

**B****DE-2906**

**B. Sc. (Sem. I) Examination**  
**March / April - 2016**  
**Physics for Electronics : Paper - I**  
*(For Electronics Special Course)*

Time : 2 Hours]

[Total Marks : 50

**Instructions :**

(1)

નીચે દર્શાવેલ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી. 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. 1)"/>	<input type="text"/>
Name of the Subject :	<input type="text"/>
<input type="text" value="PHYSICS FOR ELECTRONICS : PAPER - 1"/>	<input type="text"/>
Subject Code No. : <input type="text" value="2"/> <input type="text" value="9"/> <input type="text" value="0"/> <input type="text" value="6"/>	<input type="text"/>
Section No. (1, 2,.....) : <input type="text" value="1,2,3"/>	
	Student's Signature

- (2) There are total 28 questions in this question paper. All are compulsory.
- (3) Symbols used in the question paper have their usual meaning.
- (4) Figures to the right indicate full marks of the questions.
- (5) Non-programmable scientific calculator can be used.

**Q. 1 to 12 Multiple choice questions : (1 mark)**

**Q. 13 to 22 Multiple Choise Questions : (2 marks)**

**Q. 23 to 28 Multiple Choice Questions : (3 marks)**

*O.M.R. Sheet ભરવા અંગેની અગત્યની સૂચનાઓ આપેલ  
O.M.R. Sheet-ની પાછળ છાપેલ છે.*

*Important instructions to fillup O.M.R. Sheet  
is given on back side of the provided O.M.R. Sheet.*

- 1 If a spring is extended to length 'x', then according to Hooke's law :
- (A)  $F = k^2 / x$
  - (B)  $F = k x$
  - (C)  $F = k/x$
  - (D)  $F = k^2 x$
- 2 Maximum number of beats frequency heard by a human being is
- (A) 6
  - (B) 10
  - (C) 4
  - (D) 20
- 3 A string fixed at both the ends is vibrating in two segments. The wavelength of the corresponding wave is :
- (A)  $2l$
  - (B)  $l/4$
  - (C)  $l/2$
  - (D)  $l$
- 4 On which principle sonometer works ?
- (A) Newton's law
  - (B) Hooke's law
  - (C) Elasticity
  - (D) Resonance

- 5 If the temperature increases ,then what happens to the frequency of the sound produced by the organ pipe ?
- (A) None of these
  - (B) Increases
  - (C) Decreases
  - (D) Unchanged
- 6 The tidal waves in the sea are primarily due to :
- (A) the gravitational effect of the uranus on the earth
  - (B) the gravitational effect of the moon on the earth
  - (C) the gravitational effect of the sun on the earth
  - (D) the gravitational effect of the venus on the earth
- 7 If the distance between two masses is doubled, the gravitational attraction between them :
- (A) is reduced to a quarter
  - (B) is doubled
  - (C) becomes four times
  - (D) is reduced to half
- 8 The gravitational force  $F_g$  between two objects does not depend on :
- (A) distance between the masses
  - (B) sum of the masses
  - (C) product of the masses
  - (D) gravitational constant

- 9 Gravitational mass is proportional to gravitational :
- (A) All of these
  - (B) field
  - (C) force
  - (D) intensity
- 10 The increase in length is ' $l$ ' of a wire of length ' $L$ ' by the longitudinal stress. Then the stress is :
- (A)  $l^2 \times L$
  - (B)  $L/l$
  - (C)  $l/L$
  - (D)  $L \times l$
- 11 Which is the most elastic material ?
- (A) Wood
  - (B) Iron
  - (C) Copper
  - (D) Quartz
- 12 According to Hooke's law force is proportional to :
- (A)  $x^2$
  - (B)  $1/x$
  - (C)  $1/x^2$
  - (D)  $x$

