HOLY ANGELS SCHOOL (KATWA)

ICSE CLASS X - SEMESTER I EXAMINATION, 2021 - 2022

MOCK TEST

PHYSICS

(SCIENCE - PAPER 1)

Maximum Marks 40

Time allowed: One hour (inclusive of reading time)

ALL QUESTIONS ARE COMPULSORY

The marks intended for questions are given in brackets ***[].***

Select the correct option for each of the following questions.

Question 1

(a) The SI unit of velocity ratio is [1]

1. metre 2. kilometre 3. newton-metre 4. none of these

(b) If the speed of a car is halved, its kinetic energy becomes [1]

1. one-fourth 2. one-fifth 3. one-seventh 4. one-third

(c) Potential energy is the energy possessed by a body due to its [1]

1. changed position 2. changed size and shape 3. both 1. and 2. 4. none of these

(d) 1 Nm is equal to [1]

1. 10^{11} dyne-cm 2. 10^{7} dyne-cm 3. 10^{9} dyne-cm 4. 10^{10} dyne-cm

(e) A steering wheel of diameter 0.5 m is rotated anticlockwise by applying two forces each of magnitude 5 N.

Steps to find the moment of force are given below. Choose an option which has the correct sequence of steps, to find the moment of force. [2]

(i) Moment of force = force × perpendicular distance from point of rotation.

(ii) Moment of force = force / perpendicular distance from point of rotation.

(iii) Moment of force = perpendicular distance from point of rotation / force

(iv) Moment of force = 5 N × 0.5 m = 2.5 Nm

(v) Moment of force = $\frac{5}{0.5}$ = 10 Nm

1. (i), then (v) 2. (i), then (iv) 3. (i), then (iii) 4. (ii), then (v)
5. (iii), then (iv)

(f) A pulley system with a velocity ration of 4 is used to lift a load of 150 kgf through a vertical height of 20 m. The effort required is 50 kgf in the downward direction. (g = 10 ms^{-2}) [4]

(i) The distance moved by the effort is

1. 280 m 2. 240 m
3. 180 m 4. 80 m

(ii) The word done by the effort is

1. 4×10^4 J 2. 4×10^3 J
3. 4×10^2 J 4. 4×10^5 J

(iii) The value of mechanical advantage is

1. 1 2. 2
3. 3 4. 4

(iv) The efficiency of the pulley system is

1. 25% 2. 99%
3. 75% 4. 85%

Question 2

(a) The speed of light in water is 2.25×10^8 ms^{-1}. The refractive index of water is [1]

1. 1.39 2. 1.33 3. 2.33 4. 2.39

(b) Name the colour of white light which is deviated the least [1]

1. violet 2. yellow 3. red 4. blue

(c) The relation for the angle deviation (δ) for a ray of light passing through a equilateral prism in terms of the angle of incidence (i_1), angle of emergence (i_2) and angle of prism (A) is given by [1]

1. $\delta = i_1 + i_2 - A$ 2. $\delta = i_1 + A - i_2$ 3. $\delta = i_2 + A - i_1$ 4. $\delta = i_1 - i_2 - A$

(d) The critical angle for glass-air is 45° for the light of yellow colours. Select the correct option about the critical angle for glass-air for red light [1]

1. Its critical angle will remain same
2. It will be more than 45°
3. It will be less than 45°
4. None of the above option is correct

(e) A water pond appears to be 2.7 m deep. The refractive index of water is $\frac{4}{3}$.

Steps to find the actual depth of the pond are given below. Choose an option which has the correct sequence of steps, to find the actual depth. [2]

(i) Refractive index $= \frac{\text{Apparent depth}}{\text{Real depth}}$

(ii) Refractive index $= \frac{\text{Real depth}}{\text{Apparent depth}}$

(iii) $2.7 = \frac{\frac{4}{3}}{\text{Real depth}}$

(iv) $\frac{4}{3} = \frac{\text{Real depth}}{2.7}$

(v) Real depth $= \frac{4 \times 2.7}{3} = 3.6$ m

1. (i), then (v) 2. (ii), then (iii) 3. (iii), then (i) 4. (ii), (iv), then (v)
5. (iii), (iv), then (v)

(f) A ball of mass 10 g falls from a height of 5 m. It rebounds from the ground to a height of 4 m. ($g = 9.8$ ms^{-2}) [4]

