DPP-2932
B. Sc. (Sem. I) Examination
March / April – 2016
Applied Physics for Electronics : Paper - I
(For Electronics Special Course)

Time : 2 Hours] [Total Marks : 50

Instructions :

(1) Fill up strictly the details of your answer book.

Name of the Examination:
B. Sc. (SEM. 1)

Name of the Subject:
APPLIED PHYSICS FOR ELECTRONICS - 1

Subject Code No. 2 9 3 2 — Section No. (1, 2, .....)
Nil

Seat No.:

(2) All the questions are compulsory.

(3) Symbols used in the paper have their usual meaning.

(4) Figures to right indicate full marks.

(5) Scientific calculator without memory can be used.

O.M.R. Sheet एक अंक निर्धारी अन्वेषण-वाली सूची आपके O.M.R. Sheet एक अंक निर्धारी सूची आपके है. Important instructions to fill up O.M.R. Sheet are given back side of provided O.M.R. Sheet.
1 The unit of gravitational constant $G$ is

(A) $\text{N/kg}^2\text{m}^2$

(B) none of these

(C) $\text{Nm}^2/\text{kg}^2$

(D) $\text{Nm}^2/\text{kg}^2$

2 The only elastic modulus that applies to fluid is

(A) modulus of rigidity

(B) bulk modulus

(C) Young's modulus

(D) shear modulus

3 Bulk modulus was first defined by

(A) Maxwell

(B) None of these

(C) Thomas Young

(D) Bulk

4 The Poisson's ratio cannot have the value

(A) 0.1

(B) 0.5

(C) 0.3

(D) 0.2
5 A For most materials, $Y$ is $n$ times the $\eta$, where $n$ is

(A) 4

(B) 5

(C) 2

(D) 3

6 Apparatus used to find out the velocity of sound in gas is

(A) Quinck's tube

(B) none of these

(C) Melde's apparatus

(D) Kund's tube

7 The Doppler's effect is applicable for

(A) space waves

(B) both light waves and sound waves

(C) light waves

(D) sound waves

8 Doppler shift in frequency does not depend upon

(A) The velocity of the observer

(B) distance from the source to the listener

(C) The frequency of the wave produced

(D) The velocity of the source of sound
9 Decibel is the unit of

(A) sound loudness

(B) energy of radiation

(C) intensity of light

(D) x-ray radiation capacity

10 Force of gravity is least at

(A) a point in between equator and any pole

(B) none of these

(C) The equator

(D) the poles

11 Orbital velocity of an orbital satellite does not depend upon

(A) radius of the earth

(B) acceleration due to gravity

(C) mass of the earth

(D) mass of the satellite

12 A geostationary satellite

(A) moves faster than a near earth satellite

(B) is stationary in the space

(C) revolves about the polar axis

(D) has time periods less than that of the near earth satellite
13 A source and an observer approach each other with same velocity 50 m/s. If the apparent frequency is 435 sec\(^{-1}\), then the real frequency is
(A)  390 sec\(^{-1}\)
(B)  420 sec\(^{-1}\)
(C)  320 sec\(^{-1}\)
(D)  360 sec\(^{-1}\)

14 If the pressure amplitude in a sound wave is tripled, then the intensity of sound is increased by a factor of
(A)  6
(B)  10
(C)  9
(D)  3

15 Weight of 1 kg becomes \(\frac{1}{6}\) on moon. If radius of moon is \(1.768 \times 10^6\) m, then the mass of the moon will be
(A)  \(0.765 \times 10^{22}\) kg
(B)  \(7.65 \times 10^{22}\) kg
(C)  \(76.5 \times 10^{22}\) kg
(D)  \(765 \times 10^{22}\) kg

16 A time period of a geostationary satellite at a height 3600 km is 24 hrs. A spy satellite orbits very close to earth surface (\(R = 6400\) km). What will be its time period
(A)  2 hrs
(B)  1.5 hrs
(C)  4 hrs
(D)  1 hrs

17 The orbital velocity of an artificial satellite in a circular orbit just above the earth's surface is 'v'. For a satellite orbiting at an altitude of half the earth's radius, the orbital velocity is
(A)  \(\left(\frac{2}{3}\right)^{1/2} v\)
(B)  \(\frac{2}{3} v\)
(C)  \(\frac{3}{2} v\)
(D)  \(\left(\frac{3}{2}\right)^{1/2} v\)
18 A material has $\sigma = 0.50$. If a uniform rod of it suffers a longitudinal strain of $2 \times 10^{-3}$ then the % change in volume is
(A) 0.2
(B) zero
(C) 0.6
(D) 0.4

19 If the $Y$ of the material is 3 times its $\eta$ then its volume elasticity will be
(A) $2 \times 10^{10}$ N/m²
(B) $3 \times 10^{10}$ N/m²
(C) zero
(D) infinity

20 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) −0.25
(C) +0.50
(D) −0.50

21 The frequency of a whistle of an engine is 600cps is moving with the speed of 30 m/s towards an observer. The apparent frequency will be (velocity of sound = 300 m/s)
(A) 990 cps
(B) 330 cps
(C) 600 cps
(D) 660 cps

22 A sound source is moving towards a stationary observer with $\frac{1}{10}$ of the speed of sound. The ratio of apparent to real frequency is
(A) $\left(\frac{11}{10}\right)^2$
(B) $\left(\frac{9}{10}\right)^2$
(C) $\frac{10}{9}$
(D) $\frac{11}{10}$
A source and an observer approach each other with same velocity 50 m/s. If the apparent frequency is 435 Sec\(^{-1}\), then the real frequency is

(A) 390 Sec\(^{-1}\)

(B) 420 Sec\(^{-1}\)

(C) 320 Sec\(^{-1}\)

(D) 360 Sec\(^{-1}\)

When the intensity of sound increases 10\(^6\) times its original intensity, the change in the intensity level is

(A) 10 dB

(B) 40 dB

(C) 60 dB

(D) 30 dB

An astronaut whose height h is 1.7 m. floats "feet down" in an orbiting space shuttle at a distance \(r = 6.77 \times 10^6\) m from the center of the earth. The difference between the gravitational acceleration at her feet and that at her head is (\(M_e = 5.98 \times 10^{24}\) kg, \(G = 6.67 \times 10^{-11}\) m\(^3\)/kg s\(^2\))

(A) \(-4.37 \times 10^{-7}\) m/s\(^2\)

(B) \(-4.37 \times 10^{-6}\) m/s\(^2\)

(C) \(-4.37 \times 10^{-8}\) m/s\(^2\)

(D) \(-4.37 \times 10^{-9}\) m/s\(^2\)
26 The mass of Jupiter is \( 1.9 \times 10^{27} \) kg, radius \( 7.15 \times 10^7 \) m. The escape speed of an object from the Jupiter is

(A) 59.5 cm/s
(B) 79.5 km/s
(C) 59.5 km/s
(D) 59.5 m/s

27 The ratio of young's modulus and modulus of rigidity of a wire is 2.644. The value of Poisson's ratio is

(A) 0.62
(B) 0.22
(C) 0.322
(D) 0.55

28 The \( Y \) and \( \sigma \) of the material of a wire are \( 13.6 \times 10^{10} \) mks and 0.5 respectively. The modulus of rigidity is

(A) \( 4.53 \times 10^{12} \) N/m\(^2\)
(B) \( 4.53 \times 10^9 \) N/m\(^2\)
(C) \( 4.53 \times 10^{10} \) N/m\(^2\)
(D) \( 4.53 \times 10^{11} \) N/m\(^2\)