KATHMANDU UNIVERISTY
End Semester Examination
May/June, 2022

Level : B.Arch.
Year : III
Time : 2 hrs. 30 mins.

Course : EEEG 331
Semester : II
F.M. : 40

SECTION "B"
[5Q. × 8 = 40 marks]

Attempt *ANY FIVE* questions. Assume any suitable data if necessary.

1. a. Define ohm's Law. A piece of silver wire has a resistance of 1 Ω. What will be the resistance of mangnin wire of one-third length and one-third the diameter of silver wire, if the specific resistance of manganin is 30 times of silver? [4]

   b. Explain the working of MCB and its types? [4]

2. a. Discuss briefly various electric distribution systems. [4]

   b. Write short notes on: [2 + 2]
      i. Public Address System
      ii. Telephone Network

3. a. Explain briefly electrical light pollution stating the requirements of unified glare ratings for different location. [4]

   b. Draw a typical layout of micro-hydro power plant and explain briefly. [4]

4. Design a lighting installation for room having dimensions 10 m × 7 m × 4.2 m having working plane 0.75 m above the floor. The other given factors are as below: [8]

Reflection factor of Ceiling	70%
Reflection factor of Wall	50%
Reflection factor of Working Plane	20%
Light Loss Factor	0.779
Luminaire Type	1800 mm twin tube with opal diffuser ceiling mounted
Downward light output ratio	36%
SHRmax	1.6:1
SHRnom	1.5:1
Dimension	1800mm long*200mm wide
Lamp	1800mm, 75W plus white
Initial lumen per lamp	5800
Lamp per luminaires	Two
Desired average illuminance on the working plane	500 lux

Room index	0.75	1.0	1.25	1.5	2.0	2.5	3.0	4.0	5.0
Room reflectances C W F									
70 - 50 - 20	0.36	0.42	0.47	0.51	0.56	0.60	0.63	0.66	0.69
30	0.31	0.36	0.42	0.46	0.52	0.56	0.59	0.63	0.66
10	0.27	0.32	0.37	0.41	0.47	0.52	0.55	0.60	0.63
50 - 50 - 20	0.33	0.38	0.43	0.46	0.51	0.54	0.57	0.60	0.62
30	0.29	0.34	0.38	0.42	0.51	0.51	0.53	0.57	0.59
10	0.25	0.30	0.35	0.38	0.44	0.48	0.50	0.54	0.57
30 - 50 - 20	0.31	0 35	0.39	0.42	0.46	0.49	0.51	0.54	0.55
30	0.27	0.31	0.35	0.38	0.43	0.46	0.48	0.52	0.54
10	0.23	0.28	0.32	0.35	0.40	0.44	0.46	0.50	0.52
0 - 0 - 0	0.20	0.24	0.28	0.30	0.34	0.37	0.39	0.42	0.44

5. Calculate the size of each MCB's for individual rooms and size of main MCB using the following load data of a single storey house. Also, determine size of the conductor required from distribution board to each switch board and power circuit illustrating in a single line diagram. (Voltage: 220V, use the data of current rating of copper conductor, the distance falls within the permissible no voltage drop) [8]

Location	Lights (quantity × watts) (time)	Fans (quantity × watts) (time)	5A Receptacles (quantity × watts) (time)
Bedroom	4 × 15watts (5hr)	1 × 180watts (6hr)	3 × 60 watts (1hr)
Living	4 × 20watts (5hr)	2 × 180watts (4hr)	3 × 60 watts (1hr)
Kitchen	4 × 20watts (4hr)	1 × 180watts (2hr)	2 × 400 watts (1hr)

Current rating of copper conductor one three core or four core cable

Size of Conductor (sq. mm)	Current carrying capacity (Amperes)
1	5
1.5	8
2.5	10
4.0	15
6.0	20
8.0	25
10.0	30
15.0	37
20.0	43
25.0	52
35.0	68
50.0	88

6. Design a standalone solar pv system for the house (battery size, Inverter specification, pv module size (each module of 100 Wp), wire size) based on the data in question number 5. [8]