



**DRR-3214**

**B. Sc. (Sem. VI) Examination**

**March / April - 2016**

**Physics : Paper - VII**

Time : 2 Hours]

[Total Marks : 50

Instructions :

(1)

नीचे दशांशिक निशानीवाणी विगतो उत्तरवही पर अवश्य लખवी. Fillup strictly the details of signs on your answer book.	Seat No. :
Name of the Examination :	<input type="text"/>
<input type="text" value="B. SC. (SEM. VI)"/>	<input type="text"/>
Name of the Subject :	<input type="text"/>
<input type="text" value="PHYSICS : PAPER - VII"/>	<input type="text"/>
Subject Code No. : <input type="text" value="3"/> <input type="text" value="2"/> <input type="text" value="1"/> <input type="text" value="4"/>	<input type="text"/>
Section No. (1, 2,.....): <input type="text" value="Nil"/>	<input type="text"/>
	Student's Signature

- (2) Figures to the right side 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.
- (5)  $c = 3 \times 10^8 \frac{m}{s}$ ,  $h = 6.62 \times 10^{-34} Js$ ,  $k_B = 1.38 \times 10^{-23} \frac{J}{mol K}$ .

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

- (1) What is the unit and dimensional formula of magnetization?
- (2) What is Bohr magneton?
- (3) Which basic equation was modified by Maxwell?
- (4) Define : Intensity of wave.
- (5) State the differential equation of a wave.
- (6) What is the usual lifetime of a metastable state?
- (7) In which wavelength range, one gets almost flat gain in EDFA?
- (8) Which type of excitation mechanism was employed in ruby laser?
- (9) What is coherence?
- (10) What is cavity lifetime?

- 2 (A) Attempt any ONE of the following. 10
- (1) On the basis of the magnetic properties, discuss diamagnetic and paramagnetic substances. Also discuss their behavior in uniform and non-uniform magnetic fields. Give their examples also.
  - (2) Explain displacement current. Derive its equation taking an example of a capacitor. Give general form of Ampere's law.
- (B) Attempt any ONE of the following. 4
- (1) Show that the unit of BH is  $J/m^3$ .
  - (2) Prove that the energy density associated with electric field in an electromagnetic wave is equal to that associated with magnetic field in it.
- 3 (A) Attempt any ONE of the following. 10
- (1) Discuss the interaction between an atom and an electromagnetic radiation.
  - (2) Explain Michelson stellar interferometer in detail.
- (B) Attempt any ONE of the following. 4
- (1) What will be the value of energy density for a normal optical source radiating at the wavelength of  $6000 \text{ \AA}$ , the temperature of the source is 1000 K and refractive index of the medium being 1.
  - (2) Discuss threshold condition for population inversion.
- 4 Write short notes on any TWO of the following. 14
- (i) Bohr magneton
  - (ii) Poynting's vector
  - (iii) Components of laser
  - (iv) Properties of laser
  - (v) Spatial coherence.