PHYSICS

BOOKS - GURUKUL BOOKS & PACKAGING PHYSICS (HINGLISH)

FEBRUARY 2019

Section A

1. If a detergent is dissolved in water, the surface tension of water

A. increases

B. decreases

C. remains

D. becomes infinite

Answer:

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2. Specific heat capacity of water is

A. 8 R

B. $\frac{7}{8}R$

C. 9 R

D. $\frac{9}{7}R$

Answer:

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3. The electric field intensity outisde the charged conductiong shpere of radius 'R' placed in a medium of permittivity $\in$ at a

distance 'r' from the centre of the shhere in terms of surface charge density σ is :

A. $\frac{\sigma}{\in}\left(\frac{R}{r}\right)^2$

B. $\frac{\sigma}{\in}\left(\frac{r}{R}\right)^2$

C. $\frac{\sigma}{\in}\left(\frac{R}{r^2}\right)^2$

D. $\frac{\sigma}{\in}\left(\frac{r}{R}\right)^2$

Answer:

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4. An electron of energy 150 e V has wavelength of 10^{-10} m. The wavelength of a 0.60 keV electron is :

A. 0.50Å

B. 0.75Å

C. 1.2Å

D. 1.5Å

Answer:

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5. What is the value of tangential acceleration in U.C.M ?

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6. On heating a ferromagnetic substance above curie temperature

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7. At which position of the plane of the rotating coil with the direction of magnetic field the e.m.f induced in the coil is maximum ?

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8. Name the logic gate which generates high output when at least one input is high.

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Section B

1. In Young's experiment interference bands were produced on a screen placed at 150 cm from two slits, 0.015 mm apart and illuminated by the light of wavelength 6500Å . Calculate the fringe width.

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2. The susceptibility of magnesium at 300 K is 1.2×10^{-5} What will be its susceptibility at 200 K ?

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3. The length of the second's pendulum in a clock is increases to 4 times its initial length. Calculate the number of oscillations completed by the new pendulum in one minute.

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4. A body of mass 1 kg is made to oscillate on a spring of force constant 16 N/m. Calculate (a) Angular frequncy , (b) Frequency of vibrations.

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5. Define capacitance of a capacitor and its SI unit.

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6. RADIUS OF GYRATION

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7. Distinguish between p type and n type semiconductors

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8. Explain the terms (a) Transducer and (b) Attenuation in communication system.

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Section C

1. Obtain expression of energy of a particle at dfferent positions in the vertical circular motion.

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2. What is binding energy of a satellite?

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3. State Hook's low. Define elastic limit and modulus of elasticity.

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4. The rise of a liquid in a capillary tube depends on

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5. Explain the reflection of transverse and longitudinal waves from a denser and a rarer medium.

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6. What is photelectric effect ? Define (i) Stopping potential (ii) Photoelectric work function.

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7. PERFECTLY BLACK BODY

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8. When a resistor of 5Ω is connected across a cell, its terminal potential differnce is balanced by 140 cm of potentiometer wire and when a resistance of 8Ω is connected across the cell, the terminal potential difference is balanced by 160 cm of the potentiometer wire. Find the internal resistance of the cell.

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9. A cyclotron is used to acclerate protons to a kinetic energy of 5 MeV. If the radius and the frequency field in the cyclotron is 2T. Find the radius and the frequency needed for the applied alternating voltage of the cyclotron. (Given : Velocity of proton $= 3 \times 10^7 m/s$)

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10. The L-C parallel resonant circuit

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11. Derive an expression for the frequency of spectral series by assuming the expression for the total energy of the election of hydrogen.

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

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Section D

1. Show that even as well as odd harmonics are present as overtones in the case of an air column vibrating in a pipe open at both the ends.

A wheel of momen of intertia 1 kg m^2 is rotating at a speed of 30 rad/s Due to friction on the axis, it comes to rest i n 10 mintes. Calculate the average torque of the friction.

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2. Explain the formation of stationary waves by analytical method. Shwo that nodes and antinodes are equally spaced in sationary waves.

The radius gyration of a body about an axis, at a distance of 0.4 m from its centre of mass is $0.5m$. Find its radius of gyrtion about a parallel axis passing through its centre of mass.

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3. Obtain an expression for potential of a particle performing S.H.M. What is the value of potential energy at (i) Mean position and (ii) Extreme position.

A stretched sonometer wiere is in unison with a tunning fork. When the length of the wire is increases by 5%, the number of bats heard paer second is 10. Final the frequency of the tuning fork.

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4. From differential equation of linear S.H.M obtain an expression for acceleration. Velocity and displacement of a particle performing S.H.M.

A sononmeter wire 1 meter long weighing 2 g is in resonsnace with a tunning fork of frequency 300 Hz. Find tension in the sonometer wire.

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5. Explain refraction of light the basis of wave theory : Hence prove the laws of refraction.

Two coherent sources of light having intensity ratio $81:1$ produce interference frings Calculate the ratio of intensitites at the maxima and minima in the interference pattern.

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6. State Brewster law and show that when light is incident at polarzing angle the reflected and refracted rays are mutually perpendicular to each other.

Mono chromatic light of wavelenght 4300 Å falls on slit of width 'a' For what value of a the first maximum falls at 30°?

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