

M.TECH ILLUMINATION TECH. AND DESIGN
SECOND YEAR , SECOND SEMESTER EXAM 2018

SUBJECT: - LIGHTING & BIOLOGICAL FACTORS

Full Marks 100
Time: Three hours

(50 marks for this part)

Use a separate Answer-Script for each part

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No. of Questions	PART - I Question number 1 is compulsory and answer any two	Marks
1a)	Describe the position of "Optical Radiation Band" in "Electromagnetic Spectrum" and describe its subdivision also.	10
b)	Specify the effect to various classes of UV upon human skin.	6
c)	Specify the significance of Ionizing radiation .Specify the threshold wavelength.	2
2a)	Describe the role of Red and Blue light in the photo synthesis with proper diagram.	6
b)	Specify role of various colour of light in following functions: (i) Stem elongation (ii) Flowering (iii) Chlorophyll	6
c)	Specify the unit of Radiant Energy for plant application and describe its measurement device.	4
3a)	Explain Photo oxidative reaction .What is meant by Cytotoxic?	6
b)	Explain Photo Dynamic therapy for cancer location and binding . Specify the colours involved in this process and explain the reason . What should be the precautionary measure after the therapy ?	6
c)	Explain the Photo therapy treatment for Vitiligo .Why it is necessary and what is the preferred colour needed for this application.	4

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4a)	Describe two partial sighted problems of eyes and describe detection and rectification measure of any .	6
b)	Describe the role in making the eyes to see the target. Explain with suitable example.	6
c)	Explain why and how proper quality of colour of light as well as eye quality of the Tester is needed for Chemical and Electronic assembly Labs. Name and briefly describe a test for eye quality detection .	4
5a)	Describe the role , proccdure , specific wave length of UV for Bone mineralization.	10
b)	Describe the other six uses of UV in detection / rectification in Biological , Commercial , Jewellery , Industrial ,etc. applications.	6

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Part-II (50 Marks)

No. of question	<u>Answer Any Three Questions</u> Two marks reserved for neatness and well organized answer	Marks
1.a)	“Photochemical and photobiological parameters can be expressed in terms of photometric parameters.”—Explain the statement with suitable examples.	6
b)	What do you mean by passive absorption and active absorption of optical radiation by human body?	4
c)	Discuss different laws regarding non visual effects of optical radiation.	6
2.a)	Briefly discuss the effects of quantity of light, spectral power distribution of lamp, spatial distribution, timing and duration of optical radiation on circadian photobiological functions in Human.	10
b)	Write a short note on “Blue Light Hazard”.	6
3.a)	What is Human Centric Lighting? Write down the benefits of this type of lighting.	4
b)	Briefly describe the method to obtain Action Spectrum for melatonin regulation in Humans due to effect of lighting.	10
c)	Mention the basic differences between ‘Vision-related’ Lighting quality and ‘Health-related’ Lighting quality?	2
4. a)	Discuss the impact on sleep and mood under different kind of office lighting exposure in two seasons.	10
b)	Briefly explain different physiological & psychological effects of lighting.	6
5.a)	Discuss field experiment methods to study the effects of blue-enriched light on daily course light perception.	10
b)	Define Effectiveness of Spectrum, Exposure & Effective Exposure in optical radiation.	6