs   Maximum: 50 Marks

Answer ALL Questions

The figures in the right hand margin indicate marks.

PART – A: (Multiple Choice Questions)   **(1 x 10 = 10 Marks)**

Q.1. Answer ALL questions   [CO#]   [PO#]

a.   According to Faraday's Laws of Electromagnetic Induction, an E.M.F. is induced in a conductor whenever it   1   1

  (i) lies in a magnetic field   (ii) cuts magnetic flux

  (iii) moves parallel to the direction of the magnetic field   (iv) lies perpendicular to the magnetic flux

b.   Relative permeability of vacuum is   1   1

  (i) $4\pi \times 10^{-7}$ H/m   (ii) 1 H/m

  (iii) 1   (iv) ¼ π

c.   The capacitance of a capacitor is NOT influenced by

  (i) plate thickness   (ii) plate area

  (iii) plate separation   (iv) nature of the dielectric   1   1

d.   The reverse current in a diode is of the order of ……………….   2   1

  (i)kA   (ii) mA

  (iii) μA   (iv) A

e.   An ideal crystal diode is one which behaves as a perfect ……….. When forward biased.   2   1

  (i) conductor   (ii) Insulator

  (iii) resistance material   (iv) Semiconductor

f.   In inductive circuit, when Inductance (L) or inductive reactance (X_L) increases, the circuit current?   3   1

  (i) Also Increases   (ii) Decreases

  (iii) Remain Same   (iv) None of the above

g.   Superposition theorem can be applied only to circuits having   3   1

  (i) Resistive elements   (ii) Passive elements

  (iii) Nonlinear elements   (iv) Linear bilateral elements

h.   A resistor with colour bands: red-red-red-gold, has the value: 3   1

  (i) 22k 5%   (ii) 2k2 5%

  (iii)220R 5%   (iv) 22R 5%

i.   If two resistors are placed in series, is the final resistance: 4   1

  (i) Higher   (ii) Lower

  (iii) The same   (iv) Cannot be determined

j.   According to boolean law: A + 1 = ?   4   1

  (i)1   (ii)A

  (iii)0   (iv)A'

PART – B: (Short Answer Questions)   **(2 x 5 = 10 Marks)**

Q.2. Answer ALL questions   [CO#] [PO#]

a. The total current drawn by a circuit consisting of three resistors connected in parallel is 12 A. The voltage drop across the first resistor is 12 V, the value of second resistor is 3Ω and the power dissipation of the third resistor is 24 W. What are the resistances of the first and third resistors ?   CO1   PO 2

b. Three sinusoidally alternating currents of RMS values 5, 7.5, and 10 A are having same frequency of 50 Hz, with phase angles of 30°, -60° and 45°.
(i) Find their average values, (ii) Write equations for their instantaneous values   CO4   PO 2

c. Explain in brief 'magnetic hysteresis'.   CO2   PO 1

d. An alternating current varying sinusoidally with a frequency of 50 Hz has an RMS value of 20 A. Write down the equation for the instantaneous value and find this value (a) 0.0025 second (b) 0.0125 second after passing through a positive maximum value. At what time, measured from a positive maximum value, will the instantaneous current be 14.14 A ?   CO1   PO 2

e. Realise X-OR gate using NAND logic and NOR logic   CO3   PO 1

PART – C: (Long Answer Questions)   **(6 x 5 = 30 Marks)**

Answer *ANY FIVE* questions   Marks [CO#] [PO#]

3. In the circuit of figure below, find current through 1 Ω resistor using both Thevenin's Theorem.   (6)   CO1   PO 2
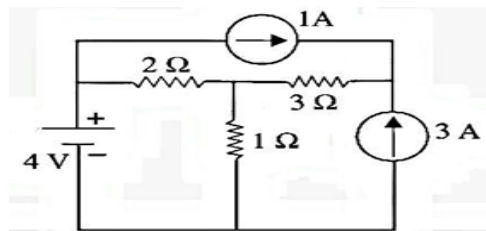
4. Use superposition theorem to find current the I in the circuit in Fig.4.   (6)   CO1   PO 2
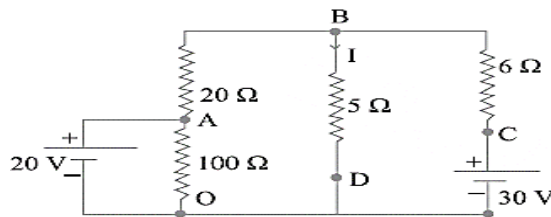

Fig.4

5. An AC supply of 230 V is applied to a half-wave rectifier circuit through a transformer of turn ratio 10:1. Find (i) the output DC voltage and (ii) the peak inverse voltage. Assume the diode to be ideal.   (6)   CO4   PO 2

6. Explain common collector configuration of BJT.   (6)   CO3   PO 1

7. A 75 kW, 440 V, 3-phase, 6-pole, 50 Hz wound rotor induction motor has a full load slip of 0.04 and the slip at maximum torque of 0.2 when operating at rated voltage and frequency with rotor winding short circuited at the slip rings. Assume the stator resistance and rotational losses to be negligible. Find (a) maximum torque (b) starting torque (c) full load copper loss.   (6)   CO1   PO 2

8. Explain with suitable diagrams the operation of dc shunt motor.   (6)   CO2   PO 1

9. Expand $A(A + B)(\overline{A}+ B+ \overline{C})$ to maxterms and minterms.   (6)   CO3   PO 2

10. What is a combinational circuit and Design a full adder circuit using minimum number of logic gates?   (6)   CO4   PO 2

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