ICOE/Lib/Dec-BE/Elect/Sem-VIII/EM/30/05/2024

Paper / Subject Code: 52888 / Environmental Management

B.E / Elect / Sem- VIII / May-2024

30.05.2024

(Time: 3 Hours) (Total Marks: 80)

Note:
1. Question No.1 is compulsory.
2. Attempt any **three** out of the remaining **Five** questions.
3. Assume suitable data if necessary.

Q. 1. Answer **any FOUR** of the following: (20)

(a) Define Environmental Objective as per ISO 14001

(b) What are the challenges in implementation of ISO 14000 standards?

(c) Unawareness or ignorance of environmental protection will lead to detrimental consequence comment. Justify the statement.

(d) Write short note on Global Warming as a Global Environmental Concern.

(e) Discuss on Applications of Environmental Management System..

(f) Discuss the key success factors for applied to almost all the operation for EMS implementation.

Q. 2. (a) What is Water (P & CP) Act? Give its objectives. (10)

(b) Discuss in short about Environment Protection Act. (10)

Q. 3. (a) Discuss roles of Government as regulatory agency for Environmental Management. Enlist 3 points. (10)

(b) Explain limiting factors and carrying capacity as related to Ecosystems. (10)

Q. 4. (a) What is Total Quality Environment Management Concept? (10)

(b) How is CSR related to Environmental Management? Explain with an example. (10)

Q. 5. (a) Elaborate the ISO 14001 EMS Model for Municipalities. (10)

(b) Discuss in short about EMS certification. (10)

Q. 6. Answer the following (20)

(a) Discuss on Wildlife protection Act.

(b) What are the guidelines to conduct and Environmental audit?

Paper / Subject Code: 52876 / Power System Planning and Relibility (DLOC - VI)

B.E/Sem.VIII/Electrical/May-2024

28/05/2024

(Time: 3 Hours) Total Marks – 80

N.B.:- (1) Question No.1 is compulsory.
(2) Attempt any three questions out of remaining five questions.
(3) Assume necessary data wherever necessary.

1. Attempt the following 20
   a) State characteristics of load.
   b) Describe Bath tub curve.
   c) State System and load point indices.
   d) Describe LOLE, LOEE and EIR

2. a) Differentiate between Short term, Medium term and long term load forecasting. 10
   b) Explain the weather sensitive load model. 10

3. a) Explain Markov process with two state model. 10
   b) A system is having four components with individual reliability of 0.97, 0.99, 0.92, and 0.95 each. Calculate reliability and unreliability of a system when the components are connected in i) series and ii) parallel. 10

4. a) Explain Capacity Outage Probability table Recursive algorithm for including no de-rated state. 10
   b) Consider a system containing five units of 40MW each with FOR=0.03. Prepare the capacity outage table for the system. Find Loss of Load Expectation and risk factor if the annual peak load is 180 MW and base load if 40% of peak load. 10

5. a) Explain conditional probability method. 10
   b) A generating system has one generator unit of 25 MW and 2 generator units of 50 MW with FOR 0.02. Prepare Capacity Outage Table for the same. 10

6. a) Describe Reliability evaluation of radial distribution Feeder system 10
   b) Define following index: 10
      a) System Average Interruption Frequency Index
      b) System Average Interruption Duration Index
      c) Customer Average Interruption Duration Index
      d) Customer Total Average Interruption Duration Index
      e) Customer Average Interruption Frequency Index

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ICOE/Lib/BE/Sem-VIII/Elect/PP&F/24/05/2024

Paper / Subject Code: 52872 / Power Quality and FACTs (DLOC - V)

BE./Sem.VIII/Electrical/May.2024

24/05/2024

Duration: 3hrs **Total Marks: 80**

NB: 1) Question No. 1 is Compulsory.

2) Attempt any three Questions out of remaining five Questions.

3) Assume suitable data if necessary and justify the same.

Q1.		Answer the following questions	
	A)	State objectives of series compensator	05
	B)	Explain the merits and demerits of transmission interconnections	05
	C)	Explain Ideal Compensator and its conditions	05
	D)	What is the flicker in power quality?	05
Q2	A)	Explain the operating principle of the Thyristor Controlled Reactor (TCR) in detail	10
Q2	B)	Explain switching converter type series compensation (SSSC).	10
Q3	A	Classify in detail the power filter used for harmonic elimination and explain any one with advantages and disadvantages,	10
Q3	B)	Explain the capacitor-based circuit for power factor correction.	10
Q4	A)	Explain various basic FACTS controllers on the basis of their connection with needful diagram. Give One example in each categories.	10
Q4	B)	Explain various parameters which limit the loading capabilities of transmission line	10
Q5	A)	Explain the Thyristor controlled phase angle regulator (TCPAR).	10
Q5	B)	Explain the power flow in Mesh system	10
Q6	A)	What is instantaneous PQ theory?	10
Q6	B)	Explain power factor correction in a single phase system	10

