Gandhi Institute of Engineering and Technology University, Odisha, Gunupur (GIET University)

B. Tech (First Semester - Regular) Examinations, December 2025

25FYES10001 – Basics of Electrical and Electronics Engineering

(Common to All branch)

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)**

Q.1. Answer *ALL* questions		CO #	Blooms Level
a.	State and explain Kirchoff's Current Law with an appropriate example.	CO1	K2
b.	Describe phase sequence and explain the method to reverse it.	CO2	K2
c.	Explain the function of the commutator in a DC machine.	CO3	K2
d.	Define current amplification factor, α. Show that it is always less than unity.	CO4	K4
e.	What is the ideal input impedance of an op-amp?	CO5	K1

PART – B **(10 x 5 = 50 Marks)**

Answer *ALL* the questions	Marks	CO #	Blooms Level
2. a. Find $R_{eq.}$ for the circuit shown in Fig. 1.	5	CO1	K3

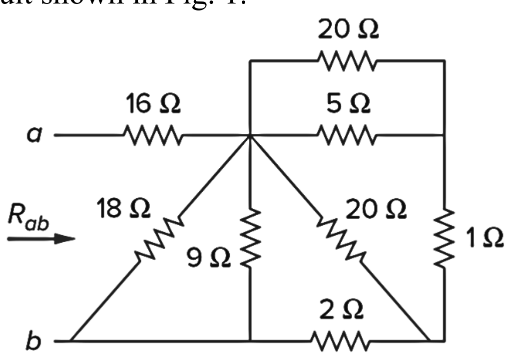


Fig.1

	Marks	CO #	Blooms Level
b. Use Thevenin's theorem to find the current flowing through the 6 Ω resistor of the network shown in Fig. 2. All resistances are in ohms.	5	CO1	K3

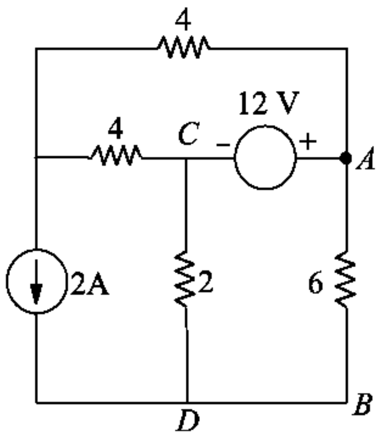


Fig.2

(OR)

c. A network is arranged as shown in Fig. 3. Determine the value of currents in each resistor using Nodal analysis. — 5 CO1 K3

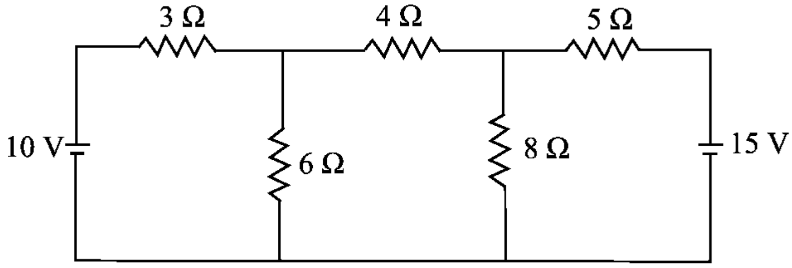
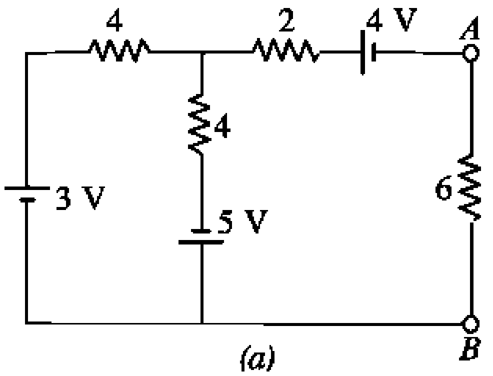


Fig.3

d. State Norton's Theorem. For the circuit shown in Fig. 4, calculate the current in the 6 Ω resistance by using Norton's theorem. — 5 CO1 K3



(a)

Fig.4

3.a. Define the Average value and derive the general expression for its calculation. — 5 CO1 K4

b. A balanced delta connected load of (8 + j6) Q per phase is connected to a 3-phase 230 V supply. Find the line current, p.f., power, reactive power and total volt amperes. — 5 CO2 K3

(OR)

c. Two coils A and B are connected in series across a 240-V, 50-Hz supply. The resistance of A is 5 Ω and the inductance of B is 0.015 H. If the input from the supply is 3 kW and 2 kVAR, find the inductance of A and the resistance of B. Calculate the voltage across each coil. — 5 CO1 K4

d. A balanced 3-phase star load has load impedance of (15-j20) Ω per phase and is supplied from a balanced 3-phase 400V, 50 Hz AC supply. Calculate the values for line voltages, phase voltages, line currents, Phase current & Power consumption at the load. — 5 CO2 K3

4.a. Explain the principle of DC generator and hence derive the expression for generated EMF. — 5 CO3 K4

b. A 1-phase transformer has 400 primary and 1000 secondary turns. The net cross-sectional area of the core is 60 cm2. If the primary is connected to a 50 Hz supply at 500 V, determine (a) the peak value of the flux density in the core and (b) the voltage induced in the secondary winding. — 5 CO2 K3

(OR)

c. Explain the construction and working principle of a single-phase transformer with a neat diagram. — 5 CO2 K2

d.	An 8-pole lap connected armature has 40 slots with 12 conductors per slot generates a voltage of 500V. Determine the speed at which it is running if the flux per pole is 50mWb.	5	CO3	K3
5.a.	With a neat circuit diagram, explain the working of a half wave rectifier along with relevant waveforms.	5	CO3	K2
b.	Explain the Common Emitter Connection of transistor with suitable diagram. Also draw its input and output characteristics.	5	CO4	K2
	(OR)			
c.	Explain the VI Characteristic curve of a PN-Junction Diode with suitable graph.	5	CO3	K2
d.	Explain the construction and working of NPN and PNP transistor with suitable diagram.	5	CO4	K2
6.a.	Draw the circuit diagram of of a non-inverting amplifier and derive the expression for voltage gain.	5	CO5	K4
b.	Explain the working of AND, OR, and NOT gates with truth tables and logic symbols.	5	CO6	K2
	(OR)			
c.	Define differential and common-mode signals. Mention expressions for differential gain and common-mode gain.	5	CO5	K2
d.	Explain in detail the symbol and pin diagram of a standard operational amplifier	5	CO5	K2

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