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Physics Science Questions for CDS, CGL Tier-1, Railways and SSC 10+2 Exams

Physics Quiz 13

Directions: Study the following question carefully and choose the right answer.

1. R is the radius of curvature and f is the focal length of a spherical mirror. What is the relationship between the two?

- (A) $R=2f$ (B) $R=f/2$ (C) $R=f^2$ (D) $R=f/4$

2. Which of the following is true regarding the formation of image in a concave mirror when the object is at infinity?

- (A) Diminished, virtual and inverted
(B) Enlarged, real and inverted
(C) Highly diminished, point sized, real and inverted
(D) Enlarged, virtual and erect

3. Which of the following is true regarding the formation of image in a convex mirror when the object is at infinity?

- (A) Highly diminished, point sized, virtual and erect
(B) Diminished, virtual and erect
(C) Enlarged, virtual and erect
(D) Diminished, virtual and inverted

4. The net power of lenses placed in contact with each other is given by

- (A) The average of power of all the lenses
(B) The sum of the powers of all the lenses
(C) The product of the powers of all the lenses
(D) The sum of the reciprocal of the powers of all the lenses

5. The speed of light in vacuum is?

- (A) 3×10^6 m/s (B) 3×10^8 m/s (C) 3×10^{10} m/s (D) 3×10^5 m/s

6. Which of the following eye component controls the size of the pupil?

(A) Retina (B) Ciliary muscles (C) Optic nerve (D) Iris

7. What happens to the resistance of a wire when its length is doubled?

(A) Resistance doubles (B) Resistance is halved (C) Resistance remains same
(D) Resistance becomes 4 times the original value

8. The unit of power is?

(A) Joules (B) Watt (C) Ampere (D) Farad

9. What is the total resistance when resistors are connected in parallel?

(A) Sum of the individual resistances
(B) Average of the individual resistances
(C) Sum of the reciprocal of the individual resistances
(D) None of the above

10. The magnetic field inside a long straight solenoid carrying current

(A) Is zero
(B) Decreases as we move towards its end
(C) Increases as we move towards its end
(D) Is the same at all points

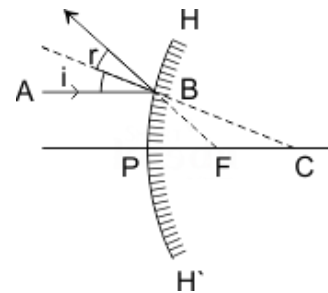
Correct Answers:

1	2	3	4	5	6	7	8	9	10
A	C	A	B	B	D	A	B	D	C

Explanations:

1.

The radius of curvature of a spherical mirror is twice the focal length. Below is an image showing the same.



Hence, option A is correct.

2.

The image formed is highly diminished, point sized, real and inverted when the object is placed at infinity. The following table summarises all the positions and type of image formed.

Position of the object	Position of the image	Size of the image	Nature of the image
At infinity	At the focus f	Highly diminished, point sized	Real and inverted
Beyond c	Between f and c	Diminished	Real and inverted
At c	At c	Same size	Real and inverted
Between C and f	Beyond c	Enlarged	Real and inverted
At F	At infinity	Highly enlarged	Real and inverted
Between p and f	Behind the mirror	enlarged	Virtual and erect

Hence, option C is correct.

3.

The image formed is highly diminished, point sized, virtual and erect. There are only two different types of positions of image.

Position of the image	Position of the object	Size of the image	Nature of the image
At infinity	At the focus f , behind the mirror	Highly diminished, point sized	Virtual and erect
Between infinity and the pole f of the mirror	Between p and f , behind the mirror	Diminished	Virtual and erect

Hence, option A is correct.

4.

The net power of lenses placed in contact with each other is given simply by the addition of individual powers. Also, note that $P=1/f$ where f is the focal length.

Suppose, there are 3 lenses of powers P_1, P_2, P_3 placed in contact with each other then the net power becomes $= P_1+P_2+P_3$.

Hence, option B is correct.

5.

The speed of light in vacuum is 3×10^8 m/s. The speed changes in different media.

Hence, option B is correct.

6.

All the above are parts of eye. Iris controls the size of the pupil. Most of the refraction of light rays occurs at the outer surface of the cornea. Image is formed on the retina.

Hence, option D is correct.

7.

Resistance of a wire doubles when the length of the wire is doubled. This is because $R= r L/A$ where r is the resistivity, L is the length of the wire and A is the area of cross section. Since, Resistance is directly proportional to the length of the wire therefore the resistance doubles if length is doubled.

Resistance is also inversely proportional to the area of cross section therefore it becomes doubled if area of cross section is halved.

'r' is a constant of proportionality. It remains same for a material.

Hence, option A is correct.

8.

The unit of power is watt. The formula for power is $P = V I$ where V is the voltage and I is the current. One watt of power is consumed when 1 A of current flows at a potential difference of 1 volt.

Joules is the unit of energy. Ampere is the SI unit of current and farad is the unit of capacitance.

Hence, option B is correct.

9.

A solenoid is a long coil of wire wrapped in many turns. When current passes through it, it creates a nearly uniform magnetic field inside. Solenoids can convert electric current to mechanical action, and so are very commonly used as switches.

Hence, option D is correct.

10.

Resistors when connected in parallel give a combined resistance which is equal to the sum of the reciprocal of all the resistors. For ex. If R_1, R_2, R_3 are three resistances and are connected in parallel then the combined resistance of the system becomes= $\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$

When the resistors are connected in series, the resistance becomes $R_1 + R_2 + R_3$ i.e it is simply the addition of all the resistances.

Hence, option C is correct.



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