(i) The initial potential energy of the ball is

1. 0.59 J 2. 0.39 J
3. 0.69 J 4. 0.49 J

(ii) The kinetic energy of the ball just before striking the ground is

1. 0.49 J 2. 0.69 J
3. 0.59 J 4. 0.39 J

(iii) The kinetic energy of the ball after striking the ground is

1. 0.492 J 2. 0.392 J
3. 0.299 J 4. 1.392 J

(iv) The less in kinetic energy on striking the ground is

1. 0.078 J 2. 0.098 J
3. 0.088 J 4. 1.098 J

Question 3

(a) The mechanical advantage of an ideal single movable pulley is [1]

1. 1 2. 2 3. less than 2 4. less than 1

(b) The minimum distance between the sources and the reflector in air, to hear an echo is approximately [1]

1. 10 m 2. 17 m 3. 34 m 4. 50 m

(c) In the spectrum of white light by a prism, the colour at the extreme and opposite to the base of prism is [1]

1. violet 2. yellow 3. red 4. blue

(d) How does the refractive index of a medium depend on its temperature ? [1]

1. Refractive index decreases with the increase in temperature of medium
2. Refractive index decreases with the decrease in temperature of medium
3. Refractive index remains same with the increase in temperature of medium
4. None of the above

(e) Select the laws of refraction from the following statements : [2]

1. The incident ray, the reflected ray and the normal at the point of incident, all lie in the same plane
2. The incident ray, the refracted ray and the normal at the point of incident, all lie in the same plane
3. The ratio of the sine of the angle of incidence 'i' to the sine of the angle of refraction 'r' is constant for the pair of given media
4. The ratio of the sine of the angle of refraction 'r' to the sine of the angle of incidence 'i' is constant for the pair of given media
5. The angle of incidence is equal to the angle of refraction

(f) A man standing between two cliffs produces a sound and hears two successive echoes at intervals of 3s and 4s respectively. The speed of the sound in the air is 330 ms^{-1}. [4]

(i) What is the distance between the person and the first cliff from where after 3s he is hearing echo ?

1. 395 m
2. 490 m
3. 390 m
4. 495 m

(ii) What is the distance between the person and the 2nd cliff from where after 4s he is hearing echo ?

1. 660 m
2. 670 m
3. 680 m
4. 690 m

(iii) What is the distance between the two cliffs ?

1. 1055 m
2. 1933 m
3. 1155 m
4. 2031 m

(iv) What is the SI unit of frequency ?

1. Hz
2. Km
3. ampere
4. metre

Question 4

(a) Identify the physical quantity which is measured in terms of horse power. [1]

1. work
2. temperature
3. power
4. mass

(b) 20 Kwh is equal to [1]

1. 3.6×10^6 J
2. 4.6×10^6 J
3. 7.2×10^6 J
4. 9.6×10^6 J

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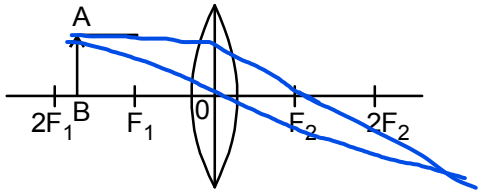
(c) See the following diagram :



(i) What is the nature of the image ? [2]

1. diminished
2. upright
3. real
4. virtual

magnified

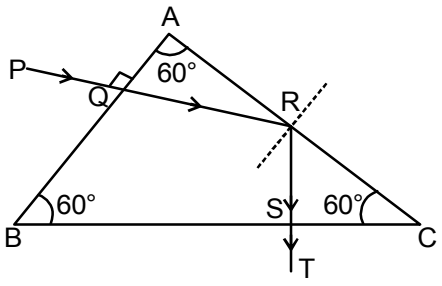
(ii) Name the instrument where the above phenomenon is utilised

1. slide projector
2. thermometer
3. spectrometer
4. reading lens

(d) Select the correct statements from the following [2]

1. X-rays are used for detection of fracture in bones
2. Ultraviolet radiations can pass through rock-salt
3. Infrared radiations can pass through rock-salt
4. Electromagnetic waves are longitudinal in nature

(e) See the following diagram and answer the following question (critical angle for glass-air media = 42) [4]



(i) The phenomenon at the surface AC is

1. reflection
2. refraction
3. partial reflection
4. total internal reflection

(ii) The angle of incidence at the surface AC is

1. 60°
2. 80°
3. 70°
4. 50°

(iii) The angle of incidence at the surface BC is

1. 0°
2. 20°
3. 30°
4. 40°

(iv) Select the correct statement from the following

1. The speed of light ray PQ is equal to the speed of light ray ST
2. The speed of light ray PQ is equal to the speed of light ray QR
3. The speed of light ray RS is equal to the speed of light ray ST
4. The speed of light ray QR is equal to the speed of light ray ST