AUROUS ACADEMY
IIT-JEE | NEET | FOUNDATION

PRAGYAN

Class – X (Going to XI) – Sample Paper
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 8 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: _____

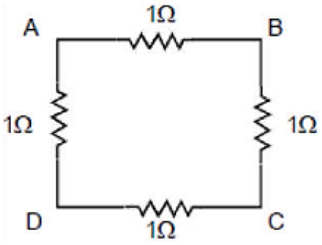
PHYSICS

1. Unit of electric power may also be expressed as

(A) volt ampere (B) kilowatt hour

(C) watt second (D) joule second

2. Four identical resistances are joined as shown in fig. The equivalent resistance between points (A) and (B) is R_1. The equivalent resistance between points A and C is R_2 then ratio of R_1/R_2 is:



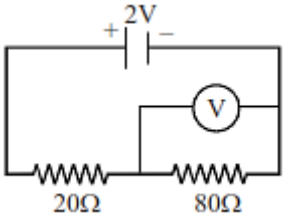
(A) 1 : 1 (B) 4 : 3 (C) 3 : 4 (D) 1 : 2

3. An electric bulb is rated 220volt and 100watt. The resistance of the filament of the electric bulb is

(A) 2.2 ohm (B) 2.2×10^4 ohm

(C) 484 ohm (D) 100 ohm

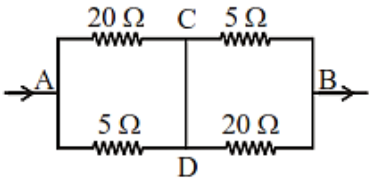
4. In figure, the e.m.f. of the cell is 2V and internal resistance is negligible. The reading of the voltmeter will be



(A) 2 volt (B) 1.33 volt

(C) 1.60 volt (D) 0.80 volt

5. When some potential difference is maintained between A and B, current I enters the network at A and leaves at B.



(A) The equivalent resistance between A and B is 8 Ω.

(B) The equivalent resistance between A and B is 4 Ω.

(C) No current flows between C and D.

(D) The equivalent resistance between A and B is 2 Ω.

6. A student focussed the image of a candle flame on a white screen using a convex lens. He noted down the position of the candle screen and the lens as under

Position of candle = 12.0 cm

Position of convex lens = 50.0 cm

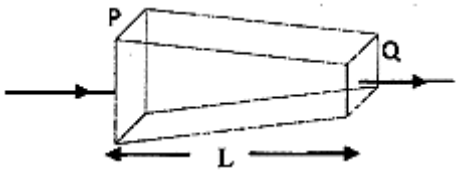
Position of the screen = 88.0 cm

What is the focal length of the convex lens?

(A) 19 cm (B) 20 cm

(C) 21 cm (D) 22 cm

7. A conductor of length L has a varying cross section with area 2A at P and A at Q as shown in the adjacent figure. If it carries a steady current I, then



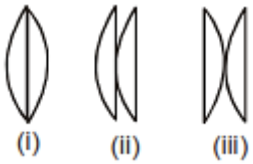
(A) Current at surface P is more than surface Q.
(B) Current at surface Q is more than surface P.
(C) Current at surface P and surface Q are same.
(D) None of these

8. Two mirrors are inclined at an angle 60°, an object is placed asymmetrically between them. Then number of images formed will be:
(A) 6 (B) 5 (C) 7 (D) 9

9. Which of the following conditions are necessary for total internal reflection to take place at the boundary of two optical media?
1. Light is passing from optically denser medium to optically rarer medium.
2. Light is passing from optically rarer medium to optically denser medium.
3. Angle of incidence is greater than the critical angle.
4. Angle of incidence is less than the critical angle.
(A) 1 and 3 only (B) 2 and 4 only (C) 3 and 4 only (D) 1 and 4 only

10. Size of image of an object by a mirror having a focal length of 20 cm is observed to be reduced to 1/3rd of its size. What is the nature of the image and the mirror?
(A) Image is real and inverted. Mirror is concave.
(B) Image is real and inverted. Mirror is convex.
(C) Image is virtual and inverted. Mirror is concave.
(D) Information insufficient.

