PHYSICS

BOOKS - GURUKUL BOOKS & PACKAGING PHYSICS (HINGLISH)

JULY 2016

Section I

1. The difference in tensions in the string at lowest and highest points in the path of the

particle of mass 'm' performing vertical circular motion is :

A. 2mg

B. 4 mg

C. 6mg

D. 8 mg

Answer: C

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2. The body is rotating with uniform angular velocity (ω) having rotational kinetic energy (E) . Its angular momentum (L) is :

A. $\dfrac{2E}{\omega}$

B. $\dfrac{E^2}{\omega}$

C. $\dfrac{E}{\omega^2}$

D. $\dfrac{E}{2\omega}$

Answer: A

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3. The S.I. unit of compressibility is

A. $\dfrac{m^2}{N}$

B. Nm^2

C. $\dfrac{N}{m^2}$

D. $\dfrac{kg}{m^3}$

Answer: A

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4. The working of RADAR is based on …………… .

    A. resonance

    B. speed of star

    C. Doppler effect

    D. speed of rotation of sun

Answer: C

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5. When two capillary tubes of different diameters are dipped vertically, the rise of the liquid is

A. is same in both the tubes

B. is more in the tube of larger diameter

C. will not be in smaller diameter tube

D. is more in the tube of smaller diameter

Answer: D

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6. A sonameter wire vibrates with three nodes and two antinodes, the corresponding mode of vibration is ....

    A. first overtone

    B. second overtone

    C. third overtone

    D. fourth overtone

Answer: D

7. Ratio of pressures exerted by two gases is 3 : 2 and their densities are in the ratio 2 : 3. The ratio of their R.M.S. velocities is

A. $2 : 3$

B. $3 : 2$

C. $2 : 1$

D. $1 : 2$

Answer: B

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8. Draw a neat labelled diagram showing the various forces and their components acting on a vehicle moving along curved banked road.

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9. Obtain an expressing for critical velocity of a satellite orbiting around the earth.

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10. Draw a neat labelled diagram showing forces acting on the meniscus of water in a capillary tube.

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11. State any four assumptions of kinetic theory of gases.

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12. A tube open at both ends has length 47 cm. Calculate the fundamental frequency of air column. (Neglect end correction. Speed of sound in air 3.3×10^2 m/s) .

13. A uniform solid sphere has a radius 0.1 m and density 6×10^3 kg/ m^3 . Find the moment of intertia about a tangent to its surface.

14. A particle executes S.H.M with a period of 10 seconds. Find the time in which its potential energy will be half of its total energy.

15. A stone of mass 2kg whirled in a horizontal circle attached at the end of 1.5 m long string. If the string makes an angle of $30°$ with vertical, compute its period $\left(g = 9.8m/s^2\right)$.

16. State Kepler's laws of planetary motion.

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17. Obtain an expressing for torque acting on a body rotating with uniform angular acceleration.

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18. A steel wire having cross - sectional area $2mm^2$ is stretched by 10 N. Find the lateral strain produced in the wire.

(Given : Y for steel $= 2 \times 10^{11} N/m^2$ Poisson 's ratio $\sigma = 0.29$)

19. A body cools from $62°$ C to $54°$ C in 10 minutes and to $48°$ C in the next 10 minutes. Find the temperature of the surroundings.

20. Explain the formatin of stationary wave by analytical method. Show that nodes and antinodes are equally spaced in a stationary wave.

The speed limit for a vehicle on road is 120 km/hr. A policeman detects a drop of 10 % in the pitch of horn of a car as it passes him. Is the policeman justified in punishing the car driver for crossing the speed limit ?

(Given : Velocity of sound = 340 m/s)

21. Define practical simple pendulum. Show that motion of bob of pendulum with small amplitude is linear S.H.M. Hence obtain an expression for its period. What are the factors on which its period depends ?

The total free surface energy of a liquid drop is $\pi\sqrt{2}$ times the surface tensin of the liquid. Calculate the diameter of the drop in S.I unit.

