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**Question Paper Code: R1325**

B.E. / B.Tech. DEGREE EXAMINATION, NOV/DEC 2024

First Semester

Computer Science and Business Systems

R21UEE125- PRINCIPLES OF ELECTRICAL ENGINEERING

(Common to AI&DS and CSE(AI&ML) Branches)

(Regulations R2021)

Duration: Three hours

Maximum: 100 Marks

Answer All Questions

PART A - (10 x 1 = 10 Marks)

1. What is the unit of electric potential difference (voltage)? CO1- U  
(a) Ampere                      (b) Volt                      (c) Ohm                      (d) Coulomb
2. Which component stores energy in an electric field? CO1- U  
(a) Resistor                      (b) Capacitor                      (c) Inductor                      (d) Voltage Source
3. The S.I. unit of power is CO1- U  
(a) Henry                      (b) Coulomb                      (c) Watt                      (d) Watt-hour
4. Norton resistance is found by? CO1-U  
(a) Shorting all voltage sources  
(b) Opening all current sources  
(c) Shorting all voltage sources and opening all current sources  
(d) Opening all voltage sources and shorting all current sources
5. The square waveform of current has following relation between r.m.s. value and average value CO1-U  
(a) r.m.s. value is equal to average value r.m.s.  
(b) value of current is greater than average value r.m.s.  
(c) value of current is less than average value  
(d) None of the above

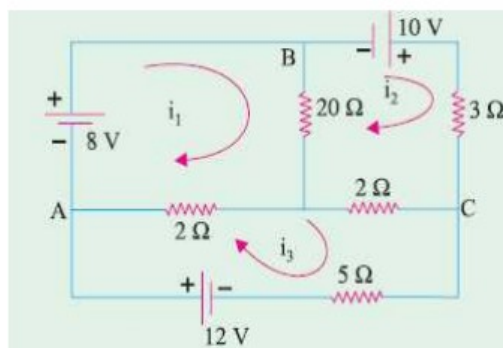
6. The power factor of an ordinary electric bulb is CO1-U  
 (a) Zero (b) Unity  
 (c) Slightly more than unity (d) Slightly less than unity
7. An electro-mechanical energy conversion device is one which converts CO1-U  
 (a) Electrical energy to mechanical energy only  
 (b) Mechanical energy to electrical energy only  
 (c) Electrical to mechanical and mechanical to electrical  
 (d) None of the mentioned
8. Materials whose permeabilities are slightly greater than that of free space CO1-U  
 (a) Paramagnetic (b) Non magnetic  
 (c) Ferromagnetic (d) Diamagnetic
9. Which of the following is unit of inductance? CO1- U  
 (a) Ohm (b) Henry (c) Capacitance (d) Ampere
10. Which of the following circuit elements will oppose the change in circuit current? CO1- U  
 (a) Inductance (b) Capacitance (c) Resistance (d) All the above

PART – B (5 x 2= 10 Marks)

11. An Electric iron is rated 1000W, 240V. Find the current drawn & resistance of the heating element. CO1-U
12. Write some applications of maximum power transfer theorem. CO1-U
13. Define RMS and Average Value. CO1-U
14. Define capacitance of a conductor state it's SI unit CO1-U
15. What is self inductance? CO1 -U

PART – C (5 x 16= 80 Marks)

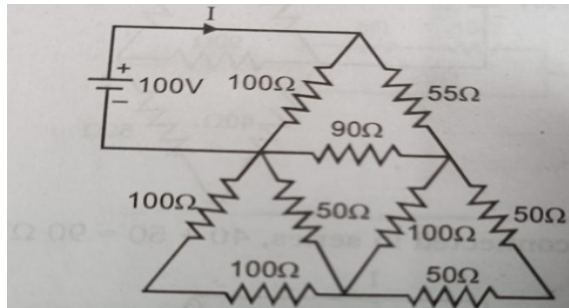
16. (a) Determine current in 5ohm resistor using Mesh Analysis. CO2-App (16)



Or

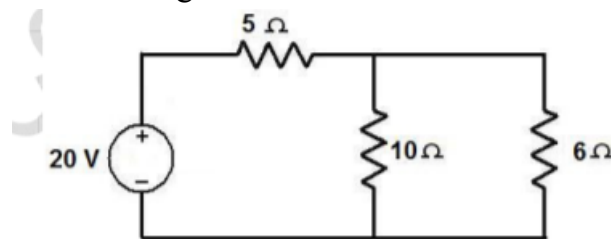
- (b) i) What will be the current drawn by a lamp rated at 250V, 40 watts connected to a 230V supply? CO2-AP (8+8)  
ii) An electric heater draws 8A from 250V supply. What is its power rating? And also find the resistance of the heater element?

17. (a) Analyze the circuit given below (or described in your materials) to determine the total current taken from the source. CO3-Ana (16)



Or

- (b) Using Norton's theorem, Analyze current through 6 ohm resistance shown in figure CO3-Ana (16)



18. (a) A Series circuit has  $R= 10\Omega$ ,  $L= 50\text{mH}$  and  $C=100\mu\text{F}$  and is supplied with 200 V 50 C/S, Find (a) Impedance, (b) Current, (c) Power, (d) Power factor, (e) the Voltage drop CO2-App (16)

Or

- (b) (i) Explain R-L series Circuit. CO2-App (8+8)  
(ii) A Series R-L Circuit with  $R= 25 \Omega$ ,  $L= 0.02 \text{ H}$  is connected to a 250 V, 50 cycle source. Calculate (a) Impedance, (b) Current (c) power, (d) power factor

19. (a) (i) Find the net capacitance for three capacitors connected in parallel, given their individual capacitances are  $1.0\mu\text{F}$ ,  $5.0\mu\text{F}$ , and  $8.0\mu\text{F}$ . CO3-Ana (8+8)  
(ii) Derive an expression for energy stored in a capacitor

Or

- (b) Two capacitors of capacitance  $C_1 = 6 \mu\text{F}$  and  $C_2 = 3 \mu\text{F}$  are connected in series across a cell of emf 18 V. Calculate: The equivalent capacitance  
The potential difference across each capacitor  
The charge on each capacitor      CO3-Ana      (16)
20. (a) What are the basic concepts of household wiring and explain.      CO1 - U      (16)  
Or
- (b) What is inductance and explain in detail about the types of inductances on      CO1 - U      (16)