AUROUS ACADEMY
IIT-JEE | NEET | FOUNDATION

APRE 2024
(Aurous Potential Recognition Exam)

Class – X (Going to XI)
Duration : 2 hrs. | Maximum Marks : 180

IMPORTANT INSTRUCTIONS

1. This Booklet is your Question Paper. DO NOT break seal of Booklet until the invigilator instructs to do so.

2. Fill your APRE Roll No. & Answer Sheet No. in the space provided on the cover page.

3. Please make sure that paper you received is of your class only.

4. The Answer Sheet is provided to you separately which is a machine readable Optical Response Sheet (ORS).
   You have to mark your answers in the ORS by darkening bubble, as per your answer choice, by using black or blue ball point pen.

5. After breaking the Question Paper seal, check there are 11 pages in the booklet. This Question Paper contains 60 MCQs with 4 choices (Subjects: Physics: 20, Chemistry: 20, Maths: 20)

6. Think wisely before darkening bubble as there is negative marking for wrong answer. Answer once marked by pen cannot be cancelled.

7. Marking Scheme:
   a. If darkened bubble is RIGHT answer: 3 Marks.
   b. If darkened bubble is WRONG answer: 1 Mark (Minus One Mark).
   c. If no bubble is darkened in any question: No Mark.

8. If you are found involved in cheating or disturbing others, then your ORS will be cancelled.

9. Do not put any stain on ORS and hand. It over back properly to the invigilator.

Name of the Candidate: _____

Registration Number: _____

PHYSICS

1. In a plane mirror, an object is 0.5 m in front of the mirror. The distance between object and image is –
   (A) 0.5 m   (B) 1 m   (C) 0.25 m   (D) 0.75 m

2. Air is not visible because it-
   (A) is nearly a perfectly transparent   (B) neither absorbs nor reflects light
   (C) transmits whole of light   (D) all of the above are correct

3. A light ray falls on a mirror and deviates by 60° then the angle of reflection will be
   (A) 30°   (B) 90°   (C) 60°   (D) 180°

4. The image formed by a concave mirror is observed to be virtual, erect and larger than the object. then the position of the object should be-
   (A) between the focus and the centre of curvature   (B) at the centre of curvature
   (C) beyond the centre of curvature   (D) between the pole of the mirror and the focus

5. How will the image formed by a convex lens be affected, if the central portion of the lens is wrapped in black paper, as shown in the fig.

   (A) No image will be formed
   (B) Full image will be formed but it is less bright
   (C) Full image will be formed but without the central portion
   (D) Two images will be formed, one due to each exposed half.

6. Refractive index of glass with respect to air is 1.5 and refractive index of water with respect to air is $\frac{4}{3}$. What will be the refractive index of glass with respect to water ?
   (A) 1   (B) 1.5   (C) 1.125   (D) –10

7. A swimming pool appears to be 2m deep. Its actual depth is (μ for water $= 1.33$)-
   (A) 2.66 m   (B) 2 m   (C) 2.34   (D) 2.54 m

8. The power of a lens having focal length 50 cm is-
   (A) $\frac{1}{2}$D   (B) 2D   (C) 3D   (D) 0.2 D

9. Focal length of coloured goggles (Without number) is-
   (A) zero   (B) infinity
   (C) between zero and infinity   (D) None of these

10. The focal length of eye lens is controlled by :
    (A) Iris   (B) Cornea   (C) Ciliary muscles   (D) Optic nerve

11. Rainbow is formed due to-
    (A) reflection and dispersion of light through the water droplets
    (B) total internal reflection, refraction and dispersion of light through the water droplets
    (C) only dispersion of light
    (D) only refraction of light

12. Convex lens of suitable focal length can correct-
    (A) short sightedness   (B) long sightedness   (C) presbyopia   (D) astigmatism

13. A ray of light travelling in air falls on the surface of a transparent material at an angle of 45º to the normal. It bends by 15º after refraction. Find the refractive index of the material.

