Talent Search Exam. 2023

for class-X

Duration:1:30Hr **Max. Marks 240**

INSTRUCTIONS

A. General :

1. This booklet is your Question Paper. DO NOT break seal of Booklet until the invigilator instructs to do so. Total Questions to be Attempted 60: **Physics : 10, Chemistry : 10, Biology : 10, Mathematics : 20 & MAT : 10 Questions.**

2. 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 & blue ball point pen.

3. Things NOT ALLOWED in EXAM HALL : Blank Paper, clipboard, log table, slide rule, calculator, camera, mobile and any electronic or electrical gadget. If you are carrying any of these then keep them at a place specified by invigilator at your own risk.

4. Do not use white-fluid or any other rubbing material on answer sheet. Before handing over the answer sheet to the invigilator, candidate should check that **Roll No, Test code and Book Code** have been filled and marked correctly. Immediately after the prescribed examination time is over, the **Answer sheet is to be returned to the invigilator.**

B. Filling the Answer Sheet :

5. On Side-1 of Answer Sheet write your Name and Roll Number in the respective boxes. Do not write anything on Side-2.

6. **Marking Scheme:**
a. If darkened bubble is RIGHT answer : 4 Marks.
b. If no bubble is darkened in any question: No Mark.
c. If darkened bubble is WRONG answer: –1 Mark (Minus One Mark).

7. Think wisely before darkening bubble as there is negative marking for wrong answer

PROCEDURE OF FILLING UP THE ANSWER IN ANSWER SHEET

Name of the candidate (In Capital Letters)

Roll Number

I have read all the instruction and shall abide by them.

.....

(Signature of the candidate)

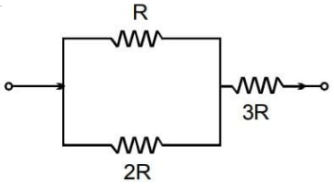
I have verified all the information filled in by the candidate.

.....

(Signature of the Invigilator)

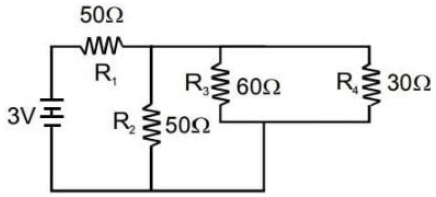
You can never quit. Winners never quit, and quitters never win.

1. The ratio of powers dissipated respectively in R and 3R, as shown is



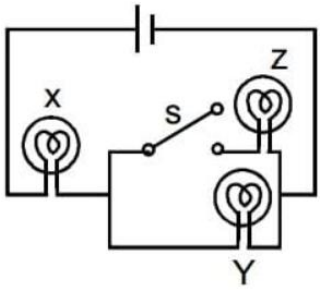
(a) 9 (b) 27/4
(c) 4/9 (d) 4/27

2. In the circuit shown, the resistances are given in ohms and the battery is assumed ideal with emf equal to 3.0 volts. The resistor that dissipates the most power is



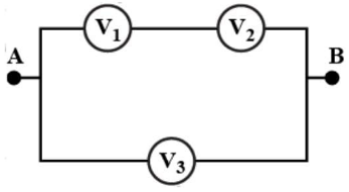
(a) R_1 (b) R_2
(c) R_3 (d) R_4

3. If X, Y and Z in figure are identical lamps, which of the following changes to the brightnesses of the lamps occur when switch S is closed?



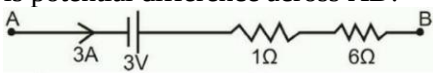
(a) X stays the same, Y decreases
(b) X increases, Y decreases
(c) X increases, Y stays the same
(d) X decreases, Y increases

4. Three voltmeters all having different resistances are joined as shown. When some potential difference is applied across A and B, then readings in voltmeter are V_1, V_2 and V_3.



(a) $V_1 = V_2$ (b) $V_1 < V_2$
(c) $V_1 + V_2 = V_3$ (d) $V_1 + V_2 > V_3$

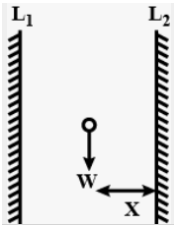
5. What is potential difference across AB?