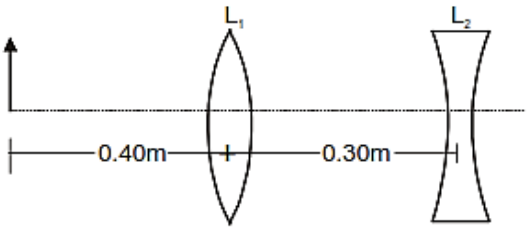
11. Two identical plano-convex lenses can be combined in three ways, as shown. The ratio of the focal lengths of these combinations will be:



(A) 2 : 2 : 1 (B) 1 : 1 : 1 (C) 1 : 2 : 2 (D) 2 : 1 : 1

12. The middle colour in sunlight spectrum is :
(A) yellow (B) green (C) blue (D) orange

13. An object is placed 0.40 m from one of the two lenses L_1 and L_2 of focal lengths 0.20 m and 0.10 m respectively as depicted in the figure. The separation between the lenses is 0.30 m.



The final image formed by this two lens system is at
(A) 0.13 m to the right of the second lens. (B) 0.05 m to the right of the second lens.
(C) 0.13 m to the left of the second lens (D) Infinity

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

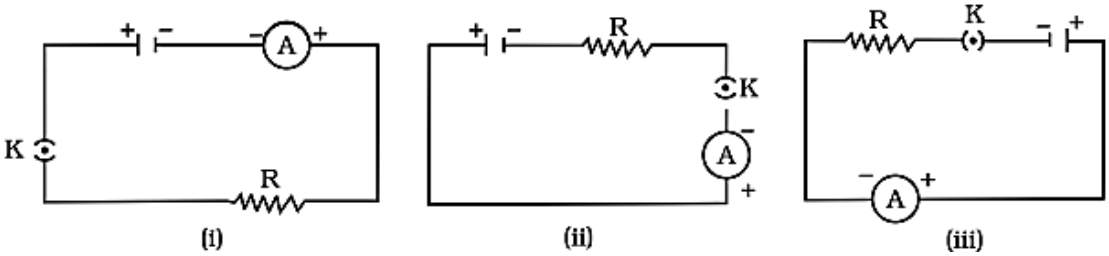
15. Which of the following statements is true?
(A) A convex lens has 4 dioptre power having a focal length +0.25 m
(B) A convex lens has –4 dioptre power having a focal length +0.25 m
(C) A concave lens has 4 dioptre power having a focal length +0.25 m
(D) A concave lens has –4 dioptre power having a focal length +0.25 m

16. 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) Kerosene (B) Water (C) Mustard oil (D) Glycerine

17. A person cannot see distinctly objects kept beyond 2 m. This defect can be corrected by using a lens of power
(A) +0.5 D (B) –0.5 D (C) +0.2 D (D) –0.2 D

18. Which of the following statements is correct regarding the propagation of light of different colours of white light in air?
(A) Red light moves fastest
(B) Blue light moves faster than green light
(C) All the colours of the white light move with the same speed
(D) Yellow light moves with the mean speed as that of the red and the violet light

19. A cell, a resistor, a key and ammeter are arranged as shown in the circuit diagrams. The current recorded in the ammeter will be



(A) maximum in (i) (B) maximum in (ii)
(C) maximum in (iii) (D) the same in all the cases

20. Which of the following represents voltage?
(A) $\frac{\text{Work done}}{\text{Current} \times \text{Time}}$ (B) Work done × Charge
(C) $\frac{\text{Work done} \times \text{Time}}{\text{Current}}$ (D) Work done × Charge × Time

CHEMISTRY

21. Which one of the following processes involve chemical reactions?
(A) Storing of oxygen gas under pressure in a gas cylinder
(B) Liquefaction of air
(C) Keeping petrol in a China dish in the open
(D) Heating copper wire in presence of air at high temperature

