

India's Number 1 Education App

# **PHYSICS**

# BOOKS - NAVBODH PHYSICS (HINGLISH)

# MODEL QUESTION PAPER FOR PRACTICE



1. Two cars, A and B, take the same time to go round around two concentric circular tracks of radii  $r_1$  and  $r_2$ , respectively. If  $r_2 = 4r_1$ , the ratio of the angular speed of car A to that of car B is

A. 4 B.  $\frac{1}{4}$ C. 2

D. 1

Answer: D



**2.** A single drop is formed by coalescing 1000 small droplets. The surface energy decreases in the ratio

A. 1:1

**B**. 10:1

**C**. 100 : 1

D. 1000:1

Answer: B



**3.** A thin toroidal winding of mean circumference of 150 cm has 7500 turns and carries a current of 5 A. The magnetic intensity within the toroid at its mean radius is

A. 10A/m

B. 250A/m

 $\mathsf{C.}\,10^3A\,/\,m$ 

D.  $25 imes 10^3 A\,/\,m$ 

#### Answer: D



4. If L is the angular momentum and I is the moment of inertia of a rotating body, then  $\frac{L^2}{2I}$  represents its

A. linear momentum

B. total energy

C. translational kinetic energy.

D.

#### Answer: B

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# **5.** The stored energy per unit volume of a stretched wire is

A. 
$$\sqrt{\frac{Y}{2u}}$$
  
B.  $\sqrt{\frac{2u}{Y}}$   
C.  $\sqrt{2uY}$ 

 $\left|\frac{2Y}{2}\right|$ D. 1

#### Answer: C

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# **6.** The angle between particle velocity and wave velocity in transverse wave is

A. zero

- B.  $\pi/4$  rad
- C.  $\pi/2$  rad

D.  $\pi$  rad.

#### Answer: C

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**7.** The polariser and analyser are inclined to each other at 60°. The intensity of polarised light emerging from polariser is I. The intensity of the unpolarised light incident on the polariser is

B. 
$$\frac{3}{4}I_0$$
  
C.  $\frac{1}{2}I_0$   
D.  $\frac{1}{4}I_0$ 

#### Answer: D

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8. The energy spent by the cell in circulating unit charge once through the complete circuit is

- A. the potential gradient
- B. the Joule heat
- C. the emf of the cell
- D. the terminal p.d. Of the cell

Answer: D

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**9.** A Photo sensitive material would emit electrons if excited by photons beyond a

threshold. To overcome the threshold, one

would increases -

A. the intensity of light

B. the frequency of light

C. the wavelength of light

D. the collector potential.

Answer: B

**10.** In AM wave total power of side bands is given by :

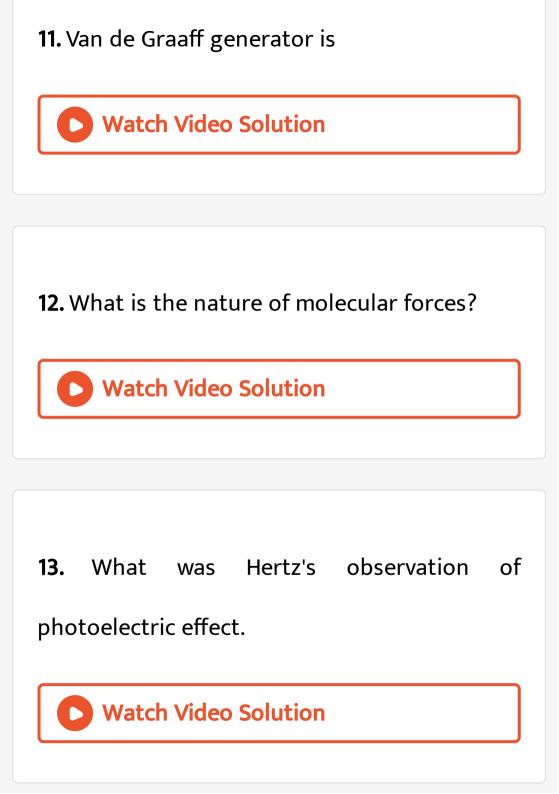
A. the entire AM band

B. the modulated carrier wave

C. the side bands

D. the pulse amplitude.

Answer: C



**14.** In a transistor, the collector current changes by 0.99 mA with a 1 mA change in the emitter current. What is the common-base current gain of the transistor?

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**15.** A body of mass 1 kg oscillates on a spring of force constant 16 N/m. Calculate the angular frequency.

**16.** By measuring the period of revolution and orbital radius of a satellite around a planet, which of the two can we determine : the mass of the satellite or that of the planet?

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**17.** State Lenz's law of electromagnetic

induction.

