



DCC-003-001503

B. Sc. (Sem. V) (CBCS) Examination

April / May – 2015

Physics

Faculty Code : 003

Subject Code : 001503

Time : $2\frac{1}{2}$ Hours]

[Total Marks : 70

- Instructions : (1) All questions are compulsory.
(2) Symbols have their usual meaning.
(3) Numbers on right side indicates full marks.

- 1 Select the correct answer from the MCQ and write in your 20 answer sheet only (All questions carry equal marks)
- (1) Orbit is allowed certain discrete orientation only, known as _____.
- (A) Space quantization
(B) Spinning of an electron
(C) Principal quantum number
(D) Orbital quantum number
- (2) In electronics configuration $2p^6$ p is stand for $l =$ _____
- (A) 0
(B) 1
(C) 2
(D) 3
- (3) Anomalous Zeeman Effect is occurred when magnetic field is _____.
- (A) Strong
(B) Weak
(C) Zero
(D) Infinite

- (4) In Zeeman Effect, the parallel view shows the doublet because of _____ property of light.
- (A) Transverse
 - (B) Longitudinal
 - (C) Electro-Magnetic
 - (D) Wave
- (5) Stark Effect is a effect when source placed in _____ field.
- (A) Magnetic
 - (B) Nuclear Force
 - (C) Electrical
 - (D) Zero
- (6) According to wave mechanics, orbital angular momentum is given by _____.
- (A) $P_l = \sqrt{l(l+1)} \frac{h}{2\pi}$
 - (B) $P_l = \sqrt[3]{l(l+1)} \frac{h}{2\pi}$
 - (C) $P_l = l \frac{h}{2\pi}$
 - (D) $P_l = l^2 (l+1)$
- (7) The most complex molecular spectra is _____ spectra.
- (A) Pure rotational
 - (B) Rotational-vibration
 - (C) Electronics band
 - (D) None

- (8) The intensity of Raman lines is roughly _____ percent of incident radiation.
- (A) 0.01
 - (B) 1.01
 - (C) 1.001
 - (D) 0.001
- (9) TEM is _____.
- (A) Transmission Emission Microscopy
 - (B) Transition Electron Microscopy
 - (C) Transition Emission Microscopy
 - (D) Transmission Electron Microscopy
- (10) Raman line having frequencies greater than that of the incident line is called _____.
- (A) 'Stokes' lines
 - (B) Anti-stokes lines
 - (C) Reflected lines
 - (D) None
- (11) Michelson Interferometer works on the principle of
- (A) Division of Wavefront
 - (B) Division of Amplitude
 - (C) Multiple reflection
 - (D) None

(12) Visibility of the fringes in Michelson Interferometer is given by

(A) $\frac{I_{\max} + I_{\min}}{I_{\max} - I_{\min}}$

(B) $\frac{I_{\max} + I_{\min}}{I_{\min} - I_{\max}}$

(C) $\frac{I_{\max} - I_{\min}}{I_{\max} + I_{\min}}$

(D) $\frac{I_{\min} - I_{\max}}{I_{\max} + I_{\min}}$

(13) Quarter wave plate is used in producing _____.

(A) Elliptically polarized light

(B) Circularly polarized light

(C) Both (A) and (B)

(D) None

(14) For calcite crystal _____.

(A) $\mu_o < \mu_e$

(B) $\mu_o > \mu_e$

(C) $\mu_o = \mu_e$

(D) None

- (15) The Snell's law is obeyed by_____.
- (A) O-Ray
 - (B) E-Ray
 - (C) Both (A) and (B)
 - (D) None
- (16) In Fabry-Perot Etalon, fringes are produced due to _____.
- (A) Multiple reflections in air film
 - (B) Multiple reflections in glass film
 - (C) Refraction through Air film
 - (D) Refraction through glass film
- (17) In Fabry-Perot interferometer, condition to produce maximum intensity is given by _____.
- (A) $2d \cos \theta = m\lambda$
 - (B) $d \cos \theta = m\lambda/2$
 - (C) $2 \cos \theta = m\lambda/d$
 - (D) Above all
- (18) Lummer and Gehrcke plate is used to observe _____.
- (A) Polarized light
 - (B) Fine structure of spectral lines
 - (C) Both (A) and (B)
 - (D) None

- (19) Nicol prism is made from _____
- (A) Quartz
 - (B) Calcite
 - (C) Ceramic glass
 - (D) None
- (20) The refractive index is same in all direction is known as optically _____ material.
- (A) Anisotropic
 - (B) Isotropic
 - (C) Crystalline
 - (D) Amorphous

- 2 (a) Answer the following questions : (any three) 6
- (1) What is anisotropic material ?
 - (2) Define Optical axis.
 - (3) What is Polarizer and Analyzer ?
 - (4) What is double refraction ?
 - (5) What is Pockels effect ?
 - (6) What is Cotton – Mouton effect ?
- (b) Answer the following questions : (any three) 9
- (1) Explain the application of M.I. as to determine the refractive index of gases.
 - (2) What is plan polarized light ?
 - (3) Explain half wave plate.
 - (4) Explain calcite crystal
 - (5) Explain positive and negative crystal.
 - (6) What is anisotropic crystal ?

- (c) Answer the following questions : (any two) 10
- (1) Explain 'Circular Fringes' in Michelson interferometer.
 - (2) Explain construction and working of Michelson Interferometer.
 - (3) Compare the properties of E-Rays and O-Rays.
 - (4) Explain the Huygens explanation of double refraction.
 - (5) Explain Nicol prism with schematic diagram.
- 3 (a) Answer the following questions : (any three) 6
- (1) What is Zeeman Effect ?
 - (2) What is Stark Effect ?
 - (3) What is the full form of orbital state s,p,d,f ?
 - (4) Explain $2p^6$ orbital state.
 - (5) What is π -component in Zeeman Effect ?
 - (6) Write the types of molecular Band Spectra.
- (b) Answer the following questions : (any three) 9
- (1) Explain the hypothesis of electron spin.
 - (2) Explain space quantization.
 - (3) Write a note on electronic band spectra.
 - (4) Give the difference between Raman spectra and Fluorescence spectra.
 - (5) Explain Stark effect.
 - (6) Write the principle of AFM.
- (c) Answer the following questions : (any two) 10
- (1) Give the classical interpretation of Normal Zeeman Effect.
 - (2) Explain pure rotational spectra.
 - (3) Explain Paschen-Back effect.
 - (4) Explain Raman Effect on the bases of quantum theory.
 - (5) Write a note on TEM.