

Marks:-80

12/5/2026

2. Solve any Three Questions out of the remaining

3. Assume suitable data if required and specify the same

- State the various factors used to classify the types electrical systems.
- State the features of motor control.

[5]

b. State the features of motor control center.

[5]

d. State the various features of Emergency Control.

[5]

d. State the various features of Energy Conservation ACT 2001.

[5]

e. Explain the concept of monitoring in energy conservation

[5]

f. State the design features of energy efficient motors.

[5]

Q No 2A. Explain the estimation procedure with example.

[10]

Q No 2B. Explain the design of switchboards.

[10]

Q No 3A. Find the KVA rating of the transformer required which is feeding following three phase loads. Specify the various specifications required for transformer and its criterion's for the selection. [10]

[10]

Load No	Rating KW and Phase	LF	DF	Efficiency	Power Factor
1	100-3Phase	0.8	0.7	0.7	0.95
2	200-3Phase	0.75	0.6	0.8	0.9
3	300-1Phase	0.75	0.6	0.9	0.85
4	600-1Phase	0.8	0.5	0.9	0.7

Q No 3B. Justify that HT Consumer Electricity Bill can be used as an electrical load management techniques.

[10]

Q No 4A. A 10 HP, 415V, 3 ϕ , 50Hz 1440 rpm, 0.85 pf, 0.9 efficiency Induction Motor is connected to PCC by a cable of length 5m. Two other cables are running in a cable tray. Ambient temperature is 40°C. Fault level is 20 KA. Grouping factor is 0.87. Calculate the cable current only. Justify the various assumption in the calculations and selection of cable conductor. (Data Sheet Not Required) [10]

[10]

Q No 4B. A reading room measuring (20m (L) + 15m (B) + 5m (H)) requires an average illumination of 350 lux. State the various assumptions in design of lighting system for this room. Calculate the number of lamps required. Draw the lighting layout. (Data Sheet provided)

[10]

Q No 5A. Explain the terms maximizing the system efficiency and fuel substitution with example.

[10]

Q No 5B. Explain the assessment of energy consumption in Variable speed drives.

[10]

Q No 6A. Explain the APFC and VFD as an energy efficient technology for indoor system.

[10]

Q No 6B. Explain the implementation of Energy Management system (EMS)

[10]

Data for Lighting System Designing

K	$R_c = 0.7$			$R_c = 0.5$			$R_c = 0.3$		
	$R_{wv} = 0.5$	$R_{wv} = 0.3$	$R_{wv} = 0.1$	$R_{wv} = 0.5$	$R_{wv} = 0.3$	$R_{wv} = 0.1$	$R_{wv} = 0.5$	$R_{wv} = 0.3$	$R_{wv} = 0.1$
0	0	0	0	0	0	0	0	0	0
0.6	0.43	0.39	0.36	0.42	0.38	0.36	0.41	0.38	0.36
0.8	0.45	0.41	0.38	0.44	0.40	0.38	0.43	0.40	0.38
1.00	0.51	0.47	0.44	0.55	0.47	0.44	0.49	0.46	0.40
1.25	0.55	0.51	0.49	0.53	0.50	0.48	0.52	0.50	0.48
1.50	0.57	0.54	0.52	0.56	0.53	0.51	0.54	0.52	0.50
2.00	0.61	0.58	0.56	0.59	0.57	0.55	0.57	0.56	0.54
2.50	0.63	0.61	0.59	0.61	0.59	0.57	0.59	0.58	0.56
3.00	0.65	0.63	0.61	0.63	0.61	0.59	0.61	0.59	0.58
4.00	0.67	0.65	0.63	0.64	0.63	0.62	0.62	0.61	0.59
5.00	0.68	0.67	0.65	0.65	0.64	0.63	0.63	0.62	0.61

Lamp Data			
Sr. No.	Type of Lamp	Wattage	Lumen output
1.	Fluorescent (T8/T5)	18 (Halo phosphate)	1015
		36 (Halo phosphate)	2450
		18 (82/84/86)	1300
		36 (82/84/86)	3250
		28 (T5)	2800
2.	CFL	9	600
		11	760
		13	920
		18	1200

Sr. No	Type of Cable	Value of k (Cu)	Value of k (AL)
a)	PVC cable $\leq 300\text{mm}^2$	115	76
b)	PVC cable $> 300\text{mm}^2$	103	68
c)	XLPE cable	114	92