



Time: 3 hrs

Maximum: 60 Marks

**PART - A**

(The figures in the right hand margin indicate marks)

(2 x 5 = 10 Marks)

Q.1. Answer **ALL** questions

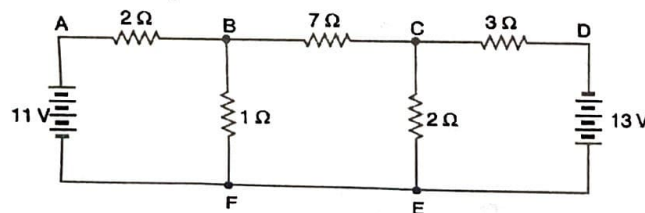
- |   | CO # | Blooms Level |
|---|------|--------------|
| a. Three resistors $15\Omega$ , $20\Omega$ and $30\Omega$ are connected in parallel across 240V DC source. Compute the power dissipated in each resistor and total power drawn from the source. | CO1  | K3           |
| b. Explain the function of commutator in a DC machine.  | CO3  | K2           |
| c. What differentiates a p-type semiconductor from an n-type semiconductor at a fundamental level.  | CO4  | K2           |
| d. What is the role of the trigger circuit in a digital oscilloscope?   | CO5  | K2           |
| e. Mention any two precaution to prevent electric shock.  | CO6  | K2           |

**PART - B**

(10 x 5 = 50 Marks)

Answer **ALL** questions

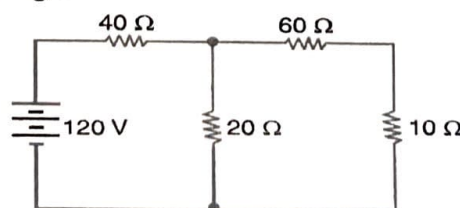
- |   | Marks | CO # | Blooms Level |
|---|-------|------|--------------|
| 2. a. A network is arranged as shown in Fig.1. Determine the current in different resistors using Nodal analysis. | 5     | CO1  | K3           |



- |  |   |     |    |
|--|---|-----|----|
| b. In a series circuit containing pure resistance and a pure inductance, the current and the voltage are expressed as:<br>$i(t) = 5 \sin(314t + 2\pi/3)$ and $v(t) = 15 \sin(314t + 5\pi/6)$<br>(a) What is the impedance of the circuit? (b) What is the value of the resistance? (c) What is the inductance in henrys? (d) What is the average power drawn by the circuit? (e) What is the power factor? | 5 | CO2 | K3 |
|--|---|-----|----|

(OR)

- |  |   |     |    |
|--|---|-----|----|
| c. State Thevenin's theorem. Using this theorem, find the current in $10\Omega$ resistor as shown in Fig.1 | 5 | CO1 | K3 |
|--|---|-----|----|



d.	What is the average value? Derive an expression for the average value of a sinusoidal AC signal?	5	CO2	K1,K3
3.a.	A balanced 3-phase star load has load impedance of $(5-j10) \Omega$ per phase and is supplied from a balanced 3-phase 400V, 50 Hz AC supply. Calculate the values for line voltages, phase voltages and line currents & Power consumption at the load. Also find the power factor.	5	CO2	K3
b.	Explain the principles of a DC generator and subsequently derive the expression for the generated EMF.	5	CO3	K2,K3
(OR)				
c.	A 25KVA single phase transformer has 500 turns on the primary and 50 turns on the secondary winding. The primary is connected to 3000V, 50 Hz supply. Find the full load primary and secondary currents, the secondary emf and maximum flux in the core. Neglect leakage drops and no-load primary currents.	5	CO3	K3
d.	Describe the construction and operational principles of a single-phase transformer in detail.	5	CO3	K2,K3
4.a.	What is a semiconductor diode? Explain the biasing of a p-n junction with a suitable diagram.	5	CO4	K2,K3
b.	How does a biased clipper operate? Explain its working with the help of a circuit diagram.	5	CO4	K2,K3
(OR)				
c.	With a neat circuit diagram, describe the working of a half-wave rectifier along with the relevant waveforms.	5	CO4	K2,K3
d.	How does a negative clamper operate? Explain its working with the help of a circuit diagram.	5	CO4	K2,K3
5.a.	Convert the following: (i) $(1011011101.10101)_2 = (?)_{10} = (?)_8 = (?)_{16}$ (ii) Compute 1's and 2's complement of $(101010)_2$ and $(111001)_2$ (iii) $(0.6875)_{10} = (?)_2$	5	CO5	K3,K4
b.	How does a function generator operate? elucidate its functionality using an appropriate block diagram?	5	CO5	K2,K4
(OR)				
c.	Explain the working of a function generator with suitable block diagram.	5	CO5	K2,K3
d.	What are the universal gates. Explain with respective logic symbol and truth tables for a comprehensive understanding.	5	CO5	K2,K3
6.a.	Elaborate the operational principles of a thermal power plant, supported by a schematic block diagram?	5	CO6	K2,K3
b.	Write short note on Displacement sensors.	5	CO6	K2
(OR)				
c.	How does a person get an electric shock? What precautions should be taken to avoid electric shock?	5	CO6	K2,K3
d.	Write short note on Sound sensors.	5	CO6	K2

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