SCIENCE foundation

Class **10** **D**

CODE

SCHOOL NAME

CHAPTER TEST

DO NOT OPEN THIS BOOKLET UNTIL ASK TO DO SO

Total Questions: 50 | Time: 1 hr.

Name …… Test Code ……

Roll No …… Section …… Contact Number ……

Guideline for the candidate

1. You will get addition 5 minutes to fill up information about your self on the OMR sheet, before the start exam
2. Write your **Name**, **Class, Section**, **Roll Number** and **Mobile Number** clearly on the **OMR sheet** and do not forget to sign it.
3. The Question Paper comprises two sections:

Science Section (45 Questions), and **Achiever section** (5 Questions)

Each Question in Achiever Section Carries 3 marks, where as all other Question carry one mark each

4. All Questions are compulsory. There is no negative marking. Use of calculator is not permitted.
5. There is only one correct answer. Choose only ONE option for answer
6. To mark your choice of answer by darkening the circles on the OMR sheet, use **HB Pencil/ Black ball point pen** only.
7. Return the OMR sheet to the invigilator at the end of the exam.
8. Please fill in your personal details in the space provided on this page before attempting the paper.

Students signature…… Invigilator Signature; ……

CHAPTER TEST (Foundation)

Topic: Light – Reflection and Refraction

Subject: Science (physics) **TEST CODE: F–SC–10–CT–09**

Time Allowed: 60min **Maximum Marks: 60**

Science Section

1. The focal length of a convex lens depends on:
   (A) Colour of the light
   (B) The material index
   (C) All of these
   (D) Radius of the surfaces

2. Which of the following can make a parallel beam of light when light from a point source is incident on it?
   (A) Convex mirror as well as concave lens
   (B) Two plane mirrors placed at 90° to each other
   (C) Concave mirror as well as convex lens
   (D) Concave mirror as well as concave lens

3. The image formed by a concave mirror is virtual, erect, and magnitude. The position of object is:
   (A) between pole and focus
   (B) between focus and centre of curvature
   (C) at focus
   (D) at pole

4. The speed of light, in a given medium, is $\frac{2}{3}$ rd. of its speed in a vacuum. The absolute refractive index of the medium is equal to:
   (A) $\frac{3}{2}$ (B) $\frac{4}{9}$
   (C) $\frac{2}{3}$ (D) $\frac{9}{4}$

5. A ray of light is incident on a plane mirror making an angle of 90 degree with the mirror surface. The angle of reflection for this ray of light will be:
   (A) 60 degree (B) 90 degree
   (C) 45 degree (D) 0 degree

6. The refractive indices of four substances P, Q, R, and S are 1.50, 1.36, 1.77, and 1.31 respectively. The speed of light is the maximum in the substance:
   (A) R (B) S
   (C) P (D) Q

7. Refractive index of diamond with respect to vacuum is 2.5, and then the velocity of light in diamond is
   (A) $2.1\times10^{8} m/s$ (B) $2.5\times10^{8} m/s$
   (C) $1.2\times10^{8} m/s$ (D) $25\times10^{8} m/s$

8. If two lenses of power P_1 and P_2 are put in contact, what will be the net power?
   (A) $P_1 \times P_2$ (B) $P_1 - P_2$
   (C) $\frac{P_1}{P_2}$ (D) $P_1 + P_2$

9. The image of an object formed by a plane mirror is:
   (A) virtual (B) upside – down
   (C) real (D) diminished

10. When an object is placed at a distance of 15 cm from a concave mirror, its image is formed at 10 cm in front of the mirror. The focal length of the mirror:
    (A) 10 cm (B) 4 cm
    (C) 8 cm (D) 6 cm

11. In a convex spherical mirror, reflection of light takes place at:
    (A) a bulging – out surface
    (B) a bent – in surface
    (C) an uneven surface
    (D) a flat surface

12. A ray of light passes from glass into air. The angle of refraction will be:
    (A) greater than the angle of incidence
    (B) equal to the angle of incidence
    (C) smaller than the angle of incidence
    (D) 45 degrees

13. The laws of reflection hold good for
    (A) convex mirror only
    (B) concave mirror only
    (C) plane mirror only
    (D) all mirrors irrespective of their shape

14. A student wants to obtain an erect image of an object using a concave mirror of 10 cm focal length. What will be the distance of the object from mirror?
(A) Less than 10 cm
(B) 10 cm
(C) more than 20 cm
(D) between 10 cm and 20 cm

15. Which of the following lenses would you prefer to use while reading small letters found in a dictionary?
(A) A convex lens of focal length 50 cm
(B) A convex lens of focal length 5 cm
(C) A concave lens of focal length 50 cm
(D) A concave lens of focal length 5 cm

16. A convex lens has a focal length of 40 cm. Calculate its power.
(A) 2.5 D (B) 3.5 D
(C) 6.6 D (D) 4.5 D

17. An object of size 2.5 cm is kept perpendicular to the principal axis of a concave mirror. The distance of the object from the pole of the mirror equals the radius of curvature of the mirror. The size of the image formed is:
(A) 3.5 cm (B) 5.0 cm
(C) 1.25 cm (D) 2.5 cm

18. What is not a characteristic of a rearview mirror in a car?
(A) They give a virtual image
(B) Convex in nature
(C) Concave in nature
(D) They have wider field of coverage

19. A bundle of light rays is called a
(A) Arrows of light (B) Pool of light
(C) Beam of light (D) Bunch of light

20. The image formed by a concave mirror is observed to be virtual, erect and larger than the object. Where should be the position of the object?
(A) Between the principal focus and the centre of curvature
(B) Beyond the centre of curvature
(C) At the centre of curvature
(D) Between the pole of the mirror and its principal focus.