- 13 There is no change in volume of a wire due to change in its length on stretching. The Poisson's ratio of the material of the wire is :
- (A)  $-0.25$
  - (B)  $+0.50$
  - (C)  $-0.50$
  - (D)  $+0.25$
- 14 The displacement of a particle is  $x = 3 \sin(5\pi t) + 4 \cos(5\pi t)$ , the amplitude of the particle is :
- (A) 7
  - (B) 3
  - (C) 4
  - (D) 5
- 15 Two waves of wavelengths 50 cm and 51 cm produced 12 beats/sec. The velocity of sound is :
- (A) 360 m/s
  - (B) 306 m/s
  - (C) 331 m/s
  - (D) 340 m/s
- 16 To increase the frequency from 100Hz to 400Hz the tension in the string has to be changed by :
- (A) None of these
  - (B) 4 times
  - (C) 16 time
  - (D) 20 times
- 17 A tuning fork vibrates 2 beats in 0.04 sec. The frequency of the fork is :
- (A) None of these
  - (B) 50 Hz
  - (C) 100 Hz
  - (D) 80 Hz

- 18 In a satellite if the time of revolution is  $T$ , then KE is proportional to :
- (A)  $T^{-2/3}$
  - (B)  $1/T$
  - (C)  $1/T^2$
  - (D)  $1/T^3$
- 19 The period of satellite in a circular orbit of radius  $R$  is  $T$ , the period of another satellite in a circular orbit  $4R$  is :
- (A)  $T/8$
  - (B)  $4T$
  - (C)  $T/4$
  - (D)  $8T$
- 20 A body revolves around the sun 27 times faster than the earth. What is the ratio of their radii ?
- (A)  $1/4$
  - (B)  $1/3$
  - (C)  $1/9$
  - (D)  $1/27$
- 21 The upper end of a wire of radius 4 mm and length 100 cm is clamped and its other end is twisted through an angle of  $30^\circ$ . The angle of shear is :
- (A)  $0.012^\circ$
  - (B)  $12^\circ$
  - (C)  $0.12^\circ$
  - (D)  $1.2^\circ$
- 22 A 2 m long rod of radius 1 cm which is fixed from one end is given a twist 0.8 radians. The shear strain is developed will be :
- (A) 0.016
  - (B) 0.002
  - (C) 0.004
  - (D) 0.008

- 23 Y and  $\eta$  of a wire is  $11.25 \times 10^{10}$  mks and  $4.55 \times 10^{10}$  mks respectively. The Bulk modulus of rigid body is :
- (A)  $7.1 \times 10^{12}$  N/m<sup>2</sup>
- (B)  $7.1 \times 10^{10}$  N/m<sup>2</sup>
- (C)  $7.1 \times 10^{11}$  N/m<sup>2</sup>
- (D)  $7.1 \times 10^9$  N/m<sup>2</sup>
- 24 A steel rod of length 3.0m and 2.5 cm diameter is tightly clamped at one end and a twisting torque of 55Nm is applied at free end. If  $\eta$  of steel is  $8 \times 10^{10}$  mks, the angle of twist of the rod in degrees is :
- (A) 0.5
- (B) 0.038
- (C) 0.060
- (D) 0.076
- 25 Two waves of lengths 1 m and 1.01 m produces 10 beats in 3 seconds in a gas, then the velocity of sound in a gas is :
- (A) 536.67 m/s
- (B) 336.67 m/s
- (C) 336.67 cm/s
- (D) 436.67 m/s

- 26 A hall of volume  $5500 \text{ m}^3$  is found to have a reverberation time of 2.3 s. The sound absorbing surface of the hall has an area of  $750 \text{ m}^2$ . The average absorption coefficient is :
- (A) 0.704  
(B) 0.504  
(C) 0.604  
(D) 0.404
- 27 If mass of the earth is  $5.98 \times 10^{24} \text{ kg}$ , radius is  $6.37 \times 10^6 \text{ m}$  and  $G$  is  $6.67 \times 10^{-11} \text{ m}^3 / \text{kg} \cdot \text{s}^2$ , then the escape speed of a body from the earth's surface is :
- (A) 41.2 km/s  
(B) 11.2 km/s  
(C) 11.2 m/s  
(D) 11.2 cm/s
- 28 A playful astronaut releases a bowling ball of mass  $m = 7.2 \text{ kg}$  into a circular orbit about at an altitude 'h' of 350 km. The mechanical energy of the ball in its orbit is ( $R = 6370 \text{ km}$ ,  $G = 6.67 \times 10^{-11} \text{ Nm}^2/\text{kg}^2$ ,  $M = 5.98 \times 10^{24} \text{ kg}$ )
- (A) -214 J  
(B) -214 MJ  
(C) -21.4 MJ  
(D) -2.14 MJ