



DG-3117
B. Sc. (Sem. V) Examination
March / April - 2016
Physics : Paper - VII

Time : Hours]

[Total Marks : 50

Instructions :

(1)

<p>नीचे दृशायेव निशानीवाणी विगतो उत्तरवही पर अवश्य लपवी. Fillup strictly the details of signs on your answer book.</p> <p>Name of the Examination : B. Sc. (Sem. 5)</p> <p>Name of the Subject : PHYSICS : PAPER - 7</p> <p>Subject Code No. : 3 1 1 7 Section No. (1, 2,.....): Nil</p>	<p>Seat No. : [][][][][][][]</p> <p style="text-align: center;">Student's Signature</p>
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- (2) Figures to the right indicate the total marks carried by the question.
- (3) Symbols used in the question paper have their usual meanings.
- (4) Students are permitted to use non-programmable scientific calculator.

Q:1 Answer the following in brief (Any eight). (8)

- (1) Some charge Q is given externally to an electrically neutral conductor. Now, what will be the net charge inside the conductor?
- (2) Give the unit and dimensional formula of "polarization".
- (3) The temperature of plasma is increased by a factor of 4. What will be the change in its Debye length?
- (4) On which factors does the value of the electric susceptibility of a substance depend?
- (5) What is an inductor?
- (6) $\Omega \cdot s$ is a unit of _____.
- (7) Why is the optical fiber made from silica doped with germanium while the cladding is made from pure silica?
- (8) Output power is half of the input power from an optical fiber. What is the value of loss in dB ?
- (9) What is interferometry?
- (10) Which phenomenon is used in the working of a periscope?

- Q:2 (A) Attempt any one of the following. (5)**
- (1) (a) Define and explain magnetic flux. (5)
 - (b) State and prove Lenz's law. (5)
 - (2) Derive $\vec{D} = \epsilon_0 \vec{E} + \vec{P}$ for a dielectric. (4)
- (B) Solve any one of the following. (4)**
- (1) Show that the energy density in a dielectric is given by $\frac{1}{2} \vec{D} \cdot \vec{E}$, taking an example of a charged capacitor.
 - (2) A one meter rod is falling freely vertically with a velocity of 50 m/s . The rod always remains horizontal and in the east-west direction. If the horizontal component of earth's magnetic field at that place is 0.35 gauss , what will be the induced emf in it?
- Q:3 (A) Attempt any one of the following. (10)**
- (1) Explain the construction and working of Fabry-Perot's interferometer.
 - (2) Explain the principle on which the optical fibers operate. Why are optical fibers made from glass?
- (B) Solve any one of the following. (4)**
- (1) When the movable mirror in the Michelson's interferometer is moved through a distance of 0.1179 mm , 400 fringes cross the field of view. What is the wavelength of the light used in it?
 - (2) What will be the critical angle if a glass slab having refractive index 1.65 is (i) placed in air and (ii) immersed in water? The refractive index of water is $4/3$.
- Q:4 Write short note on any two of the following. (14)**
- (i) Quasi-neutrality in plasma
 - (ii) Faraday's law of electromagnetic induction
 - (iii) Gauss' Law in the presence of dielectric
 - (iv) Haidinger's fringes
 - (v) Attenuation in optical fibers