[45] SEAT No._____

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Sardar Patel University

M. Sc. (Integrated) Biotechnology Examination, Second Semester
Monday, 18th March, 2019
10:00 a.m. to 01:00 p.m.
PS02CIGB25 : Biophysics

Maximum Marks: 70

Note: (1) All the Questions are compulsory.
(2) Figures on the right indicate marks.

Q-1. *Multiple Choice Questions-* **[8]**

(1) The condition for constructive interference is path difference should be equal to....
(a) odd integral multiple of wavelength (b) Integral multiple of wavelength
(c) odd integral multiple of half wavelength (d) Integral multiple of half wavelength

(2) What is the power of the lens, if the far point of a short-sighted eye is 200 cm?
(a) -0.5 D (b) 2 D (c)1 D (d) -1.5 D

(3) Which of the following wavelength ranges is associated with UV spectroscopy?
(a) 0.8 - 500μm (b) 400 - 100nm (c) 380 - 750nm (d) 0.01 - 10nm

(4) Which of the following statements is true?
(a) X-rays have longer wavelengths that microwaves
(b) Radio waves have shorter wavelengths than X-rays
(c) Gamma rays have longer wavelengths than UV rays
(d) Gamma rays have shorter wavelengths than microwaves

(5) Magnetic susceptibility 'χ' is denoted by. .....
(a) χ= I/H (b) χ=H/I (c) χ=B/H (d) χ =H/B

(6) The direction of electric line of forces is from.....
(a) positive to negative charge (b) negative to positive charge
(c) one end of the charge (d) none of these

(7) X-rays have been discovered by.....
(a) J. W. Ritter (b)W. C. Roentgen (c) Pierre Curie (d) none of these

(8) The relation of axial length in unit cell of triclinic crystal is.....
(a) a=b=c (b) a=b≠c (c) a≠b≠c (d) a≠b=c

Q-2. ***Answer the following questions in short. (Any Seven)*** **[14]**

(1) Write the Rayleigh's criterion for resolution?

(2) List the difference between Ramsden and Huygens' eyepiece.

(3) Differentiate between Interference and Diffraction.

(4) Enlist the types of spectra.

(5) Write the application of spectroscopy.

(6) List the properties of electric line of force

(7) Define Hall effect.

(8) What is Heisenberg's uncertainty principle?

(9) State Bragg's law.

(P.T.O.)

Q-3. (A) Define Newton's rings. Derive the condition for dark rings by reflected light. [6]

(B) Define all the cardinal points in a lens system with a suitable ray diagram. [6]

OR

(B) (i) Derive the equation of resolving power of a telescope. [3]

(ii)A parallel beam of light is incident on a thin glass plate such that the angle of refraction into the plate is 60^0. Calculate the smallest thickness of the glass plate which will appear dark by reflection. Given for glass μ=1.5, wavelength λ=5890 $X10^{-8}$ cm. [3]

Q-4. (A) Discuss Electromagnetic radiation (EMR). [6]

(B) Write a note on the instrumentation of UV-spectroscopy. [6]

OR

(B) (i) Calculate the energy in electron volts of photons of wavelength 3000 Å Take h = $6.628X10^{-34}$ J-s. [3]

(ii) Derive Beer-Lambert law. [3]

Q-5 (A) Derive the equation of electrostatic potential at any point in space. Write various units of potential. [6]

(B) Discuss the properties of ferromagnetic and paramagnetic substances. [6]

OR

(B) (i)The distance between the electron and the proton in the hydrogen atom is 5.3 $X10^{-11}$ m. Calculate the electrostatic force between the two particles. Take ε_r =1 for the medium, ε_0 = 8.854 X 10^{-12} F/m and the charge of electron 1.6 $X10^{-19}$ coulomb. [3]

(ii) What is Hysteresis in magnetic substances? [3]

Q-6 (A) Explain the production of X-rays using Coolidge tube. [6]

(B) Define crystal. Write a note on crystal systems. [6]

OR

(B) (i) Explain any two characteristics of photoelectrons produced in photoelectric effect. [3]

(ii) State and explain De Broglie hypothesis. [3]