    (A) $\sqrt{3}$ (B) $\sqrt{2}$ (C) $\sqrt{7}$ (D) 0

14. A boy stands straight in front of a mirror at a distance of 30 cm away from it. he sees his erect image whose height is $\frac{1}{5}$th of his real height. The mirror he is using is:

    (A) plane mirror   (B) convex mirror   (C) concave mirror   (D) plano-concave mirror

15. The distance of an object from the focus of a concave mirror of focal length f is x & the distance of the real image from the focus is y. Then

    (A) $\frac{1}{x} + \frac{1}{y} = \frac{1}{f}$ (B) $\frac{1}{x} - \frac{1}{y} = \frac{1}{f}$ (C) $xy = f^2$ (D) None of these

16. The difference between reflection and total internal reflection is that
    (A) the laws of reflection hold true for reflection but not for total internal reflection.
    (B) total internal reflection can take place only when light travels from a rarer medium to a denser medium while reflection can take place vice-versa also.
    (C) reflection can take place when light travels from a rarer medium to denser medium and vice-versa but total internal reflection can take place only when it travels from an optically denser to an optically rarer medium.
    (D) reflection is a natural phenomena while total internal reflection is man-made

17. A normal eye is not able to see objects closer than 25 cm because
    (A) the focal length of the eye is 25 cm
    (B) the distance of the retina from the eye-lens is 25 cm
    (C) the eye is not able to decrease the distance between the eye-lens and the retina beyond a limit
    (D) the eye is not able to decrease the focal length beyond a limit

18. To read a poster on a wall, a person with defective vision needs to stand at a distance of 0.4 m from the poster. A person with normal vision can read the poster from a distance of 2.0 m. Which one of hte following lens may be used to corect the defective vision?

(A) A concave lens of 0.5 D (B) A concave lens of 1.0 D

(C) A concave lens of 2.0 D (D) A convex lens of 2.0 D

19. An object is placed at a distance 2f from the pole of a convex mirror of focal length f. The linear magnification is
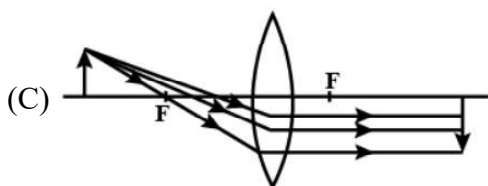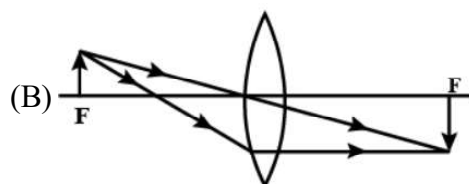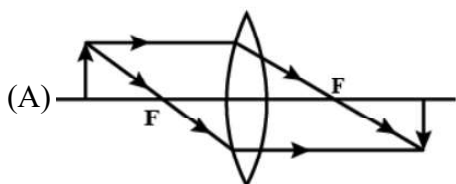
(A) $\dfrac{1}{3}$ (B) $\dfrac{2}{3}$ (C) $\dfrac{3}{4}$ (D) 1

20. Which of the following ray diagram is correct?

(A)   (B)

(C)   (D)

linage at infinity
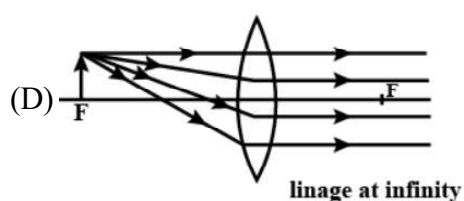
CHEMISTRY

21. The process of reduction involves
    (A) addition of oxygen
    (B) addition of hydrogen
    (C) removal of oxygen
    (D) removal of hydrogen

22. Which of the following is an endothermic process?
    (A) Dilution of sulphuric acid
    (B) Sublimation of dry ice
    (C) Condensation of water vapours
    (D) Respiration in human beings

23. When SO_2 gas is passed through saturated solution of H_2S, which of the following reaction occurs?
    (A) $SO_2 + 2H_2S \rightarrow 2H_2O + 3S$
    (B) $SO_2 + 2H_2S \rightarrow H_2O + 3S$
    (C) $SO_2 + H_2S \rightarrow H_2O + S$
    (D) $SO_2 + H_2O \rightarrow SO_3 + H_2$

24. $Pb + CuCl_2 \rightarrow PbCl_2 + Cu$
    The above reaction is an example of:
    (A) combination
    (B) double displacement
    (C) decomposition
    (D) displacement

25. Which of the following involves combination of two elements ?
    (A) $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$
    (B) $CaO(s) + CO_2(g) \rightarrow CaCO_3(g)$
    (C) $2SO_2(g) + O_2(g) \rightarrow 2SO_3f(g)$
    (D) $NH_3(g) + HCl(g) \rightarrow NH_4Cl(s)$

