A **Reg. No. :**

Question Paper Code: R1330

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 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. In a closed circuit, the sum of the potential drop is equal to the potential rise. it's related to　　　　　　　　　　　　　　　　CO1-U

   (a) KCL　　　　　　(b) KVL　　　　　　(c) Ohm's Law　　　　　　(d) Faraday's Law

2. Which of the following elements of electrical engineering cannot be analyzed using Ohm's law?　　　　　　　　　　　　　　　　CO1-U

   (a) Capacitors　　　(b) Inductors　　　(c) Transistors　　　(b) Resistors

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. 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

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 KCL and KVL   CO1 U

12. Describe the construction of a DC Self-excited Generator. CO1-U

13. Why is silicon preferred over germanium in most semiconductor applications? CO1-U

14. What is the fundamental operating principle of most instruments? CO1-U

15. What role does an inductor play in a DC circuit? CO1 U

PART – C (5 x 16= 80Marks)

16. (a)   Solve the total current taken from the source   CO2-App   (16)

Or

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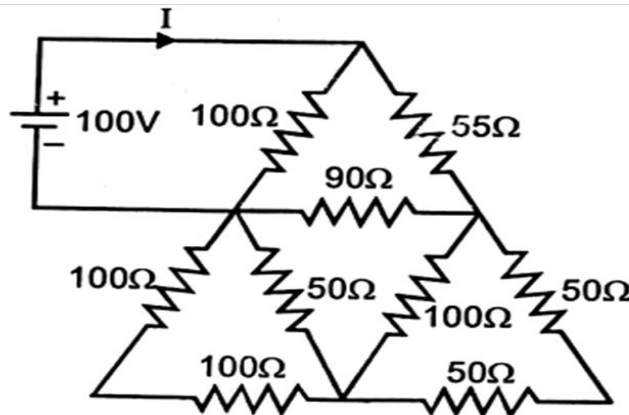
(b) A series combination of 10Ω resistance and 50mH inductance is CO2-App (16)
connected to a 220V, 50 Hz supply. Estimate the current, active power,
reactive power and apparent power. Also estimate the voltage across R
and L and draw the phasor diagram.

17. (a) Derive the EMF equation for DC generators. Explain the significance CO1-U (16)
of each term in the equation and how it relates to the generator's
performance.

Or

(b) Break down the construction of the windings in a transformer. How are CO1-U (16)
the primary and secondary windings arranged, and what materials are
commonly used?

18. (a) Describe the characteristics of a Zener diode. How does it maintain a CO1-U (16)
constant voltage under reverse bias? Provide examples of its
applications.

Or

(b) Discuss the various methods of biasing a Bipolar Junction Transistor CO1-U (16)
(BJT). Explain the importance of biasing in transistor circuits.

19. (a) Explain how moving iron meters operate. Highlight their differences CO1-U (16)
from moving coil meters and where they are used.

Or

(b) Classify instruments into types and describe each type's characteristics CO1-U (16)
and uses. Give real-world examples.

20. (a) Derive the RMS value and Average value of sinusoidal waveform and CO2-App (16)
find the form factor and peak factor

Or

(b) A series combination of 12Ω resistance and 600 µF capacitance is CO2-App (16)
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.

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