(a) 24 V (b) 0 V
(c) 6 V (d) 18 V

6. A concave mirror cannot form
(a) virtual image of virtual object
(b) virtual image of real object
(c) real image of real object
(d) real image of virtual object

7. Two plane mirrors L_1 and L_2 are parallel to each other and 3 m apart. A person standing x m from the right mirror L_2 looks into this mirror and sees a series of images. The distance between the first and second image is 4m. Then the value of x is



(a) 2 m (b) 1.5 m
(c) 1 m (d) 2.5 m

8. An endoscope is employed by a physician to view the internal parts of body organ. It is based on the principle of
(a) refraction
(b) reflection
(c) total internal reflection
(d) dispersion

9. A plane glass slab is placed over various coloured letters. The letter which appears to be raised the least is
(a) violet (b) yellow
(c) red (d) green

10. The refractive index of water is 4/3. The speed of light in water is
(a) 1.50×10^8 m/s (b) 1.78×10^8 m/s
(c) 2.25×10^8 m/s (d) 2.67×10^8 m/s

11. Which is acidic in nature-
(a) SO_2 (b) SO_3
(c) CO_2 (d) All of the above

12. 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

13. When two mole of lead nitrate is heated then:
(a) 4 moles of NO_2 gas are produced
(b) 1 moles of O_2 gas produced
(c) both (a) and (b)
(d) 2 moles of NO_2 gas are produced

14. $aK_2Cr_2O_7 + bKCl + cH_2SO_4 \rightarrow xCrO_2Cl_2 + yKHSO_4 + ZH_2O$. The above equation balances when
(a) a = 2, b = 4, c = 6 and x = 2, y = 6, z = 3
(b) a = 4, b = 2, c = 6 and x = 6, y = 2, z = 3
(c) a = 1, b = 4, c = 2 and x = 2, y = 6, z = 3
(d) a = 1, b = 4, c = 6 and x = 2, y = 6, z = 3

15. The oxidizing agent and reducting agent in the given reaction respectively are:
$SnCl_2 + HgCl_2 \rightarrow SnCl_4 + Hg_2Cl_2$
(a) $SnCl_2$ and $HgCl_2$ (b) $HgCl_2$ and $SnCl_2$
(c) $SnCl_4$ and Hg_2Cl_2 (d) $HgCl_2$ and $SnCl_4$

16. NH_3 is not a base according to:
(a) Bronsted – Lowry theory
(b) Lewis theory
(c) Arrhenius theory
(d) All the theories

17. The Basicity of H_3BO_3 respectively is:
(a) 1 (b) 2
(c) 3 (d) 4

18. Which of the following oxides of iron would be obtained on the prolonged reaction of iron with steam?
(a) FeO (b) Fe_2O_3
(c) Fe_3O_4 (d) Fe_2O_3 and Fe_3O_4

19. Which of the following metal oxide contains metal in two different valencies?
(a) Al_2O_3 (b) Fe_3O_4
(c) MnO_2 (d) PbO_2

20. In stainless steel alloy, iron metal is mixed with:
(a) Cu and Cr (b) Cr and Ni
(c) Cr and Sn (d) Cu and Ni

21. Double fertilization is
(a) fusion of two male gametes with egg
(b) fusion of one male gamete with egg and the other male gamete with the polar bodies
(c) both are correct
(d) both are incorrect

22. In a given food chain if frog has 100 J of energy then the energy available with plants and snake respectively will be;
$\text{Plants} \rightarrow \text{Insect} \rightarrow \text{Frog} \rightarrow \text{Snake}$
(a) 1000 J and 10 J (b) 10000 J and 10 J
(c) 10 J and 1000 J (d) 1000 J and 100 J

23. Plants can get along without respiratory organs because of the following except
(a) Each plant part takes care of its own gas exchange needs
(b) Plants do not present great demands for gas exchange
(c) Gas diffusion in plants occurs easily over long distances in plants
(d) Each living cell in a plant is located quite close to the surface of the plant

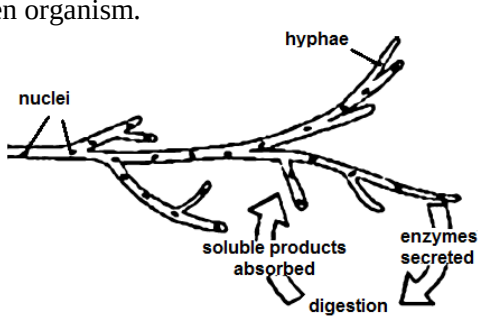
24. Nitrogenous wastes excreted through urine in humans is
(a) Trimethylamine oxide
(b) Ammonia
(c) Uric Acid
(d) Urea

25. Waste product produced during respiration in plant:
(a) CO_2 (b) Water
(c) Oxygen (d) (a) and (b)

26. Factors affecting transpiration rate are
(a) Wind
(b) Temperature
(c) Atmospheric humidity
(d) All (a), (b) & (c) are correct

27. Controls puberty in males by
(a) Luteinizing hormone (LH)
(b) Testosterone hormone
(c) Insulin
(d) Estrogen hormone

28. Identify the given image and select the correct option which indicates the mode of nutrition used by the given organism.