1. A parallel beam of light travelling in water is incident obliquely on a glass surface. After refraction its width ....

A. decreases

B. increases

C. remains the same

D. becomes zero

Answer: B

2. If 'a' is the aperture of telescope and 'λ' is the wavelength of light then resolving power of telescope is ....

A. $\dfrac{\lambda}{1.22a}$

B. $\dfrac{1.22a}{\lambda}$

C. $\dfrac{1.22\lambda}{a}$

D. $\dfrac{a}{1.22\lambda}$

Answer: D

3. From earth's surface, ionospheric layer of atmosphere lies between ....

    A. 12 km to 50 km

    B. 50 km to 80 km

    C. 80 km to 400 km

    D. 400 km to 700 km

Answer: C

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4. The kinetic energy of emitted photoelectrons is independent of ....

A. frequency of incident radiation

B. intensity of incident radiation

C. wavelength of incident radiation

D. collector plate potential

Answer: B

5. In hydrogen atom Balmar series is obtained when the electron jumps from ....

    A. higher orbit to first orbit

    B. first orbit to a higher orbit

    C. higher orbit to second orbit

    D. second orbit to a higher orbit

Answer: C

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6. The fraction of the total current passing through the galvanometer is ....

A. $\dfrac{S}{S + G}$

B. $\dfrac{G}{S + G}$

C. $\dfrac{S + G}{G}$

D. $\dfrac{S + G}{S}$

Answer: A

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7. A meter gauge train is heading north with speed 54 km/hr in earth's magnetic field 3×10^{-4}T. The e.m.f. Induced across the axle joining the wheel is ....

    A. 0.45 mV

    B. 4.5 mV

    C. 45 mV

    D. 450 mV

Answer: B

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8. Distinguish between intrinsic and extrinsic semi conductor. (Given any two points)

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9. Draw the block diagram of a receiver in communication system.

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10. A point is situated at 6.5 cm and 6.65 cm from two coherent sources. Find the nature of illumination at the point if wavelength of light is 5000 Å.

11. Draw the diagrams showing the dipole moments in paramagnetic substance when external magnetic field is (a) absent (b) strong.

12. A voltmeter has resistance of 100 Ω . What will be its reading when it is connected across a cells of e.m.f 2 V and internal resistance 20 Ω ?

13. The susceptibility of magnesium at $300K$ is 1.2×10^{-5}. At what temperature will the susceptibility increase to 1.8×10^{-5}?

14. What is Broglie wavelength of an electron accelerated through 25000 volt ?

15. Draw the schematic symbols for AND, OR, NOT and NAND gate.

16. Using analytical method for interference bands, obtain an expression for path difference between two light waves.

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17. State the low of radioactive decay. Hence derive the relation N= $N_0e^{-\lambda t}$. Represent it graphically.

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18. Determine the change in wavelength of light during its passage from air to glass. Refractive Index of Glass with respect to Air is 1.5 and the frequency of light is 5×10^{14} Hz. Also find the wave number of light in glass (velocity of light in air $c = 3 \times 10^8 m/s$).

19. Light of wavelength 3000 Å falls on a metal surface having work function 2.3 eV. Calculate the maximum velocity of ejected electrons.

(Planck's constant , $h = 6.63 \times 10^{-34}$ J.s. , velocity of light $c = 3 \times 10^8 m/s$, mass of an electron $= 9.1 \times 10^{-31}$ kg)

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20. A potentiometer wire has a length 2 m and resistance of 10Ω. It is coonnected in series with a resistance of 990Ω and a cell of e.m.f. 2 V. The potential gradient along the wire is

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21. With the help of a neat diagram, describe the construction and working of van de Graff generator.

A moving coil galvanometer has a resistance of 25Ω and gives a full scale deflection for a current of 10 mA. How will you con vert it into a voltmeter having range $0 - 100V$?

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