22. Zinc reacts with silver nitrate to form which compounds?
(A) $Zn(NO_3)_2 + Ag$ (B) $ZnNO_3 + Ag$
(C) $AgNO_3 + Zn(NO_3)_2$ (D) $Ag + Zn(NO_3)_3$

23. $MnO_2 + 4HCl \longrightarrow MnCl_2 + H_2O + Cl_2$. The oxidising agent is
(A) MnO_2 (B) HCl (C) $MnCl_2$ (D) $Ag + Zn(NO_3)_2$

24. $2AgI(s) \xrightarrow{\text{Sunlight}} 2Ag(s) + I_2(g)$
The colour of iodine is
(A) Green (B) Purple (C) Brown (D) Pink

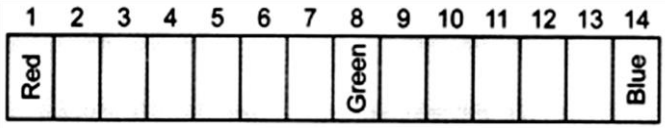
25. Which of the following is neutral salt?
(A) NH_4Cl (B) CH_3COONH_4 (C) CH_3COONa (D)Na_2CO_3

26. Sodium carbonate is a basic salt because it is a salt of
(A) strong acid and strong base. (B) weak acid and weak base.
(C) strong acid and weak base. (D) weak acid and strong base.

27. $Fe_2O_3 + 2Al \longrightarrow Al_2O_3 + 2Fe$ This reaction is an example of –
(A) Combination reaction (B) Double displacement reaction
(C) Decomposition reaction (D) Displacement reaction

28. The substance that looses electrons is called as:
(A) oxidizing agent (B) reducing agent
(C) catalyst (D) none of above

29. Equal volumes of hydrochloric acid and sodium hydroxide solutions of same concentration are mixed and the pH of the resulting solution is checked with a pH paper. What would be the colour obtained? (You may use colour guide given in figure)



(A) Red (B) Yellow (C) Yellowish green (D) Blue

30. In the following reaction, identify the products $Na_2CO_3(aq) + 2HCl\ (aq) \longrightarrow$ _____
(A) $NaCl + H_2O$ (B) $H_2O + CO_2$
(C) $Na_2CO_3 + CO_2 + H_2O$ (D) $NaCl + CO_2 + H_2O$

31. At what temperature is gypsum heated to form Plaster of Paris?
(A) 35°C (B) 70°C (C) 80°C (D) 100°C

32. Which of the following acid is used by goldsmiths for cleaning gold and silver ornaments?
(A) HF (B) H_2SO_4 (C) HNO_3 (D) H_3PO_4

33. Common salt besides being used in kitchen can also be used as the raw material for making
(i) washing soda (ii) bleaching powder
(iii) baking soda (iv) slaked lime
(A) (i) and (ii) (B) (i), (ii) and (iv) (C) (i) and (iii) (D) (i), (iii) and (iv)

34. Which of the following oxide(s) of iron would be obtained on prolonged reaction of iron with steam?
(A) FeO (B) Fe_2O_3 (C) Fe_3O_4 (D) Fe_2O_3 and Fe_2O_4

35. Which one among the following is an acidic oxide?
(A) Na_2O (B) CO (C) CO_2 (D) Al_2O_3

36. Oxides of moderately reactive metals like Zinc, Iron, Nickel, Tin, Copper etc. are reduced by using
(A) Aluminium as reducing agent (B) Sodium as reducing agent
(C) Carbon as reducing agent (D) Calcium as reducing agent

37. Which of the following metals liberate hydrogen with HNO_3?
(i) Cu (ii) Zn (iii) Mn (iv) Mg
(A) (i) and (ii) (B) (ii) and (iii) (C) (iii) and (iv) (D) (i) and (iv)

