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FIRST Semester B. E. Degree Semester End Examination (SEE), Jan/ Feb 2024

Fundamentals of Electrical Engineering
CSE/ISE/AI&ML/CSE(DS)

(Model Question Paper - 1)

[Time: 3 Hours]		[Maximum Marks: 100]

Instructions to students:

i. **Answer FIVE FULL Questions as per choice.**
ii. **Use BLACK ball point pen for text, figure, table, etc.**
iii. **Assume missing data, if any.**

|			Marks	CO	RBT Level
		Module-1			
1.	a)	Differentiate between conventional & non conventional energy sources	[04 Marks]	CO1	L2
	b)	With a neat block diagram, explain wind power generation	[08 Marks]	CO1	L2
	c)	With a neat block diagram, explain Hydro power generation	[08 Marks]	CO1	L2
		OR			
2.	a)	With neat single line diagram, explain the various steps of electrical power transmission and distribution system	[06 Marks]	CO1	L2
	b)	Explain Thermal power generation with a neat block diagram	[07 Marks]	CO1	L2
	c)	Explain Solar power generation with a neat block diagram	[07 Marks]	CO1	L2
		Module-2			
3.	a)	State Ohm's Law. Mention its limitations.	[06 Marks]	CO2	L2
	b)	Define average and RMS values of sinusoidal voltage. Also derive the respective expressions.	[06 Marks]	CO2	L2
	c)	A resistance R is connected in parallel with 4 ohm resistor which is connected in series with a parallel combination of 2 ohm & 8 ohm resistors respectively. The total power consumed by the network is 16W. find the value of R & total current	[08 Marks]	CO2	L3
		OR			
4.	a)	Explain the generation of single phase AC with the suitable diagram	[08 Marks]	CO2	L2
	b)	Find the currents in all the resistors shown in fig	[06 Marks]	CO2	L3
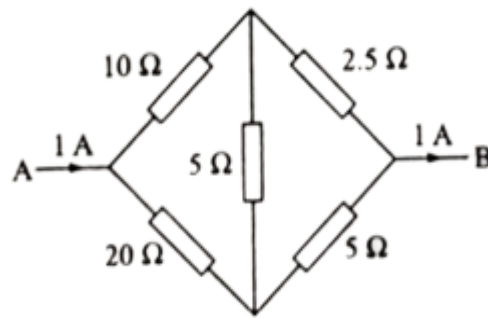
c)	An expression for alternating voltage is given by V=140sin314t. Find (i) RMS value, (ii) average value, (iii) Form factor, (iv) Peak factor	[06 Marks]	CO2	L3

Module-3

5.	**a)**	Derive the emf equation of a transformer and hence obtain the voltage and current transformation ratios.	[06 Marks]	CO3	L3
	b)	Explain the different characteristics of DC shunt motor.	[06 Marks]	CO3	L2
	c)	A 6 pole lap connected DC series motor with 864 conductors takes a current of 110A at 480V. the armature and the series field winding resistance is 0.18 ohm and 0.02 ohm respectively. The flux produced per pole is 50m wb. Find the torque developed and the speed	[08 Marks]	CO3	L3

OR

6.	**a)**	Derive an expression of armature torque developed in a D. C. motor.	[06 Marks]	CO3	L3
	b)	Explain the various losses in a transformer and how to minimize them?	[06 Marks]	CO3	L2
	c)	A transformer is rated at 100 kVA. At full load its copper loss is 1200W and its iron loss is 960W. Calculate: i) the efficiency at full load, UPF ii) the efficiency at half load, 0.8 p.f.	[08 Marks]	CO3	L3

Module-4

7.	**a)**	With neat circuit diagram and switching table explain two way and three way control of load	[06 Marks]	CO4	L2
	b)	What is electric shock? Give the list of preventive measures against the shock.	[06 Marks]	CO4	L2
	c)	In a 4BHK flat, total 8persons are residing. The average consumption of electricity per day for this flat is as follows:	[08 Marks]	CO4	L3

No	Appliance(s)	Wattage	Hours
1	4 Geysers	1.5kW	15min
2	4 Air conditioners	1.8kW	1hour
3	1 refrigerator	450W	3hours
4	1 induction heater	1500W	30 min
5	8 LED tube lights	20W	6hours
6	8 ceiling fans	100W	2hours

If the tariff of electric supply company is as follows, estimate the total electricity bill for this flat for the month of March. i)Up to 100 units :Rs

4.00 per unit ii)From 101 to 200 units :Rs 5.00 per unit iii)From 200 to 400 units :Rs.6.50 per unit iv)Above 400 units :Rs.8.00 per unit

OR

8.	**a)**	What are the desirable characteristics of tariff and explain two part tariff.	**[06 Marks]**	**CO4**	**L2**
	b)	Define earthing. With neat diagram, explain pipe earthing.	**[06 Marks]**	**CO4**	**L2**
	c)	A consumer has the following connected load: 10 lamps of 80W each and two heaters of 1500W each. His maximum demand is 1500 W. On the average, he uses 8 lamps for 5 hours a day and each heater for 3 hours a day. Each unit is 4 INR. Find his total load, monthly energy consumption and amount of bill.	**[08 Marks]**	**CO4**	**L3**

Module-5

9.	**a)**	Write a short note on UPS and also Explain its types and its application	**[10 Marks]**	**CO5**	**L2**
	b)	Suppose you have an inverter battery with a capacity of 150 Ah and an input voltage of 12 V, and you want to power three tube lights, three fans, and a Wi-Fi router using this battery. In this scenario, you may be wondering how long your appliances will run on this battery and what will be the battery backup time. Calculate the backup time of your inverter battery and determine how long your devices will be powered.	**[10 Marks]**	**CO5**	**L3**

OR

10.	**a)**	Write a short note on Batteries, Explain parameters of battery and its application	**[10 Marks]**	**CO5**	**L3**
	b)	Explain solar energy conversion devices and applications	**[10 Marks]**	**CO5**	**L2**

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