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) Fill up strictly the details of signs on your answer book.

Name of the Examination :

Name of the Subject :

Seat No. :

(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 Choose Questions : (2 marks)

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

O.M.R. Sheet भरवा अंगी अगर नहीं सूचनाओं आपेक्ष
O.M.R. Sheet-मे पात्र आपेक्ष छ.

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

DE-2906_A ] 1 [ Contd..
1 The tidal waves in the sea are primarily due to:
(A) the gravitational effect of the moon on the earth
(B) the gravitational effect of the sun on the earth
(C) the gravitational effect of the venus on the earth
(D) the gravitational effect of the uranus on the earth

2 If the distance between two masses is doubled, the gravitational attraction between them:
(A) is doubled
(B) becomes four times
(C) is reduced to half
(D) is reduced to a quarter

3 The gravitational force $F_g$ between two objects does not depend on:
(A) sum of the masses
(B) product of the masses
(C) gravitational constant
(D) distance between the masses

4 Gravitational mass is proportional to gravitational:
(A) field
(B) force
(C) intensity
(D) All of these
5. The increase in length is \( \ell \) of a wire of length \( L \) by the longitudinal stress. Then the stress is:

(A) \( L/\ell \)

(B) \( \ell/L \)

(C) \( L\times\ell \)

(D) \( \ell^2\times L \)

6. Which is the most elastic material?

(A) Iron

(B) Copper

(C) Quartz

(D) Wood

7. According to Hooke's law force is proportional to:

(A) \( l/x \)

(B) \( l/x^2 \)

(C) \( x \)

(D) \( x^2 \)

8. If a spring is extended to length \( x \), then according to Hooke's law:

(A) \( F=kx \)

(B) \( F= k/x \)

(C) \( F= k^2 x \)

(D) \( F= k^2 /x \)
9 Maximum number of beats frequency heard by a human being is
   (A) 10
   (B) 4
   (C) 20
   (D) 6

10 A string fixed at both the ends is vibrating in two segments. The wavelength of the corresponding wave is:
   (A) \( \frac{l}{4} \)
   (B) \( \frac{l}{2} \)
   (C) \( l \)
   (D) \( 2l \)

11 On which principle sonometer works?
   (A) Hooke's law
   (B) Elasticity
   (C) Resonance
   (D) Newton's law

12 If the temperature increases, then what happens to the frequency of the sound produced by the organ pipe?
   (A) Increases
   (B) Decreases
   (C) Unchanged
   (D) None of these
13 In a satellite if the time of revolution is T, then KE is proportional to :
(a) \( \frac{1}{T} \)
(b) \( \frac{1}{T^2} \)
(c) \( \frac{1}{T^3} \)
(d) \( T^{-2/3} \)

14 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) 4T
(B) T/4
(C) 8T
(D) T/8

15 A body revolves around the sun 27 times faster than the earth. What is the ratio of their radii ?
(A) 1/3
(B) 1/9
(C) 1/27
(D) 1/4

16 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°. The angle of shear is :
(A) 12°
(B) 0.12°
(C) 1.2°
(D) 0.012°

17 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) 0.002
(B) 0.004
(C) 0.008
(D) 0.016
18 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) +0.50
(B) -0.50
(C) +0.25
(D) -0.25

19 The displacement of a particle is \( x = 3 \sin(5\pi t) + 4 \cos(5\pi t) \), the amplitude of the particle is:
(A) 3
(B) 4
(C) 5
(D) 7

20 Two waves of wavelengths 50 cm and 51 cm produced 12 beats/sec. The velocity of sound is:
(A) 306 m/s
(B) 331 m/s
(C) 340 m/s
(D) 360 m/s

21 To increase the frequency from 100Hz to 400Hz the tension in the string has to be changed by:
(A) 4 times
(B) 16 time
(C) 20 times
(D) None of these

22 A tuning fork vibrates 2 beats in 0.04 sec. The frequency of the fork is:
(A) 50 Hz
(B) 100 Hz
(C) 80 Hz
(D) None of these
23 If mass of the earth is $5.98 \times 10^{24}$ kg, radius is $6.37 \times 10^{6}$ m and $G$ is $6.67 \times 10^{-11}$ m$^3$/kg·s$^2$, then the escape speed of a body from the earth's surface is:

(A) 11.2 km/s  
(B) 11.2 m/s  
(C) 11.2 cm/s  
(D) 41.2 km/s

24 A playful astronaut releases a bowling ball of mass $m = 7.2$ kg in to a circular orbit about at an altitude '$h$' of 350 km. The mechanical energy of the ball in its orbit is ($R = 6370$ km, $G = 6.67 \times 10^{-11}$ Nm$^2$/kg$^2$, $M = 5.98 \times 10^{24}$ kg)

(A) −214 MJ  
(B) −21.4 MJ  
(C) −2.14 MJ  
(D) −214 J

25 $Y$ 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) $7.1 \times 10^{10}$ N/m$^2$  
(B) $7.1 \times 10^{11}$ N/m$^2$  
(C) $7.1 \times 10^{9}$ N/m$^2$  
(D) $7.1 \times 10^{12}$ N/m$^2$
26 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) 0.038
(B) 0.060
(C) 0.076
(D) 0.5

27 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) 336.67 m/s
(B) 336.67 cm/s
(C) 436.67 m/s
(D) 536.67 m/s

28 A hall of volume 5500 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 m$^2$. The average absorption coefficient is:

(A) 0.504
(B) 0.604
(C) 0.404
(D) 0.704