21. The focal length of a small concave mirror is 2.5 cm. In order to use this concave mirror as a dentist's mirror, the distance of tooth from the mirror should be:
(A) 4.5cm (B) 1.5cm
(C) 3.5cm (D) 2.5cm

22. If the focal length of a spherical mirror is 12.5 cm, its radius of curvature will be:
(A) 15 cm (B) 25 cm
(C) 20 cm (D) 35 cm

23. The image of an extended object placed in front of a concave mirror is formed at a distance of 40 cm from the object. If the image is 3 times bigger than the object, the magnitude of focal length of the mirror is
(A) 5 cm (B) 10 cm
(C) 20 cm (D) 15 cm

24. When a concave mirror forms a real and enlarged image of an object?
(A) when the object places between F and P
(B) when the object is placed at 2F
(C) when the object placed between F and C
(D) when the object is placed at F

25. To obtain a magnification of +2 with a concave mirror of radius of curvature 60 cm the object distance must be
(A) – 90 cm
(B) – 45 cm
(C) – 30 cm
(D) – 15 cm

26. For an incident angle **i** refraction angle was found to be r_1 and r_2 ($r_2 > r_1$) for two medium A and B respectively. Then
(A) A is denser than B
(B) We cannot identify the denser medium
(C) Both are equally dense
(D) B is denser than A

27. When an object is kept within the focus of a concave mirror, an enlarged image is formed behind the mirror. This image is:
(A) virtual and erect
(B) inverted
(C) real
(D) virtual and inverted

28. If **e** and **i** are the emergent and incident angles, then for a rectangular glass slab
(A) $e = \frac{i}{2}$ (B) $e = 2i$
(C) $e = i$ (D) $e > i$

29. Light travelling from a denser medium to a rarer medium along a normal to the boundary:
(A) goes along the bounding
(B) is refracted away from the normal
(C) is refracted towards the normal
(D) is not refracted

30. The nature of the image is not affected by the position of the object in
(A) convex mirror (B) convex lenses
(C) concave lenses (D) concave mirror

31. Under which of the following conditions a concave mirror can form an image larger than the actual object?
(A) When object is kept at a distance greater than its radius of curvature
(B) When object is placed between the focus and centre of curvature
(C) When the object is kept at a distance equal to its radius of curvature
(D) When object is kept at a distance less than its focal length

32. **Statement 1**: Even when one half of a convex lens is covered with a black paper, the lens will produce a complete image.
Statement 2: Intensity of image is reduced when we cover the half of a convex lens with a black paper.
(A) Statement 1 is true but statement 2 is false.
(B) Both statements 1 and 2 are false.
(C) Both statements 1 and 2 are true but statement 2 is not the correct explanation of statement 1.
(D) Both statements 1 and 2 are true and statement 2 is the correct explanation of statement 1.

33. As the incident angle is increased for a given pair of the medium, the refraction angle will
(A) decrease (B) remain the same
(C) zero (D) increase

34. In which of the following, the image of an object placed at infinity will be highly diminished and point sized?
(A) Concave mirror only
(B) Convex lens only
(C) Concave mirror, convex mirror, concave lens and convex lens
(D) Convex mirror only

35. The real image formed by a concave mirror is smaller than the object if the object is:
(A) at a distance equal to radius of curvature
(B) at a distance greater than radius of curvature
(C) at a distance equal to focal length
(D) between centre of curvature and focus

36. Power of a plane lens is _____.
(A) Negative (B) Infinity
(C) Zero (D) Positive

37. An object is placed in front of a convex mirror at infinity. According to the New Cartesian Sign Convention, the sign of the focal length and the sign of the image distance in this case are respectively:
(A) +, – (B) +, +
(C) –, – (D) –, +

38. An object moves a distance f between 2f and f of a concave mirror. The image would have travelled a distance of
(A) $\frac{f}{2}$ (B) ∞
(C) 2f (D) f

39. You are given water, mustard oil, glycerine and kerosene. In which of these media a ray of light

incident obliquely at same angle would bend the most?