38. The electronic configurations of three elements X, Y and Z are X —2, 8; Y — 2, 8, 7 and Z — 2, 8, 2. Which of the following is correct?
(A) X is a metal and Y is a non-metal (B) Y is a metal and Z is a non-metal
(C) X is noble gas and Z is a non-metal (D) Y is a non-metal and Z is a metal

39. Which of the following metals exist in their native state in nature?
(i) Cu (ii) Au (iii) Zn (iv) Ag
(A) (i) and (ii) (B) (ii) and (iii) (C) (ii) and (iv) (D) (iii) and (iv)

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

MATHEMATICS

41. If a = $\frac{2+\sqrt{3}}{2-\sqrt{3}}$, b = $\frac{2-\sqrt{3}}{2+\sqrt{3}}$ then the value of a + b is –
(A) 14 (B) –14 (C) $8\sqrt{3}$ (D) $-\sqrt{3}$

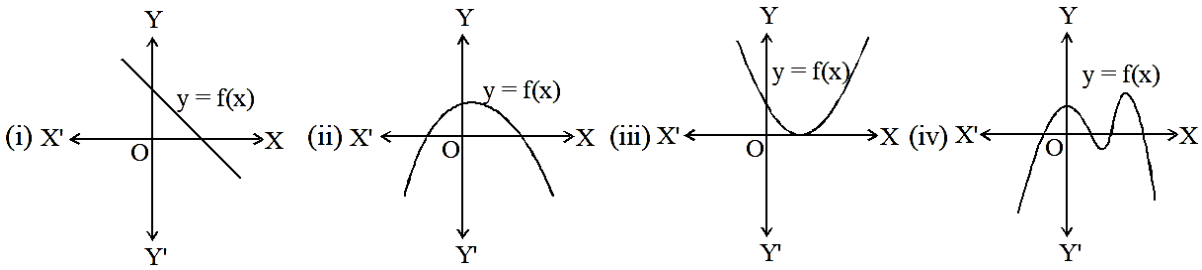
42. Which of the following statements is correct?
(A) 0 is called the additive identity for rational numbers.
(B) 1 is called the multiplicative identity for rational numbers.
(C) The additive inverse of 0 is zero itself.
(D) All the above.

43. The expression $\frac{\sqrt{3}-1}{2\sqrt{2}-\sqrt{3}-1}$ is equal to –
(A) $\sqrt{2}+\sqrt{3}+\sqrt{4}+\sqrt{6}$ (B) $\sqrt{6}-\sqrt{4}+\sqrt{3}-\sqrt{2}$
(C) $\sqrt{6}-\sqrt{4}-\sqrt{3}+\sqrt{2}$ (D) None of these

44. If α and β are the zeros of the polynomial $f(x) = 15x^2 - 5x + 6$ then $\left(1+\frac{1}{\alpha}\right)\left(1+\frac{1}{\beta}\right)$ is equal to –
(A) $\frac{13}{3}$ (B) $\frac{13}{2}$ (C) $\frac{16}{3}$ (D) $\frac{15}{2}$

45. $2x+7\overline{)\ 2x^4+21x^3+35x^2-37x+46}$ =
(A) $x^3-7x^2-7x+6-\frac{4}{2x+7}$ (B) $2x^3+14x^2-14x+12-\frac{4}{2x+7}$
(C) $x^3-7x^2+7x-6+\frac{4}{2x+7}$ (D) $x^3+7x^2-7x+6+\frac{4}{2x+7}$

46. Find the number of zeroes of f(x), in each case



(A) (i)–1; (ii)–2; (iii)–1; (iv)–4
(B) (i)–1; (ii)–2; (iii)–4; (iv)–1
(C) (i)–4; (ii)–2; (iii)–1; (iv)–4
(D) (i)–1; (ii)–2; (iii)–3; (iv)–4

