Raman Tutorials

Subject -Physics

Section – A (10 Marks)

1) A door lock is opened by turning the lever (handle) of length 0.2 m. If the moment of force produced is 1 Nm, then the minimum force required is:  
(a) 2 N (b) 5 N (c) 10 N (d) 20 N

2) Assertion (A): Ultraviolet radiations are scattered more as compared to the microwave radiations.  
Reason (R): Wavelength of ultraviolet radiation is more than the wavelength of microwave radiation.

Options:  
(a) A is true, R is true, and R is the correct explanation of A.  
(b) A is true, R is true, but R is not the correct explanation of A.  
(c) A is true, R is false.  
(d) A is false, R is true.

3) The turning effect of a force about a fixed axis is called:  
(a) Force (b) Couple (c) Moment of force (d) Torque

4) The turning effect of a force about a fixed axis is called:  
(a) Force (b) Couple (c) Moment of force (d) Torque

5) A body is acted upon by two equal forces at right angles to each other. The resultant force is:  
(a) Zero (b) Equal to either force (c) Greater than either force (d) Less than either force

6) Which of the following has the least wavelength in the electromagnetic spectrum?  
(a) Radio waves (b) X-rays (c) Ultraviolet rays (d) Gamma rays

7) Which part of the electromagnetic spectrum is used in:  
(a) Eye surgery  
(b) Satellite communication

8) In SONAR, which type of waves are used?

(a) Radio waves (b) Ultrasonic waves (c) Ultraviolet rays (d) Mechanical Waves

9) The frequency range of audible sound for humans is:  
(a) 2 Hz – 20 Hz (b) 2 Hz – 20 kHz (c) 20 Hz – 20 kHz (d) 200 Hz – 2000 Hz

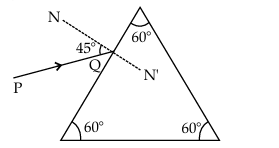
10) Sound waves require a medium for propagation because they are:  
(a) Longitudinal waves (b) Transverse waves (c) Electromagnetic waves (d) Mechanical waves

Section B (30 Marks)

1. Define Centre of Gravity (CG). A hollow cone has height 6 cm. Find the CG from its base. Will the CG change if the cone is filled with honey?
2. A metre scale of uniform thickness is pivoted exactly at its centre of gravity. A weight of 40 gf is hung at the 70 cm mark. At which position on the scale should a 60 gf weight be suspended so that the scale remains in perfect horizontal balance?
3. Two identical toy cars are released from the top of two different ramps of equal height. Ramp **X** has a smooth surface, while ramp **Y** is covered with sandpaper.

(a) Which toy car will definitely reach the same height on the opposite side of the ramp?  
(b) Will mechanical energy be conserved in both cases?

1. A uniform metre rule is balanced on a knife-edge at the 50 cm mark. A weight of 20 gf is hung at the 10 cm mark. Where must a weight of 30 gf be hung to balance the rule?
2. A uniform metre scale is balanced at the 60 cm mark when a load of 40 gf is hung at the 0 cm mark. Find the weight of the scale.
3. A glass slab has refractive index with respect to water = 98\frac{9}{8}89​.  
   (a) Find the refractive index of water with respect to glass.  
   (b) State the principle used.  
   (c) Will the ratio change with change in temperature?
4. A ray of light is incident on an equilateral glass prism at minimum deviation. If i=45:

  
(a) Complete the ray diagram from P to Q.  
(b) State the two factors on which angle of deviation depends.

1. State two uses of infrared radiation.
2. Define “critical angle” and state the condition for total internal reflection (TIR).
3. Light travels 10x10x10x in time t1t\_1t1​ in vacuum and xxx in t2t\_2t2​ in a medium.  
   (a) “It will travel 20x in time t1t\_1t1​ in diamond” — True or False?  
   (b) Express refractive index μ in terms of t1t\_1t1​ and t2t\_2t2​.
4. A resonance tube with tuning fork produces loud sound with air column = 5 cm.  
   (a) Name the phenomenon.  
   (b) Explain why loud sound is heard.  
   (c) If fork of higher frequency is used, what happens to length?
5. A tuning fork produces 256 Hz. In air at 330 m/s, find wavelength.
6. Why are multiple echoes not heard in a small classroom?
7. State one similarity and one difference between the sound waves of 50 Hz and 500 Hz.
8. Define ‘reverberation’ and give one method to reduce it in an auditorium.