Elect / BE / Sem-VIII / C-Scheme / May-2024

Paper / Subject Code: 52871 / Electrical System Design, Management and Auditing

Icoe/Lib/ BE/Elect/ Sem VIII/ C-Scheme/ ESDMA/ 04/2024

Duration: - 03 Hrs

Marks:-80

NOTE

1. **Question No 1 is Compulsory**
2. **Solve any Three Questions out of the remaining**
3. Assume suitable data if required and specify the same

Q No 1. Answer the following questions

a. State the various steps followed in Tendering Procedure. [5]

b. Discuss the selection and sizing of UPS. [5]

c. State the various steps in the implementation of energy monitoring and targeting. [5]

d. State the various features of Energy Conservation ACT 2001. [5]

Q No 2A. Discuss the designing of electrical earthing system. [10]

Q No 2B. Find the KVA rating of the transformer required which is feeding following three phase loads. Specify the various specifications required for transformer and its criteria's for the selection. For which load power factor correction is required and why? Calculate the compensating KVAR required. [10]

Load No	Rating KW	LF	DF	Efficiency	Power Factor
1	100	0.8	0.7	0.7	0.95
2	350	0.75	0.6	0.8	0.9
3	200	0.75	0.6	0.9	0.85
4	400	0.8	0.5	0.9	0.7

Q No 3A Discuss how electricity bill is useful for energy consumption optimization. [10]

Q No 3B A reading room measuring (43m (L) + 18m (B) + 5m (H) requires an average illumination of 400 lux. State the various assumptions in design of lighting system for this room. Calculate the number of lamps required. Draw the lighting layout. [10]

Q No 4A. A 50 KW heater, rated for 415V, 3ϕ, 50Hz is connected to PCC by a cable of length 100m. Two other cables are running in a cable tray. Ambient temperature is 40°C. Fault level is 20 KA. Grouping factor is 0.7. Calculate and specify the cable required for the same. [10]

Q No 4B Discuss the various electrical load management techniques. [10]

Q No 5A. Discuss the energy performance assessment of motors. [10]

Q No 5B What are the different types of energy audits? Discuss any one in detail. [10]

Q No 6A. Discuss the energy saving potentials of energy efficient transformer and smart lighting system. [10]

Q No 6B. Discuss the implementation of Building Management System [10]

Data Required for Illumination Design Problem

K	R_C = 0.7			R_C = 0.5			R_C = 0.3		
	R_W = 0.5	R_W = 0.3	R_W = 0.1	R_W = 0.5	R_W = 0.3	R_W = 0.1	R_W = 0.5	R_W = 0.3	R_W = 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

Data Required for Cable Design Problem

TABLE 14
IEE-Table 9D2
Current-carrying capacities and associated voltage drops for twin and multicore p.v.c.-insulated cables, non-armoured (copper conductors)

Conductor operating temperature : 70°C

Conductor cross-sectional area	Installation methods A to C (of Fig. 1 ('Enclosed')				Installation methods E to H (of Fig. 1 ('Clipped direct')				Installation method K (of Fig. 1 ('Defined conditions')			
	One twin cable With or without protective conductor single-phase a.c. or d.c.		One three-core cable with or without protective conductor or one four-core cable, three phase		One twin cable With or without protective conductor single-phase a.c. or d.c.		One three-core cable with or without protective conductor or one four-core cable, three phase		One twin cable With or without protective conductor single-phase a.c. or d.c.		One three-core cable with or without protective conductor or one four-core cable, three phase	
	Current carrying capacity	Volt drop per ampere per metre	Current carrying capacity	Volt drop per ampere per metre	Current carrying capacity	Volt drop per ampere per metre	Current carrying capacity	Volt drop per ampere per metre	Current carrying capacity	Volt drop per ampere per metre	Current carrying capacity	Volt drop per ampere per metre
	2	3	4	5	6	7	8	9	10	11	12	13
mm²	A	mV	A	mV	A	mV	A	mV	A	mV	A	mV
1.0	14	42	12	37	16	42	13	37	-	-	-	-
1.5	18	28	16	24	20	28	17	24	-	-	-	-
2.5	24	17	21	15	28	17	24	15	-	-	-	-
4	32	11	28	9.2	38	11	32	9.2	-	-	-	-
6	40	7.1	36	6.2	46	7.1	40	6.2	-	-	-	-
10	53	4.2	49	3.7	64	4.2	54	3.7	-	-	-	-
16	70	2.7	62	2.3	85	2.7	71	2.3	-	-	-	-
25	79	1.8	70	1.5	106	1.8	90	1.5	114	1.8	95	1.5
35	98	1.3	86	1.1	132	1.3	115	1.1	133	1.3	122	1.1
50	-	-	-	-	163	0.92	140	0.81	172	0.92	149	0.81
70	-	-	-	-	207	0.65 0.64	176	0.57	216	0.65 0.64	186	0.57
95	-	-	-	-	251	0.48 0.46	215	0.42	255	0.48 0.46	227	0.42
120	-	-	-	-	290	0.40 0.36	251	0.34	306	0.40 0.36	265	0.34
150	-	-	-	-	330	0.32 0.25	287	0.29	348	0.32 0.25	302	0.29
185	-	-	-	-	380	0.29 0.23	330	0.24	400	0.29 0.23	345	0.24
240	-	-	-	-	450	0.25 0.18	392	0.20	474	0.25 0.18	413	0.20
300	-	-	-	-	520	0.23 0.14	450	0.18	548	0.23 0.14	474	0.18
400	-	-	-	-	600	0.22 0.11	520	0.17	632	0.22 0.11	545	0.17

