



- 1- All the questions according to ILOs a.1, a. 3, a.4 ,a.13, a17, a18, a21, a22, b1, b.9, c1, c4,d3.
- 2- Number of pages :2 No. of questions : 4
- 3- The weight of each problem is indicated.
- 4- This a closed book exam.
- 5- Clear, systematic answers and solutions are required in general, marks will not be assigned for answers and solutions that require unreasonable (in the opinion of the instructor) effort to decipher.
- 6- Ask for clarification if any question statement is not clear to you.
- 7- Attempts in all questions.
- 8- The exam will be marked out of 40.

Q 1

(10)

Explain, if it can be supplied electric power to three phases motor operates at 440 V, with CU cable length 120 m and C.S.A 50 mm² at operating current 120 A with P.F 0.8 and starting current 580 A at P.F 0.35. Take into account the maximum acceptable voltage drop on motor supply inputs 8%, the voltage drops in the main cable supply at the normal operating current (600 A) equal 8 V " can use the following table".

C.S.A		3- phases motor		1- Phase motor	
CU	AL	Starting operation p.f = 0.35	Normal operating p.f = 0.8	Starting operation p.f = 0.35	Normal operating p.f = 0.8
25	35	0.65	1.3	0.75	1.5
35	50	0.52	1.0	0.6	1.15
50	70	0.41	0.75	0.47	0.86
70	120	0.32	0.56	0.37	0.64

Q 2

(10)

Calculate the maximum safety multi-core cable length(CU) by using CB, with neutral line. The cable voltage is 440 , the C.S.A of cable is 150 mm² and the C.S.A of neutral conductor is half the line conductor, there are 3 cables besides. The short circuit with magnetic release is 2000 A (take the effect of reactance at 150 = 0.85).

V	220	400	415	440	480	500	660
K1	0.58	1.05	1.11	1.16	1.26	1.31	1.73
No. of parallel cables	2		3		5		6
K2	2		2.65		3		3.33

Q 3

(5)

Calculate the percentage error with using the approximate earthing rod diameter equation with earthing resistance not greater than 0.22p. Take the length of rode 3 m, and depth 2.8 m.

Q 4

(15)

1- Sketch the components of fire alarm system.

(5)

2- Design architectural drawing room, with length 12 m, width 6 m and high 3.50 m. The ceiling is white, the wall is green, and the floor is red colors. The working level 0.8 m over the floor level, take the lighting lumens for each lamp equals 1200 with 4 lamps in each fixture, and it fixed lower than ceiling with 0.45 m. (Take F = 1.33, K =1, use the attached tables)

(10)

Good Luck

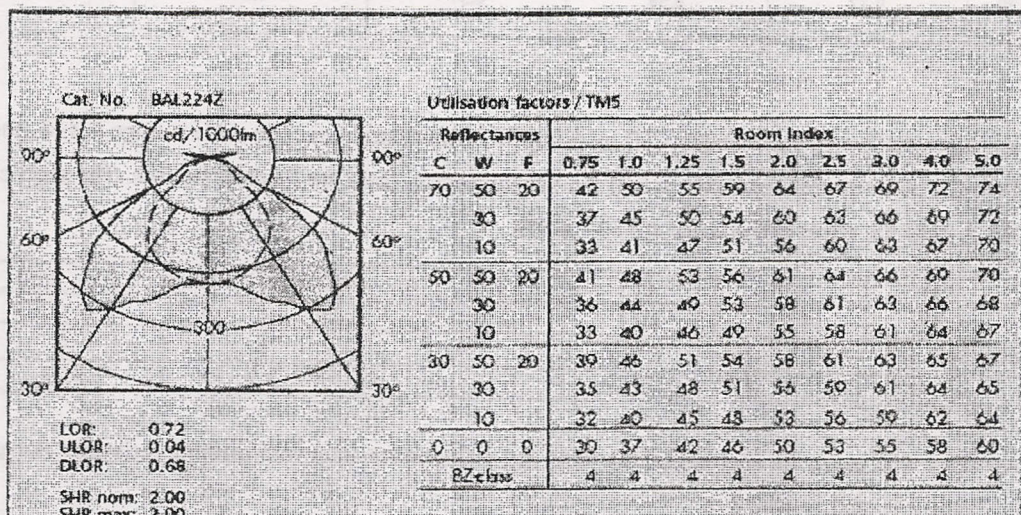
Table 1, Lux values

Brightness (luminance), Lux	places	
120	stairs	Residential buildings
60	Corridors	
150	Frog Living "general"	
120	Frog Living "Sleeping"	
120	Reception - restrooms	Offices
300	Meeting rooms	
300	Photocopy and printing room	
500	Drawing room	
1000	Architectural drawing room	

Table 2, Reflection Factors

Red	blue sky	Olive	Green	Brown	Yellow Orange	Light yellow	gray	White	Colors
20	35	30	50	40	65	70	60	70	Reflection % factor

Table3, Utilization factor



End of Exam Questions