Kafrelsheikh University
Faculty of Engineering
Department: Electrical Power and Machines
Year : 4th year(2007) 2020-2021
Subject: Network Security "Electrical Installations"

Date: 8 -3- 2021
Time Allowed: 2:00 hr.
Full Mark: 40 Marks.
Final Exam: 2 pages
Academic Code: HUM 4218

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)**

Calculate the percentage error with using the approximate earthing rod diameter equation with earthing resistance not greater than 0.215ρ. Take the length of rode 5m, and depth 3.97m.

Q 2 **(10)**

Calculate the maximum safety multi-core cable length(CU) by using CB, with neutral line. The cable voltage is 415 , the C.S.A of cable is 150 mm^2 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 16000 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	4	5	6
K2	2	2.65	3	3.2	3.33

Q 3 **(10)**

Multi-cores cable "Copper" 150 mm^2 with 3 cores PVC, at temperature 50 C^0, free air "flat" perforated trays, one tray " spaced" installation method., there are 2 cables besides it. Calculate the minimum cross section area of Aluminum cable with the same circumstances, but with 70% loading of copper cable (take; temperature = 50 C^0, Al = 0.62 CU).

Q 4 **(10)**

Design Meeting room with sketch the luminaires room distribution; length 10 m, width 6 m and high 3.25 m. The celling is white, the wall is olive, and the floor is red colors. The working level 0.8 m over the floor level, take the lighting lumens for each lamp equals 1100 with 2 lamps in each fixture, and it fixed lower than celling with 0.25 m. (Take F = 1.33, K =1, use the attached tables).

Air temperature	15	20	25	30	35	40	45	50	55
PVC	1.21	1.15	1.07	1	0.92	0.84	0.75	0.66	0.55

No. Trays	Number of cables						Method of installation
	1	2	3	4	6	9	Cables flat perforated trays
1	1	1	0.98	0.95	0.91	-	
2	1	0.99	0.96	0.92	0.87	-	
3	1	0.98	0.95	0.91	0.85	-	

C.S.A	25	35	50	70	95	120	150	185	240	300	400	500
Free air	102	125	151	191	235	270	310	357	423	456	567	650
Ground	130	156	189	232	278	315	354	399	462	521	593	668

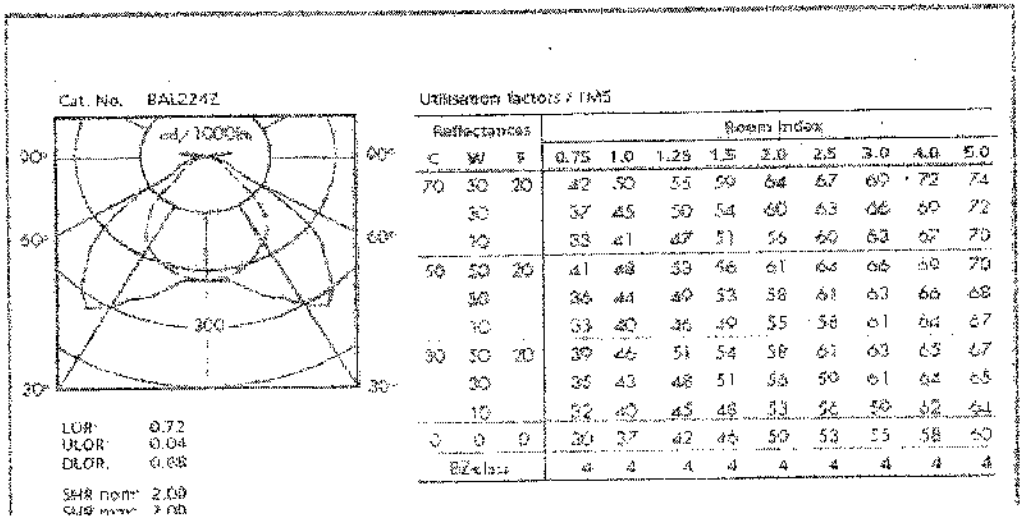
Table 1, Lux values

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

Good Luck

Dr. Fathalla Selim and Committee