FLAT CABLES ONLY

CORRECTION FACTORS

FOR AMBIENT TEMPERATURE

Ambient temperature	25°C	35°C	40°C	45°C	50°C	55°C	60°C	65°C
Correction factor	1.06	0.94	0.87	0.79	0.71	0.61	0.50	0.35

TABLE 15
IEE-Table 9D3
Current-carrying capacities and associated voltage drops for twin and multicore armoured p.v.c.-insulated cables (copper conductors).

Conductor operating temperature : 70°C

Conductor cross-sectional area	Installation method E, F and G † of Table 11 ("Clipped direct")				Installation method K of Table 11 ("Defined conditions")			
	One twin cable single phase a.c. or d.c.		One three- or four core cable three-phase		One twin cable single phase a.c. or d.c.		One three- or four core cable three-phase	
	Current carrying capacity	Volt drop per ampere per metre	Current carrying capacity	Volt drop per ampere per metre	Current carrying capacity	Volt drop per ampere per metre	Current carrying capacity	Volt drop per ampere per metre
1	2	3	4	5	6	7	8	9
mm²	A	mV	A	mV	A	mV	A	mV
1.5	20	29	18	25	-	-	-	-
2.5	28	18	24	15	-	-	-	-
4	37	12	31	9.6	-	-	-	-
6	48	7.4	41	6.3	50	7.3	42	6.3
10	66	4.3	56	3.8	69	4.3	59	3.8
16	85	2.7	73	2.3	90	2.7	77	2.3
25	115	1.8	97	1.6	121	1.8	102	1.6
35	142	1.3	119	1.1	149	1.9	125	1.1
50	168	0.92	147	0.81	180	0.92	155	0.81
	a.c.	d.c.			a.c.	d.c.		
70	209 0.65	0.64	160	0.57	220 0.65	0.64	190	0.57
95	257 0.48	0.46	219	0.42	270 0.48	0.46	230	0.42
120	295 0.40	0.36	257	0.34	310 0.40	0.38	270	0.34
150	337 0.32	0.25	295	0.29	355 0.32	0.25	310	0.29
185	393 0.29	0.23	333	0.24	410 0.29	0.23	350	0.24
240	461 0.25	0.18	399	0.20	485 0.25	0.18	420	0.20
300	523 0.23	0.14	451	0.18	550 0.23	0.14	475	0.18
400	589 0.22	0.11	523	0.17	620 0.22	0.11	550	0.17

FOR AMBIENT TEMPERATURE — CORRECTION FACTORS

Ambient temperature	25°C	35°C	40°C	45°C	50°C	55°C	60°C	65°C
Correction factor	1.06	0.94	0.87	0.79	0.71	0.61	0.50	0.35

TABLE 20
IEE-Table 9K1
Current-carrying capacities and associated voltage drops for single-core p.v.c.-insulated cables, non-armoured, with sheath (Aluminium conductors)