(a) parasitic nutrition
(b) Autotrophic nutrition
(c) Saprotrophic nutrition
(d) Symbiotic nutrition

29. Blood from superior vena cava flows into
(a) right atrium (b) right ventricle
(c) left atrium (d) left ventricle

30. "Peristalsis" helps in movement of food between which 2 organs?
(a) From large intestine to rectum
(b) From Oesophagus to stomach
(c) From large intestine to small intestine
(d) From small intestine to large intestine

[Mathematics]

31. If x, y are rational numbers such that
$(x+y)+(x-2y)\sqrt{2}=2x-y+(x-y-1)\sqrt{5}$ then
(a) $x=1, y=1$
(b) $x=2, y=1$
(c) $x=5, y=1$
(d) x and y can take infinitely many values

32. The number of real roots of the equation
$(x-1)^2+(x-2)^2+(x-3)^2=0$ is
(a) 0 (b) 1
(c) 2 (d) 3

33. Let $x_1=97, x_2=\frac{2}{x_1}, x_3=\frac{3}{x_2}, x_4=\frac{4}{x_3}....,x_8=\frac{8}{x_7}$ then
$\frac{8}{\underset{i=1}{\Lambda}} x_i - 60 = ?$ where $\frac{n}{\underset{i=1}{\Lambda}} x_i = x_1x_2x_3....x_n$
(a) 320 (b) 316
(c) 324 (d) none of these

34. Find value of
$$\frac{1}{3\sqrt{2}}\sqrt{4-\frac{1}{3\sqrt{2}}\sqrt{4-\frac{1}{3\sqrt{2}}\sqrt{4-\frac{1}{3\sqrt{2}}.....\infty}}}$$
(a) $\frac{4}{7}$ (b) $\frac{4}{9}$
(c) $\frac{3}{8}$ (d) $\frac{3}{4}$

35. If the expression $x^2-11x+a$ and $x^2-14x+2a$ must have a common factor and $a\neq 0$, then the common factor is
(a) $x-3$ (b) $x-6$
(c) $x-8$ (d) none of these

36. If α,β are roots of $x^2-p(x+1)-c=0$ then $\frac{\alpha^2+2\alpha+1}{\alpha^2+2\alpha+c}+\frac{\beta^2+2\beta+1}{\beta^2+2\beta+c}$ is equal to
(a) 0 (b) 1
(c) 2 (d) none of these

37. If α,β be the roots $x^2+px-q=0$ and γ,δ be the roots of $x^2+px+r=0$ then $\frac{(\alpha-\gamma)(\alpha-\delta)}{(\beta-\gamma)(\beta-\delta)}=$
(a) 1 (b) q
(c) r (d) $q+r$

38. $\sqrt{2x+7}+\sqrt{3x-18}=\sqrt{7x+1}$ solve for x
(a) 7 (b) 9
(c) $\frac{-18}{5}$ (d) both (b) & (c)

39. The first, second and middle terms of an AP are a, b, c respectively. Their sum is
(a) $\frac{2(c-a)}{b-a}$ (b) $\frac{2c(c-a)}{b-a}+c$
(c) $\frac{2c(b-a)}{c-a}$ (d) $\frac{2b(c-a)}{b-a}$

40. The interior angles of a polygon are in arithmetic progression. The smallest angle is 120^o and common difference is 5^o find number of sides of polygon.
(a) 9 (b) 10
(c) 11 (d) 12

41. If $(1,-6),(2,-4)$ and (a,b) are collinear then find the relation between a and b.
(a) $3a-b=8$ (b) $2a-b=8$
(c) $a+b=4$ (d) none of these

42. If (5, 0) and (– 5, 0) are the two vertices of an equilateral triangle, then find its third vertex.
(a) $(0,5\sqrt{3})$ (b) $(0,-5\sqrt{3})$
(c) $(0,3)$ (d) both (a) & (b)

43. If A, B and C are the interior angles of ΔABC then $\sin\left(\frac{B+C}{2}\right)=$
(a) $\sin\left(\frac{A}{2}\right)$ (b) $\cos\left(\frac{A}{2}\right)$
(c) $\sin\left(\frac{C}{2}\right)$ (d) none of these

44. If $\sin^2\theta+\sin\theta=1$, then find value of $\cos^6\theta+\cos^4\theta+\cos^2\theta$
(a) $\sin\theta$ (b) $3\sin\theta$
(c) $2\sin\theta$ (d) none

45. If $\sin\theta+\tan\theta=P$, then $\sin\theta+\cos\theta=$
(a) $\frac{P^2+2P-1}{P^2+1}$ (b) $\frac{P^2-2P+1}{P^2+1}$
(c) $\frac{P^2+2P-1}{P^2-1}$ (d) $\frac{P^2-2P-1}{P^2-1}$

46. The ratio of the incomes of two persons is 4 : 3 and their expenses in 17 : 12. If each of them saves Rs. 12000, find their monthly incomes
(a) 80,000, 60,000 (b) 70,000 and 50,000
(c) 30,000, 40,000 (d) none of these

