GANDHI INSTITUTE OF ENGINEERING AND TECHNOLOGY UNIVERSITY, ODISHA, GUNUPUR
(GIET UNIVERSITY)

B. Tech (Second Semester – Regular/Supplementary) Examinations, April – 2025

23BBSES10001 –Basic Electrical and Electronics Engineering

(Common to all Branches)

Time: 3 hrs Maximum: 60 Marks

Answer ALL questions

(The figures in the right-hand margin indicate marks.)

PART – A **(2 x 5 = 10 Marks)**

		CO #	Blooms Level
Q.1.	Answer ***ALL*** questions		
a.	A resistor of 10 Ω is connected across a potential difference of 50V. Calculate the power dissipated and energy transferred to heat in 20 minutes.	CO1	K1
b.	Two impedances of $Z_1 = (5 + j7)$ Ω and $Z_2 = (8+j10)$ Ω are connected in parallel. Find out the net impedance of the combination in polar form.	CO2	K2
c.	Convert the given number systems $(BA.53)_{16} = (?)_{10}$.	CO4	K2
d.	What is an ideal diode?	CO3	K1
e.	Define temperature sensor.	CO6	K1

PART – B **(10 x 5 = 50 Marks)**

		Marks	CO #	Blooms Level
	Answer ***ALL*** the questions			
2. a.	For the circuit shown in Fig.1, Find V_{CE} and V_{AG}.	5	CO1	K3

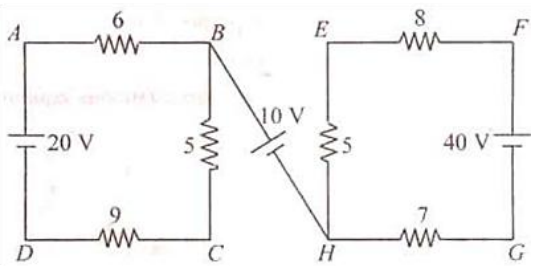

Fig.1

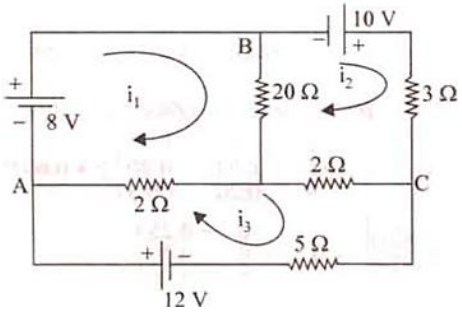

Fig.2

b.	Determine the current in 5 Ω resistor in Fig.2 by using Mesh Analysis.	5	CO1	K3
	(OR)			
c.	Using Kirchhoff's current law, find the values of the unknown currents in Fig.3.	5	CO1	K3

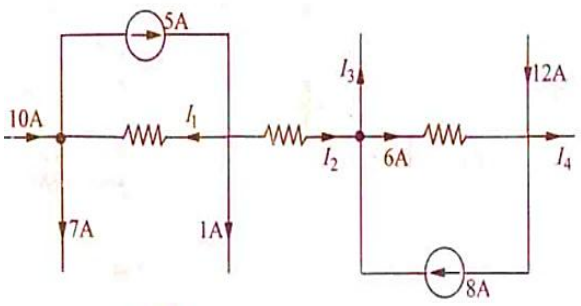

Fig.3

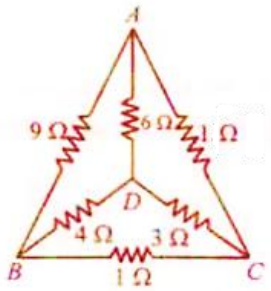

Fig.4

d.	Find the resistance across terminals A and D in Fig.4.	5	CO1	K3
3.a.	Two coils, A and B, are connected in series across a 240-V, 50-Hz supply. The resistance of A is 6 Ω, and the inductance of B is 0.013 H. If the input from the	5	CO2	K2

	supply is 3 kW and 2 kVAR, find the inductance of A and the resistance of B. Calculate the voltage across each coil.			
b.	In a circuit, the applied voltage is 100 V and is found to lag the current of 10 A by 30°. (i) Is the p.f. lagging or leading? (ii) What is the value of p.f.? (iii) Is the circuit inductive or capacitive? (iv) What is the value of active and reactive power in the circuit?	5	CO2	K2
	(OR)			
c.	Define resonance in an RLC-series circuit. Derive the expression for the quality factor at resonance.	5	CO2	K2
d.	A resistance of 20Ω, an inductance of 0.2H, and a capacitance of 100μF are connected in series across 220V, 50Hz mains. Determine the following: (a) impedance, (b) current, (c) voltage across R, L, and C, (d) power in watts and VA (e) power factor and power factor angle.	5	CO2	K2
4. a.	Define rectifier. Explain the half-wave rectifier with a suitable diagram.	5	CO3	K2
b.	Define PN-junction diode. Explain the VI characteristics of a diode with a suitable graph.	5	CO3	K2
	(OR)			
c.	Explain the Bridge type full-wave rectifier with a suitable diagram.	5	CO3	K2
d.	Define clipper. State and explain different types of clippers with relevant diagrams.	5	CO3	K2
5. a.	Define Universal Gates. Design AND, OR, NOT gates using NAND gate.	5	CO4	K2
b.	State and explain the Function Generator with a neat diagram.	5	CO4	K2
	(OR)			
c.	Perform the following binary operations (i) Add $(101111.101)_2$ with $(111011.110)_2$ (ii) Subtract $(AA)_{16}$ from $(FF)_{16}$	5	CO5	K2
d.	Convert $(EFF)_{16}$ to (i) Binary (ii) Octal (iii) Decimal	5	CO5	K2
6. a.	Derive the emf Equation of a Single-phase two winding transformer.	5	CO5	K1
b.	A 50 kVA single-phase transformer has 1000 turns on the primary and 100 turns on the secondary winding. The primary is connected to a 3000V, 50 Hz supply. Find the full-load primary and secondary currents, the secondary emf, and the maximum flux in the core.	5	CO5	K2
	(OR)			
c.	Explain different types of DC motors with neat diagrams.	5	CO6	K1
d.	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 wb. Calculate the generated emf if the generator runs at a speed of 1500 RPM with the help of a prime mover.	5	CO6	K2

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