A **Reg. No. :** | | | | | | | | | | | | |

Question Paper Code: R1330

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

First Semester

CSE (Cyber Security)

R21UEE130- FUNDAMENTALS OF ELECTRICAL AND ELECTRONICS ENGINEERING

(Regulations R2021)

(Common to CSE (IoT) branch)

Duration: Three hours Maximum: 100 Marks

Answer All Questions

PART A - (10 x 1 = 10 Marks)

1. The number of cycles per second for an AC quantity is called CO1-U

   (a) RMS value (b) Time Period (c) Frequency (d) Power factor

2. What is the average value of an AC waveform over a complete cycle? CO1-U

   (a) Zero (b) Peak value (c) RMS value (d) Peak-to-peak value

3. Which type of DC motor is suitable for constant-speed applications? CO2-U

   (a) Series motor (b) Shunt motor (c) Compound motor (d) Stepper motor

4. What is the working principle of a DC motor? CO2-U

   (a) Conversion of electrical energy to mechanical energy

   (b) Conversion of mechanical energy to electrical energy

   (c) Conversion of thermal energy to electrical energy

   (d) Conversion of chemical energy to mechanical energy

5. In electronic circuits, a Bipolar Junction Transistor (BJT) is commonly used for: CO3-U

   (a) Signal amplification (b) Voltage regulation

   (c) Switching power on and off (d) Converting AC to DC

6. In a Junction Field-Effect Transistor (JFET), how is the conduction controlled? CO3-U

(a) By a magnetic field (b) By the movement of charge carriers

(c) By varying the gate-source voltage (d) By changing the temperature

7. What is the operating principle of a moving coil meter? CO4-U

(a) Magnetic induction (b) Piezoelectric effect

(c) Photoelectric effect (d) Electrostatic discharge

8. Moving Coil and Moving Iron meters belong to which category of instruments? CO4-U

(a) Digital instruments (b) Analog instruments

(c) Optical instruments (d) Mechanical instruments

9. Calculate the resistance of a 100 W, 200 V lamp CO1-U

(a) 100 ohm (b) 200 ohm (c) 400 ohm (d) 1600 ohm

10. A capacitor carries a charge of 0.1 C at 5 V. Its capacitance is CO1-U

(a) 0.02 F (b) 0.5 F (c) 0.05 F (d) 0.2 F

PART – B (5 x 2= 10 Marks)

11. State Ohm's Law and its mathematical representation CO1-U

12. How do DC Self-excited Generators work? CO1-U

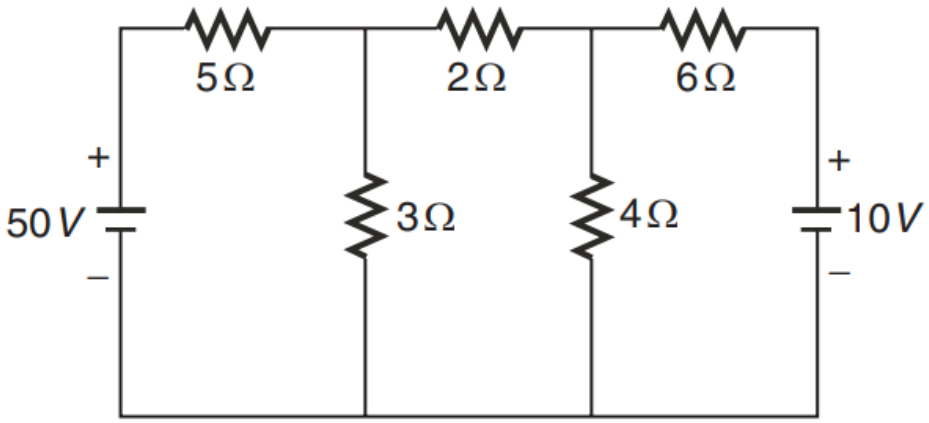
13. What distinguishes a Zener diode from a regular diode? CO1-U

14. How is data acquired in a Digital Storage Oscilloscope (DSO)? CO1-U

15. Define charge and its type CO1-U

PART – C (5 x 16= 80Marks)

16. (a) Determine the power dissipation in the 4 Ω resistor of the circuit shown in Fig. CO2-App (16)



Or

	(b)	A series combination of 10Ω resistance and 50mH inductance is connected to a 220V, 50 Hz supply. Estimate the current, active power, reactive power and apparent power. Also estimate the voltage across R and L and draw the phasor diagram.	CO2-App	(16)
17.	(a)	Derive the EMF equation for DC generators. Explain the significance of each term in the equation and how it relates to the generator's performance.	CO1-U	(16)
		Or		
	(b)	Break down the construction of the windings in a transformer. How are the primary and secondary windings arranged, and what materials are commonly used?	CO1-U	(16)
18.	(a)	Explain the working principle of a Junction Field-Effect Transistor (JFET). Discuss its characteristics and applications in electronic circuits.	CO1-U	(16)
		Or		
	(b)	Explain the operating principle of a PN junction diode. Discuss the formation of the depletion region and how the diode behaves under forward and reverse bias.	CO1-U	(16)
19.	(a)	Draw and explain the main parts of a Digital Storage Oscilloscope (DSO). How do these parts work together?	CO1-U	(16)
		Or		
	(b)	What is data acquisition in a Digital Storage Oscilloscope? Explain how signals are collected and stored digitally.	CO1-U	(16)
20.	(a)	Derive the RMS value and Average value of sinusoidal waveform and find the form factor and peak factor	CO2-App	(16)
		Or		
	(b)	A series combination of 12Ω resistance and 600 μF capacitance is connected to a 220V, 50 Hz supply. Estimate the current, active power, reactive power and apparent power. Also estimate the voltage across R and C and draw the phasor diagram.	CO2-App	(16)

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