



GIET UNIVERSITY, GUNUPUR - 765022
 B. Tech (Second Semester) Examinations, May - 2024
23BBSES10001 - Basic Electrical and Electronics Engineering
 (Common to all branches)

Time: 3 hrs

Maximum: 60 Marks

(The figures in the right hand margin indicate marks)

PART - A**(2 x 5 = 10 Marks)**Q.1. Answer *ALL* questions

- | | CO # | Blooms Level |
|--|------|--------------|
| a. A resistor of 12Ω is connected across a potential difference of 60 volts. Calculate the power dissipated and the energy transferred to heat in 4 minutes. | CO1 | K3 |
| b. List any two advantages of 3-phase system over 1-phase system. | CO2 | K1 |
| c. What are the majority charge carriers in p-type and n-type semiconductors? | CO4 | K1 |
| d. What are the Universal gates? Explain one Universal gate, providing its truth table as an example. | CO5 | K1,K2 |
| e. What role does a fuse play, and how does it differ from a Miniature Circuit Breaker (MCB). | CO6 | K2,K3 |

PART - B**(10 x 5 = 50 Marks)**Answer *ALL* questions

2. a. Determine current through different resistors using Mesh Analysis of Figure 1.

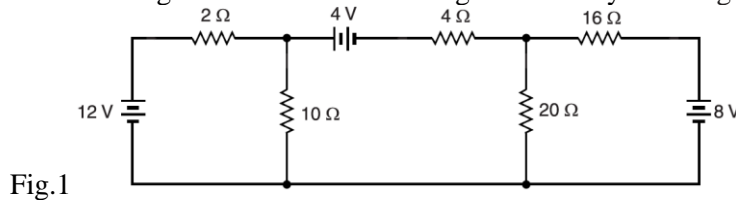


Fig.1

Marks	CO #	Blooms Level
5	CO1	K3

- b. A pure resistance of 50 ohms is in series with a pure capacitance of 100 microfarads. The series combination is connected across 100-V, 50-Hz supply. Find (i) the impedance (ii) current (iii) power factor (iv) phase angle (v) voltage across resistor (vi) voltage across capacitor.

(OR)

- c. By using Nodal analysis, determine the current in each resistor in circuit shown in Figure 2.

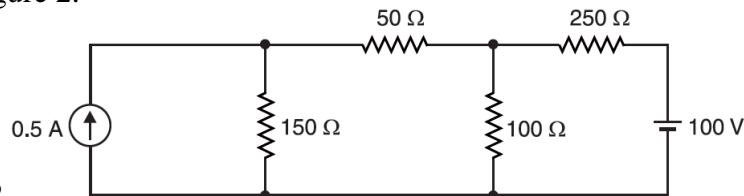


Fig.2

5	CO1	K3
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- d. What is RMS value? Derive the expression for the Root Mean Square (RMS) value of a sinusoidal AC signal.
- 3.a. A balanced 3-phase delta load has load impedance of $(10+j25) \Omega$ per phase and is supplied from a balanced 3-phase 400V, 50Hz AC supply. Determine the values for (i) Line voltages, phase voltages and (ii) line currents, phase currents (iii) total real power consumed by the load. Also determine reactive and apparent power.
- b. Describe the construction and operational principles of a DC generator in detail.

5	CO2	K1,K3
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5	CO2	K3
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5	CO3	K1,K3
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(OR)

c.	A 6-pole DC shunt generator has 1500 armature conductors in six parallel paths. The average flux per pole in the air gap is 0.065 weber. Calculate the generated emf if the generator runs at a speed of 1500 RPM with the help of a prime mover.	5	CO3	K3
d.	Derive the electromotive force (e.m.f) equation for a single-phase transformer. Determine the transformer's transformation ratio.	5	CO3	K4,K3
4.a.	Draw the circuit diagram of a full wave bridge type rectifier using diode and explain its operation with suitable waveform.	5	CO4	K2,K3
b.	How does a positive clamper operate? Explain its working with the help of a circuit diagram.	5	CO4	K2,K3
(OR)				
c.	Describe the Voltage-Current (VI) Characteristic of a Semiconductor Diode. Provide a relevant graph to illustrate its behavior.	5	CO4	K2,K3
d.	How does a positive clipper operate? Explain its working with the help of a circuit diagram.	5	CO4	K2,K3
5.a.	Convert the following:	5	CO5	K3,K4
	(i) $(1011011101.10101)_2 = (?)_{10} = (?)_8 = (?)_{16}$			
	(ii) Compute 1's and 2's complement of $(101110)_2$ and $(101001)_2$			
	(iii) $(7541)_8 = (?)_2 = (?)_{16} = (?)_{10}$.			
b.	Describe the various components of a Cathode Ray Oscilloscope (CRO), supported by a relevant block diagram	5	CO5	K2,3K
(OR)				
c.	How does a digital oscilloscope operate? elucidate its functionality using an appropriate block diagram?	5	CO5	K2,K4
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 hydro power plant, supported by a schematic block diagram?	5	CO6	K2,K3
b.	Write short note on Temperature Sensor.	5	CO6	K2
(OR)				
c.	How does earthing work? Explain the process of pipe earthing, with a relevant diagram.	5	CO6	K2,K3
d.	Write short note on Force sensors.	5	CO6	K2

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