47. If $a = x - y$, $b = y - z$ and $c = z - x$ then the value of $a^3 + b^3 + c^3$ is
(A) $3(x - y)(y - z)(z - x)$ (B) $(x - y)^3 (y - z)^3 (z - x)^3$
(C) $(x + y + z)^3$ (D) $x^3 + y^3 + z^3$

48. A fraction becomes $\frac{4}{5}$ when 1 is added to each of the numerator and denominator. However, if we subtract 5 from each then it becomes $\frac{1}{2}$. The fraction is –

(A) $\frac{5}{8}$ (B) $\frac{5}{6}$ (C) $\frac{7}{9}$ (D) $\frac{13}{16}$

49. For which values of 'a' and 'b' does the following pair of linear equations have an infinite number of solutions $2x + 3y = 7$; $(a - b)x + (a + b)y = 3a + b - 2$
(A) a = 5, b = 1 (B) a = 4, b = 2 (C) a = 1, b = 5 (D) a = 2, b = 4

50. The denominator of a rational number is greater than its numerator by 3. If 3 is subtracted from the numerator and 2 is added to the denominator, the new number becomes $\frac{1}{5}$. What was the original number?
(A) $\frac{5}{8}$ (B) $\frac{3}{5}$ (C) $\frac{7}{11}$ (D) $\frac{3}{8}$

51. If $\alpha + \beta = 90°$ and $\alpha = 2\beta$ then $\cos^2 \alpha + \sin^2 \beta$ equal :
(A) 1 (B) zero (C) $\frac{1}{2}$ (D) 2

52. If $\alpha + \beta = \frac{\pi}{2}$ and $\sin \alpha = \frac{1}{3}$, then sin b is :
(A) $\frac{\sqrt{2}}{3}$ (B) $\frac{2\sqrt{2}}{3}$ (C) $\frac{2}{3}$ (D) $\frac{3}{4}$

53. The value of the expression $\frac{5\sin^2 30° + \cos^2 45° + 4\tan^2 60°}{2\sin 30° \cos 60° + \tan 45°}$ is:
(A) 4 (B) 9 (C) $\frac{53}{12}$ (D) $\frac{55}{6}$

54. If $5\sin\theta = 3$, then $\frac{\sec\theta + \tan\theta}{\sec\theta - \tan\theta}$ is equal to :

(A) $\frac{1}{4}$ (B) 4 (C) 2 (D) None of these

55. The solutions of the equation $4^x + 2^x = 6$ is/are :

(A) 0, 1 (B) 2, 1 (C) 1, 0 (D) 1

56. If α, β are the roots of the equation $(x - a)(x - b) + k = 0$, then a, b will be the roots of the equation:

(A) $(x - \alpha)(x - \beta) - k = 0$ (B) $(x - \alpha)(x - \beta) + k = 0$

(C) $(x - a)(x - b) - k = 0$ (D) $(x - \alpha)(x - b) + k = 0$

57. D The polynomial equation $x(x + 1) + 8 = (x + 2)\{x - 2)$ is

(A) linear equation (B) quadratic equation

(C) cubic equation (D) bi-quadratic equation

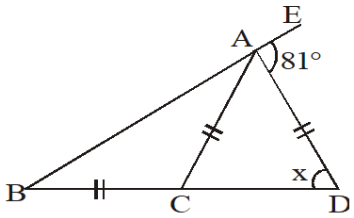
58. The distance between points $(a + b, b + c)$ and $(a - b, c - b)$ is :

(A) $2\sqrt{a^2 + b^2}$ (B) $2\sqrt{b^2 + c^2}$ (C) $2\sqrt{2}b$ (D) $\sqrt{a^2 - c^2}$

59. D The equation $2x^2 + kx + 3 = 0$ has two equal roots, then the value of k is

(A) $\pm\sqrt{6}$ (B) ± 4 (C) $\pm 3\sqrt{2}$ (D) $\pm 2\sqrt{6}$

60. In the given fig, BC = AC = AD, $\angle EAD = 81°$. Find the value of x.



(A) 45° (B) 54° (C) 63° (D) 36°

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