(A) Glycerine (B) Kerosene
(C) Water (D) Mustard oil

40. A diverging mirror is:
(A) a convex mirror
(B) a shaving mirror
(C) a plane mirror
(D) a concave mirror

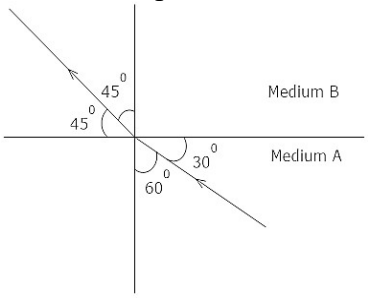
41. **Assertion (A):** The height of an object is always considered positive.
Reason (R): An object is always placed above the principal axis in the upward direction.
(A) Both A and R are true and R is the correct explanation of the assertion.
(B) Both A and R are true but R is not the correct explanation of A.
(C) A is true but R is false.
(D) A is false but R is true.

42. **Assertion (A):** A ray of light that travels obliquely from one transparent medium into another will change its direction in the second medium.
Reason (R): Refraction is due to change in the speed of light as it enters from one transparent medium to another.
(A) Both A and R are true and R is the correct explanation of A.
(B) Both A and R are true but R is not the correct explanation of A.
(C) A is true but R is false.
(D) A is false but R is true.

43. **Assertion (A):** A ray incident along normal to the mirror retraces its path.
Reason (R): In reflection, the angle of incidence is always equal to the angle of reflection.
(A) Both A and R are true and R is the correct explanation of A.
(B) Both A and R are true but R is not the correct explanation of A.
(C) A is true but R is false.
(D) A is false but R is true.

44. **Assertion (A):** A point object is placed at a distance of 26 cm from a convex mirror of focal length 26cm. The image will not form at infinity.
Reason (R): For above – given system the equation $\frac{1}{u}+\frac{1}{v}=\frac{1}{f}$ gives v = ∞
(A) Both A and R are true and R is the correct explanation of A.
(B) Both A and R are true but R is not the correct explanation of A.
(C) A is true but R is false.
(D) A is false but R is true.

45. The figure shows a ray of light as it travels from medium A to medium B. Refractive index of medium B with respect to medium A is **:**

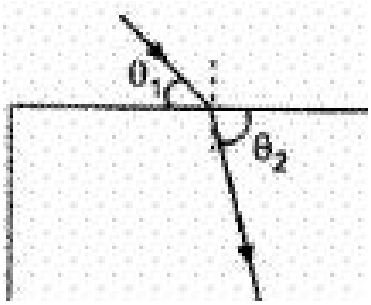


(A) $\frac{1}{\sqrt{2}}$ (B) $\frac{\sqrt{2}}{\sqrt{2}}$
(C) $\frac{\sqrt{3}}{\sqrt{2}}$ (D) $\frac{\sqrt{2}}{\sqrt{3}}$

Achiever Section

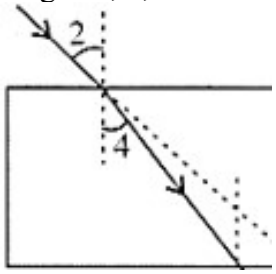
46. The image formed by a plane mirror is:
(A) real, behind the mirror, and of the same size as the object
(B) virtual, behind the mirror, and of the same size as the object
(C) virtual, behind the mirror, and enlarged
(D) real, at the surface of the mirror, and enlarged

47. A student, while doing the experiment, on tracing the path of a ray of light passing through a rectangular glass slab, measured the three angles marked as θ_1, θ_2 and θ_3 in the figure. His measurements could be correct if he were to find:



(A) $\theta_1 > \theta_2$ but $\theta_2 = \theta_3$
(B) $\theta_1 > \theta_2 > \theta_3$
(C) $\theta_1 < \theta_2$ but $\theta_1 = \theta_3$
(D) $\theta_1 < \theta_2 < \theta_3$

48. The correct sequencing of angle of incidence, angle of emergence, angle of refraction and lateral displacement shown in the following diagram by digits 1, 2, 3 and 4 is:



(A) 2, 1, 3, 4 (B) 1, 2, 1, 4, 3
(C) 2, 4, 1, 3 (D) 2, 1, 4,

49. Match the following with the correct response **:**

	Column I		**Column II**
1.	Plane mirror	A.	Virtual image, inverted and large
2.	Concave lens	B.	Virtual image, erect and same size
3.	Convex lens	C.	Virtual image, positive focal length
4.	Convex mirror	D.	Real image, negative focal length, negative power

(A) 1 – B, 2 – D, 3 – A, 4 – C
(B) 1 – C, 2 – B, 3 – D, 4 – A
(C) 1 – A, 2 – C, 3 – B, 4 – D
(D) 1 – D, 2 – A, 3 – C, 4 – B

50. Match the following with the correct response **:**

	Column I		**Column II**
1.	Mirror formula	A.	$\frac{R}{2}$
2.	Lens formula	B.	$\frac{1}{v}-\frac{1}{u}=\frac{1}{f}$
3.	Magnification	C.	$\frac{1}{v}+\frac{1}{u}=\frac{1}{f}$
4.	Focal length	D.	$-\frac{v}{u}$

(A) 1 – C, 2 – B, 3 – D, 4 – A
(B) 1 – A, 2 – C, 3 – B, 4 – D
(C) 1 – D, 2 – A, 3 – C, 4 – B
(D) 1 – B, 2 – D, 3 – A, 4 – C