### 18. Magnetic susceptibility of a diamagnetic

substances

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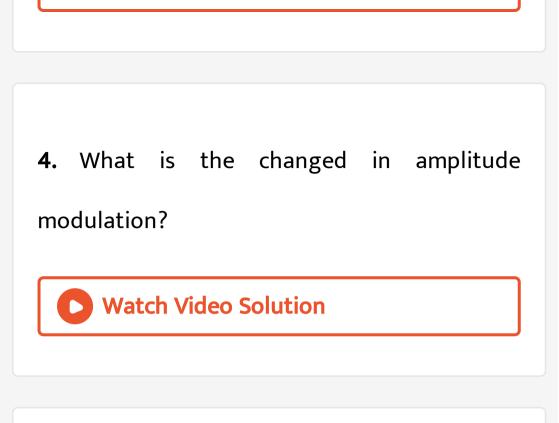
1. Resolving power of a microscope depends

upon

2. Using the method of dimensions , derive an expressions for the energy of a body executing SHM , assuming this energy depends upon its mass m , frequency v and amplitude of vibration r .

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**3.** The change in the angular momentum of the electron when it jumps from the fourth orbit ot the first orbit in a H-atom is



**5.** A body cools from  $70^{\circ}C$  to  $60^{\circ}C$  in 5 minutes and to  $45^{\circ}C$  in the next 10 minutes. Calculate the temperature of the surroundings.



6. Distinguish between harmonics and

overtones.



7. Two pipes closed at one end, 53 cm and 54 cm long, produce 3 beats per second when they are sounded together in their fundamental modes. Ignoring end correction, calculate the speed of sound in air.





## 8. PARAMAGNETIC SUBSTANCES

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**9.** Keeping the angle of banking, if the radius of curvature is made four times, the percentage increase in the maximum speed with which a vehicle can travel on a circular road is 10. State the modificrt Ampere's circuital law.

Explain each term involved in it.

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**11.** The photoelectric work function for aluminium is 4.2 eV. What is the stopping potential for radiation of wavelength 2500 Å?

**12.** A thin uniform rod- of length L, area of cross section A and density  $\rho$  - is rotated about an axis passing through a point at a distance  $\frac{L}{6}$  from one end and perpendicular to its length. Derive its moment of inertia about this axis in terms of L, A and  $\rho$ .





1. Obtain an expression for the linear acceleration of a particle in UCM.
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**2.** An n - p - n transistor power amplifier in

C-E configuration gives.



3. Define critical speed of a satellite. Derive an

expression for it.

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**4.** Huygen's wave theory of light could not explain



5. The amplitude of an alternating voltage is

240 V. What is its rms value?

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**6.** A torque of  $160N \cdot m$  is applid to a flywheel initially at rest. If the flywheel acquires kinetic energy of 8 kJ in 5 s, its angular momentum at the end of 5 s is

7. A steel wire of length 7 m and cross section  $1mm^2$  I suspended from a rigid support, with a steel weight of volume  $10^3 cm^3$  hanging from its other end. Find the decrease in the length of the wire when the steel weight is completely immersed in water.

 $Y_{
m steel} = 2 imes 10^{11} N/m^2$  density of water $= 10^3 kg/m^3$  ]

8. Derive Laplace's law for a spherical membrane.

**9.** A cube of amber, 1 cm on the side, is kept in an electric field of intensity 200 V//m. Determine the electrostatic energy contained in the cube of amber. [Dielectric constant of amber = 2.8] **10.** A battery of emf 3 V and internal resistance  $1\Omega$  is connected in parallel with a cell of emf 1.5 V and internal resistance  $0.5\Omega$  with their like poles together. The combination is used to pass a current through a resistor of resistance of  $5\Omega$ . Using Kirchhoffs circuital laws, find the current through the  $5\Omega$  resistor.





**1.** Assuming the expression for the pressure exerted by an ideal gas, show that the rms speed of a gas molecule is directly proportional to the square root of its absolute temperature.

Calculate the kinetic energy of 10 grams of argon molecules at  $127^{\circ}C$ . [Atomic weight of argon= 40]



**2.** Assuming the expression for the path difference between two interfering light waves for bright and dark fringes, obtain an expression for the fringe width. The central fringe of a double-slit interference pattern produced by light of wavelength 6000Å shifts to the position of the 5th bright fringe on introducing a thin glass plate of refractive index 1.5 in front of one of the slits. Calculate the thickness of the plate.



3. Derive an expression for the current sensitivity of a moving-coil galvanometer.
A solenoid, 1.5 m long and 4 cm in diameter, has 10 turns/cm and carries a current of 5 A.
Calculate the magnetic induction at its centre.



Define linear simple harmonic motion.
 Assuming the expression for displacement of a particle starting from extreme position,

explain graphically the varition of velocity and acceleration w.r.t. time.

A clock reagulated by seconds pendulum, keeps correct time. During summer, length of pendulum increases to 1.005 m. How much will the clock gain or loose in one day  $(g = 9.8m/s^2 \text{ and } \pi = 3.142).$ 

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5. Explain the phenomenon of nuclear fusion

with at least two examples.