26. Which of the following is a thermal decomposition reaction ?
    (A) $2H_2O \rightarrow 2H_2 + O_2$
    (B) $2AgCl \rightarrow 2Ag + Cl_2$
    (C) $ZnCO_3 \rightarrow ZnO + CO_2$
    (D) $H_2(g) + Cl_2(g) \rightarrow 2HCl(g)$

27. Barium chloride on reacting with ammonium sulphate forms barium sulphate and ammonium chloride. Which of the following correctly represents the type of the reaction involved ?
    (i) Displacement reaction
    (ii) Precipitation reaction
    (iii) Combination reaction
    (iv) Double displacement reaction
    (A) (i) only
    (B) (ii) only
    (C) (iv) only
    (D) (ii) and (iv)

28. $Na_2CO_3 \cdot 10H_2O$ is
(A) Washing soda   (B) Baking soda   (C) Bleching powder   (D) Tartaric acid

29. Which of the following statements is correct about an aqueous solution of an acid and of a base?
(i) Higher the pH, stronger the acid   (ii) Higher the pH, weaker the acid
(in) Lower the pH, stronger the base   (iv) Lower the pH, weaker the base
(A) (i) and (iii)   (B) (ii) and (iii)   (C) (i) and (iv)   (D) (ii) and (iv)

30. Rain is called acid rain when its:
(A) pH falls below 7   (B) pH falls below 6   (C) pH falls below 5.6   (D) pH is above 7

31. Sodium hydroxide is a
(A) weak base   (B) weak acid   (C) strong base   (D) strong acid

32. Sodium hydroxide is used
(A) as an antacid   (B) in manufacture of soap
(C) as a cleansing agent   (D) in alkaline batteries

33. A solution of NaCl
(i) will turn red litmus blue   (ii) will turn pH paper green
(iii) will turn blue litmus red   (iv) will not affect litmus
(A) (i) and (ii)   (B) (i), and, (iii)   (C) (i) and (iv)   (D) (ii) and (iv)

34. Curd cannot be stored in
(i) Brass vessel   (ii) Copper vessel   (iii) Steel   (iv) Bronze
(A) (i), (ii), (iii)   (B) (ii), (iii), (iv)   (C) (i), (ii), (iv)   (D) (i), (iii), (iv)

35. Lime water reacts with chlorine to form
(A) $CaCl_2$ (B) $CaOCl_2$ (C) $Ca(ClO_3)_2$ (D) CaO_2Cl_2

36. The brown gas evolved on heating of copper nitrate is
(A) O_2 (B) NO_2 (C) N_2 (D) NO

37. Which of the following gives the correct increasing order of acidic strength ?
(A) Water < Acetic acid < Hydrochloric acid   (B) Water < Hydrochloric acid < Acetic acid
(C) Acetic acid < Water < Hydrochloric acid   (D) Hydrochloric acid < Water < Acetic acid

38. Which of the following salts does not contain water of crystallisation?
(A) Blue vitriol   (B) Baking soda   (C) Washing soda   (D) Gypsum

39. Calcium phosphate is present in tooth enamel. Its nature is
(A) basic   (B) acidic   (C) neutral   (D) amphoteric

40. Which of the following statement is not correct?
(A) All metal carbonates react with acid to give salt, water and carbon dioxide.
(B) All metal oxides react with water to give salt and acid.
(C) Some metals react with acids to give salt and hydrogen.
(D) Some non-metal oxides react with water to form an acid.

MATHEMATICS

41. Which term of A.P. is 21, 42, 63, 84, ... is 210?
    (A) 9th (B) 10th (C) 11th (D) 12th

42. Two AP's have the same common difference. The first term of one of these is 3 and that of the other is 8. What is the difference between their 10th terms?
    (A) 5   (B) 10   (C) 15   (D) 19

43. Which of these terms of the sequence given is the first negative term?

    $$15, \ 13\frac{3}{4}, \ 12\frac{1}{2}, \ 11\frac{1}{4}, \ ......$$

    (A) 12th (B) 13th (C) 14th (D) 18th

44. If $\sqrt{5} = 2.236$ and $\sqrt{3} = 1.732$, then the value of $\dfrac{2}{\sqrt{5}+\sqrt{3}} + \dfrac{7}{\sqrt{5}-\sqrt{3}}$ is
    (A) 14   (B) 14.39   (C) 14.392   (D) 16

