Total No. of Questions – [4] Total No. of Printed Pages: 4

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OPCTOBER 2023 (BACKLOG) EXAM

F.Y. B. TECH. (SEMESTER - I)

COURSE NAME: BASIC ELECTRICAL ENGINEERING

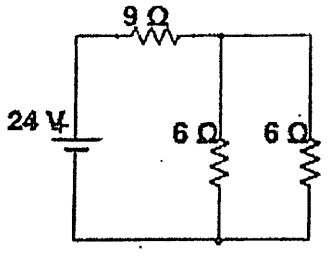
COURSE CODE: ET10182A

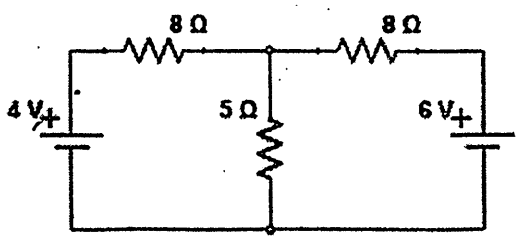
(PATTERN 2018)

Time: [2Hr] [Max. Marks: 60]

(*) Instructions to candidates:

1) **Figures to the right indicate full marks.**
2) **Use of scientific calculator is allowed**
3) **Use suitable data where ever required**

Question No.	Question Description	Marks	CO mapped	Blooms Taxonomy Level
Q.1	A) The current carried by the 9 Ω resistance for the circuit shown in the figure 1 is  Fig. 1 i) 5.6 A ii) 2 A iii) 1 A iv) 1.142 A	[2]	1	Apply
	B) If equivalent resistance R_{eq} as seen by the open terminals after removing the load branch is 6 Ω while the open circuit (or Thevenin's) voltage across the open terminals V_{Th} is 36 V then load current I_L flowing through load resistance of 30 Ω is i) 5 A ii) 4 A iii) 1 A iv) 2 A	[2]	1	Apply
	C) The current flowing through 5 Ω resistance for the network shown in fig. 2 due to 6 V voltage source acting alone will be	[2]	1	Apply

	 Fig. 2 i) 0.5 A ii) 0.28 A iii) 1.22 A iv) 0.33 A			
	D) For a network shown in fig. 2 above, considering 5 Ω as a load branch, the equivalent resistance, R_{eq} seen by the open terminals after removing the load branch of 5 Ω resistance from the circuit will be i) 5 Ω ii) 4 Ω iii) 16 Ω iv) 9 Ω	**[2]**	1	Apply
	E) For a network shown in fig. 2 above, considering 5 Ω as a load branch, the short circuit current flowing through the short circuited path after removing the load branch of 5 Ω resistance from the circuit will be i) 0.5 A ii) 0.75 A iii) 1.25 A iv) 0 A	**[2]**	1	Apply
	F) The rms value of an ac sinusoidal current is 10 A. Its peak value is i) 10 A ii) 20 A iii) $10\sqrt{2}$ A iv) $20\sqrt{2}$ A	**[2]**	2	Understand
	G) The peak factor and form factor for a sinusoidal waveform is respectively i)1.414,1.11 ii)1.11,1.414 iii)1.414,1.414 iv) 1.11,1.11	**[2]**	2	Remember
	H) For a series R-L circuit if R is 5 Ω, L is 0.1 H and supply frequency is 50 Hz then the total impedance Z of the series R-L circuit in Ω will be i) 5 + j 0.3142 ii) 5 - j 31.42 iii) 5 - j 0.3142 iv) 5 + j 31.42	**[2]**	2	Apply
	I) The phase angle between voltage across and current through a pure inductor is i) 0^0 ii) 30^0 iii) 90^0 iv) 45^0	**[2]**	2	Understand
	J) For a single-phase AC circuit if the supply voltage is 220 V, current is 3 A and phase angle Φ is 90^0 then the active power will be i) 660 W ii) Zero iii) 660 VA iv) 660VAR	**[2]**	2	Apply
	K) A transformer has 40 turns on secondary and maximum flux in core is 0.06 Wb. If	**[2]**	3	Apply

	supply frequency is 50 Hz, induced e.m.f. in volts in the secondary winding will be i) 5328 ii) 5.328 iii) 53.28 iv) 532.8			
	L) The full load current on secondary side of a single phase 10 KVA, 100/200 V, 50 Hz transformer is i) 5 A ii) 50 A iii) 500 A iv) 5000 A	[2]	3	Apply
	M) Full load Copper loss of a transformer is 2000 W. At half load, the copper loss will be i) 500 W ii) 1000 W iii) 250 W iv) 4000 W	[2]	3	Apply
	N) The readings of wattmeter connected on supply and load side are 100 W and 80 W respectively during a direct loading test on a single phase transformer of 1 KVA, 110 / 220 V, and 50 Hz rating. Its efficiency is i) 87.56% ii) 80% iii) 86.6% iv) 125 %	[2]	3	Apply
	O) The transformation ratio of a single phase 1 KVA, 400 / 200 V, 50 Hz transformer is i) 1 ii) 1.15 iii) 2 iv) 0.5	[2]	3	Understand
Q.2	**Solve any two out of three**			
	a) An electric pump lifts 1200 kg of water per minute to a height of 15 m. If its overall efficiency is 60 %, find the input power. If the pump is used for 4 hours a day, find the daily cost of energy at the rate of Rs. 2.25 per unit. Assume the value of 'g' as 9.81 m/s^2.	[5]	4	Apply
	b) Three resistances each of 400 Ω are connected in delta across a 400 V, 3 phase, 50 Hz supply. Calculate the phase current, line current, phase voltage and total power supplied.	[5]	4	Apply
	c) In a residential flat, following is the pattern of usage for various appliances during a day. i. 4 fluorescent tubes each of 40 W for 5 hours ii. 1 kW electric geyser for 1/2 hour iii. 800 W washing machine for 45 minutes iv. Other miscellaneous load of 500 W	[5]	4	Apply

	for 3 hours Estimate the total energy consumption and monthly electricity bill for a month of 30 days at the rate of Rs. 5/- per kWH.			
Q.3	**Solve any two out of three**			
	a) State any two applications of i) DC series motor ii) DC shunt motor	**[5]**	5	Remember
	b) Draw and explain in brief i) speed-armature current, ii) torque-armature current and therefore iii) speed torque characteristics of a dc shunt motor.	**[5]**	5	Understand
	c) An 8- pole, lap- connected armature of a DC generator has 480 conductors and running at 1250 rpm. Determine the emf induced if the flux per pole is 50 mWb.	**[5]**	5	Apply
Q.4	**Solve any two out of three**			
	a) Differentiate between squirrel cage and slip ring type three phase induction motor with any four significant points.	**[5]**	6	Remember
	b) A 3- phase, 50 Hz, 4 pole induction motor has a full load slip of 0.04. Calculate the synchronous speed, the speed of the rotor and the frequency of rotor current i) at standstill ii) at full load.	**[5]**	6	Apply
	c) A three phase, 4 pole, 50 Hz induction motor has a slip of 1 per cent at no load and 3 per cent at full load. Find the synchronous speed, the no-load speed, the full- load speed, the frequency of rotor currents at standstill and frequency of rotor currents at full load, speed of rotating magnetic field if the supply frequency is increased to 60 Hz.	**[5]**	6	Apply