Conductor operating temperature : 70°C

Cross-sectional area of conductor	Installation methods A to C † of Table 11 ("Enclosed")					Installation methods E to H of Table 11 ("Clipped direct")					Installation method J of Table 11 ("Defined conditions")					
	2 Cables, single-phase a.c. or d.c.			3 or 4 cables three-phase a.c.		2 Cables, single-phase a.c. or d.c.			3 or 4 cables three-phase a.c.		Flat or vertical (2 cables, single-phase a.c. or d.c. or 3 or 4 cables three-phase)				Trefoil (3 cables three-phase)	
	Current carrying capacity	Volt drop per ampere per metre		Current carrying capacity	Volt drop per ampere per metre	Current carrying capacity	Volt drop per ampere per metre		Current carrying capacity	Volt drop per ampere per metre	Current carrying capacity	Volt drop per ampere per metre			Current carrying capacity	Volt drop per ampere per metre
		a.c.	d.c.				a.c.	d.c.				1 ph d.c.	3 ph			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
mm²	A	mV	mV	A	mV	A	mV	mV	A	mV	A	mV	mV	mV	A	mV
16	80	4.5	4.5	52	3.9	72	4.5	4.5	65	3.9	-	-	-	-	-	-
25	78	2.8	2.8	67	2.5	94	2.8	2.8	85	2.5	-	-	-	-	-	-
35	96	2.1	2.0	83	1.8	115	2.1	2.0	105	1.8	-	-	-	-	-	-
50	120	1.6	1.5	100	1.4	143	1.5	1.5	123	1.3	155	1.5	1.5	1.34	140	1.3
70	150	1.2	1.0	125	1.0	181	1.1	1.0	156	0.93	190	1.3	1.0	0.85	170	0.80
95	175	0.90	0.75	150	0.80	223	0.77	0.75	191	0.69	235	0.80	0.75	0.72	205	0.67
120	205	0.80	0.60	175	0.70	261	0.62	0.60	225	0.56	275	0.65	0.60	0.58	235	0.54
150	235	0.73	0.49	200	0.64	290	0.51	0.49	259	0.48	320	0.55	0.49	0.51	270	0.45
185	-	-	-	-	-	345	0.47	0.39	299	0.40	378	0.46	0.39	0.43	310	0.37
240	-	-	-	-	-	411	0.34	0.29	361	0.34	446	0.43	0.29	0.43	370	0.30
300	-	-	-	-	-	475	0.29	0.23	418	0.30	510	0.38	0.23	0.30	435	0.25
400	-	-	-	-	-	554	0.24	0.18	465	0.28	584	0.35	0.13	0.27	490	0.22
480	-	-	-	-	-	643	0.23	0.15	541	0.26	677	0.32	0.15	0.34	570	0.20
600	-	-	-	-	-	737	0.21	0.12	616	0.24	775	0.30	0.12	0.33	648	0.18

FOR AMBIENT TEMPERATURE — CORRECTION FACTORS

Ambient temperature	25°C	35°C	40°C	45°C	50°C	55°C	60°C	65°C
Correction factor	1.06	0.94	0.87	0.79	0.71	0.61	0.50	0.35

TABLE 21
IEE-Table 9K2
Current-carrying capacities and associated voltage drops for twin and multicore armoured p.v.c.-insulated cables, non-armoured (Aluminium conductors)
Conductor operating temperature : 70°C

Conductor cross sectional area	Installation method E, to H † of Table 11 (Clipped direct)				Installation method K of Table 11 ('Defined conditions')			
	One twin cable single phase a.c. or d.c.		One three- or four core cable, three-phase		One twin cable, single phase a.c. or d.c.		One three- or four core cable, three-phase	
	Current carrying capacity	Volt drop per ampere per metre	Current carrying capacity	Volt drop per ampere per metre	Current carrying capacity	Volt drop per ampere per metre	Current carrying capacity	Volt-drop per ampere per metre
1	2	3	4	5	6	7	8	9
mm²	A	mV	A	mV	A	mV	A	mV
16	82	4.5	53	3.9	65	4.5	55	3.9
25	82	2.9	70	2.5	86	2.9	74	2.5
35	102	2.1	86	1.8	107	2.1	91	1.8
50	120	1.5	106	1.3	125	1.5	110	1.3
70	150	1.1	133	0.93	158	1.1	139	0.93
95	185	0.79	163	0.68	195	0.79	172	0.68
120	-	-	190	0.54	-	-	200	0.54
150	-	-	217	0.45	-	-	227	0.45
185	-	-	247	0.37	-	-	260	0.37
240	-	-	296	0.29	-	-	311	0.29
300	-	-	340	0.25	-	-	358	0.25

CORRECTION FACTORS

FOR AMBIENT TEMPERATURE

Ambient temperature	25°C	35°C	40°C	45°C	50°C	55°C	60°C	65°C
Correction factor	1.08	0.94	0.87	0.79	0.71	0.61	0.50	0.36

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Subject Code 52871
Semester VIII –Electrical –R 19- 14 May -2024

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

Data for Cable Numerical

Data for Illumination Numerical

Data for Illumination Design problems

K	R_C = 0.7			R_C = 0.5			R_C = 0.3		
	R_W = 0.5	R_W = 0.3	R_W = 0.1	R_W = 0.5	R_W = 0.3	R_W = 0.1	R_W = 0.5	R_W = 0.3	R_W = 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