45. If the LCM of a and 18 is 36 and the HCF of a and 18 is 2, then a =
    (A) 2   (B) 3   (C) 4   (D) 1

46. HCF of $2^3 \times 3^2 \times 5$, $2^3 \times 3^3 \times 5^2$ and $2^2 \times 3 \times 5^3 \times 7$ is
    (A) 30   (B) 48   (C) 60   (D) 105

47. The ratio of two numbers is 3 : 4 and their HCF is 4. Then LCM is
    (A) 12   (B) 16   (C) 24   (D) 48

48. If one root of the polynomial $5x^2 + 13x + K$ is reciprocal of the other, then the value of k is :
    (A) 0   (B) 5   (C) 6   (D) 1/6

49. The value(s) of k for which the equation $9x^2 + 3kx + 4 = 0$ has real and equal roots is (are)

(A) 4   (B) –4   (C) $4, \dfrac{1}{4}$ (D) 4, –4

50. The HCF of $56\,(x^6y^2 - x^2y^6)$
and $72\,(x^5y^3 + 3x^3y^5 + 2xy^7)$ is :

(A) $8x^2y\,(x^2 + y^2)$ (B) $8x^2y^2\,(x^2 + y^2)$ (C) $8xy^2\,(x^2 + y^2)$ (D) $8xy^2\,(x + y^2)$

51. If 6 years hence a man's age will be 3 times the age of his son and three years ago he was 9 times as old as his son, then what is the present age of the man?
(A) 25 years   (B) 35 years   (C) 15 years   (D) 30 years

52. Find the fourth vertex of the rectangle ABCD whose three vertices are shown in the figure given below:
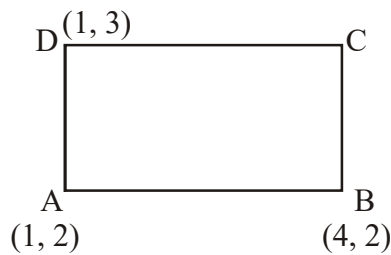
(A) (2, 1)   (B) (4, 3)   (C) (3, 1)   (D) (3, 2)

53. A number consists of two digits whose sum is 5. When the digits are reversed the number becomes greater by 9. Find the given number
(A) 23   (B) 21   (C) 19   (D) 25

54. The quadratic equation where one root is $3 + 2\sqrt{3}$ is
(A) $x^2 - 6x - 3 = 0$ (B) $x^2 + 6x - 3 = 0$ (C) $x^2 + 6x + 3 = 0$ (D) $x^2 - 6x + 3 = 0$

55. The perimeter of the triangle whose vertices are $(-1, 4), (-4, -2), (3, -4)$ will be:

(A) 38　　　　　　(B) 16　　　　　　(C) 42　　　　　　(D) None of these

56. If the distance between the points A(2, −2) and B(−1, x) is 5, then

(A) x = −3 or x = 4　　(B) x = 3 or x = −4　　(C) x = −6 or x = 2　　(D) x = 6 or x = −2

57. The roots of the equation $\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$ are

(A) $\sqrt{2}, \dfrac{5\sqrt{2}}{2}$　　　(B) $-\sqrt{2}, \dfrac{5\sqrt{2}}{2}$　　　(C) $\sqrt{2}, \dfrac{-5\sqrt{2}}{2}$　　　(D) $-\sqrt{2}, \dfrac{-5\sqrt{2}}{2}$

58. Which one is the correct alternative of the decimal representation of an irrational number ?

(A) non - terminating, non-repeating

(B) terminating

(C) termiating, repeating

(D) non-terminating, repeating

59. For what value of k, the system of equations

x + 2y = 3, 5x + ky + 7 = 0 has unique solution?

(A) k = 10　　　　　　　　　　(B) All real values except 10

(C) All natural numbers except 10　　(D) Does not exist

60. If $ax^2 + 2a^2x + b^3$ is divisible by (x + a) then ___

(A) a = b　　　　　　　　　　(B) $a^2 + ab + b^2 = 0$

(C) either a = b or $a^2 + ab + b^2 = 0$　　(D) neither a = b nor $a^2 + ab + b^2 = 0$

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