

Master in Illumination Engg - First Year - Second Semester Examination 2024

SUBJECT.....ILLUMINATION AUDIT AND MANAGEMENT.....
(Name in full)

Time:-Three Hours

Full Marks 100

No. of questions	Part-I (50 Marks)	Marks
<u>Answer any two questions 25X2=50</u>		
1.		
i)	What is the difference between electrical audit and illumination audit of any installation / building?	8
ii)	Discuss the background of formation of Bureau of Energy Efficiency (BEE) in 2002.	6
iii)	What is Energy Conservation Building Code (ECBC) ? What is the basic difference between " Building Area Method " and Space Function Method " as mentioned in ECBC?	11
2.	i)	7
i)	Discuss the role of demand side management over source side management to confront against the global energy crunch ; by considering the example of illumination application.	7
ii)	What is annual load curve? Explain the idea of base load and peak load by considering a load curve. What do you mean by base load power stations ?	9
iii)	Explain the role of the regulatory bodies e.g. Central Electricity Regulatory Commission (CERC) , State Load Despatch Center (SLDC) in load management.	9
3.	i)	14
i)	Write a note on Availability based Tariff (ABT) ?	14
ii)	What do you mean by Pumped Storage System ?	11
4.	i)	12
i)	Propose a design scheme for audit and energy management for illumination system of entire Electrical Engineering Department of Jadavpur University.	12
iii)	What is Lighting Power Density (LPD) ?	4
ii)	Discuss few energy efficient measures can be adopted to improve the Illumination system of a class room .	9

[Turn over

M. E. IN ILLUMINATION ENGG. FIRST YEAR SECOND SEMESTER EXAMINATION, 2024**SUBJECT : ILLUMINATION AUDIT AND MANAGEMENT****Time : Three hours****Full Marks-100****Use Separate Answer Script for each part**
Part-II (50 marks)

No. of question	<u>Answer any two questions</u>	Marks
1.a)	Define illumination survey and audit. Write down the objectives of performing illumination survey and audit.	6
b)	Explain the method of evaluation of lighting power density of any lighting application area in context of the ECBC.	6
c)	<p>An existing lighting System is proposed to be upgraded by another lighting system after performing illumination audit. Compare the systems based on the following data and comment on the viability of the audit proposal. Consider the life of the lighting system as 10 years & annual hours of use of the system is 8000 hours. Energy cost is Rs.7/- per unit & labour cost to replace lamp is Rs. 10/lamp.</p> <p><u>Existing System</u>– Initial cost:-Rs. 25000. Description of Luminaires:-30 nos of 2x40 Watt Fluorescent Lamp with electromagnetic ballast, Ballast Loss is 8 Watt/lamp. Cost per lamp:-Rs. 60/- Cost per Luminaire:-Rs. 300/- Lamp Life:-8000hrs.</p> <p><u>System (B)</u>– Initial cost:-Rs. 40000. Description of the lighting system:-30 nos of 2x36 Watt Fluorescent Lamp with electronic ballast, Ballast Loss is 2 Watt/lamp. Cost per lamp:-Rs. 85/- Cost per Luminaire:-Rs. 500/- Lamp Life:-12000hrs.</p>	13
2. a)	Write down the mandatory and prescriptive requirements for the implementation of ECBC.	8
b)	What are the causes of light loss? Explain the method of evaluation of maintenance factor of any indoor lighting system using relevant CIE standard.	9
c)	“Use of Daylight Sensor can enhance the energy saving potential of an indoor lighting system” ----Justify the statement.	4
d)	Define ‘Life operating cost’ and ‘Life Cycle Cost Analysis’.	4

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3. a)	Write down the process for evaluating the lighting survey and audit of an existing building.	6
b)	What are the different types of lighting survey and audit? Mention the baseline data collected for each type of audit and their scope of application.	10
c)	Define green building. Explain the role of a lighting designer and the scope of work for any green building lighting design.	9
4. a)	Describe a method to predict the maximum allowable electrical power installed of any indoor lighting application area. Validate the above model for the following cases: i) An office room with a single working plane parallel to the floor. ii) A Storehouse with different horizontal & vertical task surfaces.	20
b)	Describe the utility of Daylight for energy conservation in lighting systems.	5