

280-315

$$E = \frac{hc}{\lambda}$$



Indian Association for the Cultivation of Science
(Deemed to be University under *de novo* Category)
Master's/Integrated Master's-PhD Program/Integrated Bachelor's-Master's
Program/PhD Course
Mid-Semester Examination-Autumn 2023

Subject: Elements of Photobiology
Full Marks: 25

Subject Code(s): BIS 2101
Time Allotted: 2 h

Group-A

- ✓ 1. (a) What is the origin of bioluminescence? (b) Name and write the chemical structure of the molecule responsible for firefly bioluminescence. (c) Write the chemical mechanism showing steps of yellow light emission by firefly. 6
- ✓ 2. (a) What is the energy range of solar UV-B light in eV unit? (b) Why is this light considered to be a health hazard? (c) Write the name and Chemical structure of the biomolecule chemically sensitive to UV-B light. (d) How is UV-B light responsible to induce point mutation? 6

Group-B

- ✓ 8. Define the following (any three): 1×3=3
- ✓ a) Melanopsin
 - ✓ b) Euphotic zone
 - ✓ c) Insomnia
 - ✓ d) Phase of a cycle
- ✓ 9. Explain (any two): 2×2=4
- ✓ a) Jet lag is referred to as Desynchronization.
 - ✓ b) Carrots bloom only at the beginning of the summer.
 - ✓ c) Most food in the aphotic zone comes from dead organisms sinking to the bottom of the lake or ocean from overlying waters.
- ✓ 10. Answer the following (any two): 2×2=4
- ✓ a) What is a "sleep-waking flip-flop"? How do external stimuli affect this phenomenon? 1+1=2
 - ✓ b) Design an experiment to verify the rhythmic expression pattern of a gene 'x' in a mammalian system? 2
 - ✓ c) What are zeitgebers? Does genetic variation of the organism contribute to the effect of zeitgebers on it? Explain with an example. 1+1=2
- ✓ 11. Describe the following (any one): 2
- ✓ a) Phase response curve of melatonin
 - ✓ b) Treadmill cage