47. The sum of a two digit number and the number obtained by reversing the order of its digit is 66 and the two digits differ by 2. Find the number
(a) 42 (b) 24
(c) 36 (d) both (a) & (b)

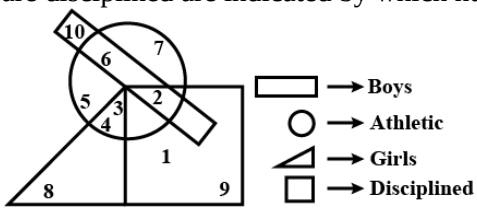
48. Sides of a triangle are in the ratio of $\sqrt{2}:1:1$ find the largest angle of triangle
(a) 90^o (b) 120^o
(c) 80 (d) none of these

49. A peacock sitting on the top of a tree observes a serpent in the ground making an angle of depression 30^o. If the peacock with a speed of 300 m per minute catches the serpent in 12 seconds then the height of the tree is:
(a) 30m (b) $30\sqrt{3}$ m
(c) $\frac{30}{\sqrt{3}}$ m (d) 15 m

50. ABC is a right angled triangle, right angled at B. If D and E are points on side AB such that AD = DE = EB, then the value of $\frac{AC^2-EC^2}{DC^2-BC^2}$ is
(a) $\frac{3}{1}$ (b) $\frac{5}{2}$
(c) $\frac{9}{4}$ (d) $\frac{2}{1}$

51. Choose the letters which will replace the question mark (?)
BEGK : ADFJ : : PSVY : ?
(a) ROUK (b) ORUX
(c) LQUT (d) LOQT

52. In the following diagram the boys who are athletic and are disciplined are indicated by which number?

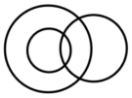
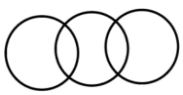


(a) 1 (b) 2
(c) 10 (d) 6

53. The following questions, a number series is given with one of the terms missing. Choose the correct alternative that will continue the same pattern and replace the question mark (?).
$7\frac{1}{7}, 8\frac{2}{6}, 9\frac{5}{5}, 12\frac{2}{4}, 16\frac{2}{3}, ?$
(a) $15\frac{2}{4}$ (b) $16\frac{4}{4}$
(c) 35 (d) $\frac{50}{2}$

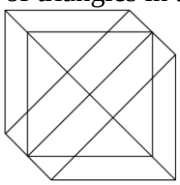
54. If DEMOCRATIC is written as EDMORCATCI, then how CONTINUOUS will be written in the same code?
(a) OCTINNIOUSU (b) OTCNINUOUS
(c) OCNTNIUOSU (d) OTNCINUOSU

55. Six persons are seated around a hexagonal table. Arup is seated opposite Belal, who is between Chirag and Deepak. Arup is between Ela and Farook. Ela is to the left of Deepak. Which of the following pairs is facing each other?
(a) Ela and Farook (b) Deepak and Ela
(c) Chirag and Ela (d) Chirag and Deepak

56. Identify the diagram that best represents the relationship among the given classes.
Males, Doctors, Brothers
(a)  (b) 
(c)  (d) 

57. Take the given statements as true and decide which of the conclusions logically follow from the statements.
Statements:
All frogs are snakes
Some snakes are birds
All birds are apples
Conclusions:
I. Some apples are frogs
II. No apple is a frog
III. Some snakes are apples
IV. All birds are snakes
(a) Either I or II; and III follows
(b) III and IV follows
(c) Either I or II follows
(d) Either I or II; and IV follows

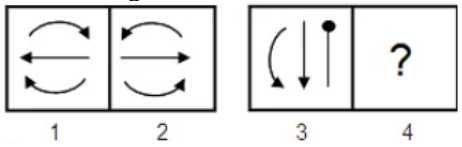
58. Find the number of triangles in the given figure.



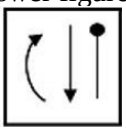
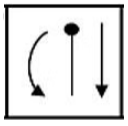
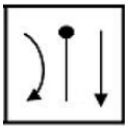
(a) 18 (b) 20
(c) 24 (d) 27

59. The second figure of the problem figures bears a certain relationship to the first figure. Similarly, one of the figures in the answer figures bears the same relationship to the third figure. You have to select the figure from the set of answer figures which would replace the sign of the question mark (?).

Problem figures

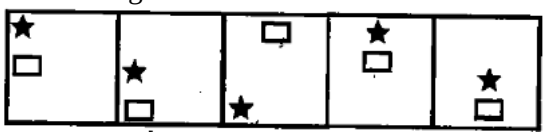


Answer figures

(a)  (b) 
(c)  (d) 

60. Select a figure from amongst the answer figures which will continue the same series as established by the five problem figures.

Problem figures



Answer figures

(a)  (b) 
(c)  (d) 

[For Rough Work]

[For Rough Work]

[For Rough Work]