Talent Search Exam. 2022

for class X

TEST CODE **1000**

BOOKLET **B**

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

Please read the instructions carefully. You are alloted 5 minutes specifically for this purpose.

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 ANSWERS IN ANSWER SHEET

Avoid Improper Marking			Proper Marking
Partially Filled	Lightly Filled	Tick-Cross Marked	Fully darken

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.

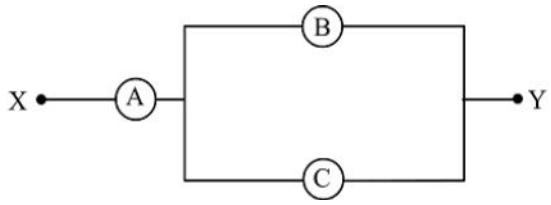
.....

(Signature of the Invigilator)

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

[PHYSICS]

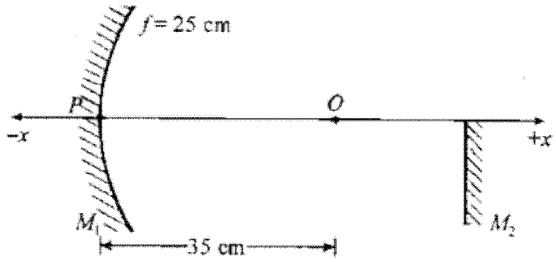
1. A, B and C are voltmeters of resistances R, 1.5 R and 3 R respectively. When some potential difference is applied between x and y, the voltmeter readings are V_A, V_B and V_C, then



(a) $V_A = V_B = V_C$ (b) $V_A \neq V_B = V_C$

(c) $V_A = V_B \neq V_C$ (d) $V_A + V_B = V_C$

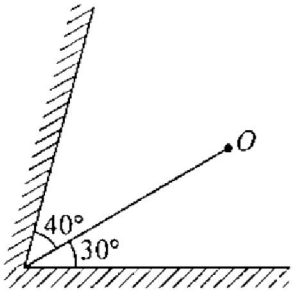
2. In figure shown find the distance from pole P of the concave mirror shown in figure, at which when a plane mirror is placed, image produced by both mirror for the object O will coincide.



(a) 61.25 cm (b) 62.25 cm

(c) 60.25 cm (d) 63.25 cm

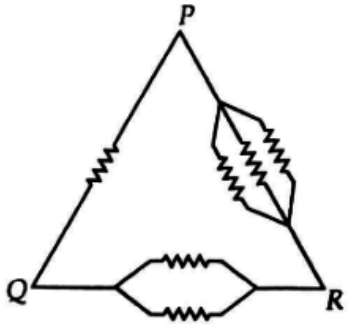
3. Two plane mirrors are inclined at an angle of 75° to each other. Find the total number of images formed when an object is placed as shown in figure.



(a) 2 (b) 4

(c) 3 (d) 1

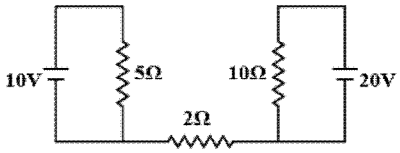
4. Six equal resistances are connected between points P, Q and R as shown in the figure. Then, the net resistance will be maximum between



(a) P and Q (b) Q and R

(c) P and R (d) Any two points

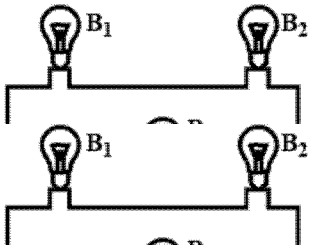
5. Find out the value of current through 2Ω resistance for the given circuit.



(a) 5A (b) 2A

(c) Zero (d) 4 A

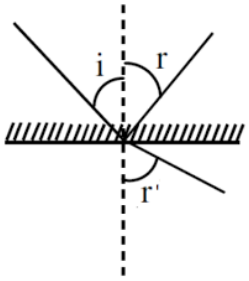
6. A 100 W bulb B_1, and two 60 W bulbs B_2 and B_3, are connected to a 250 V source, as shown in the figure. Now W_1, W_2 and W_3 are the output powers of the bulbs B_1, B_2 and B_3 respectively. Then,



(a) $W_1 > W_2 = W_3$ (b) $W_1 > W_2 > W_3$

(c) $W_1 < W_2 = W_3$ (d) $W_1 < W_2 < W_3$

7. A ray of light from a denser medium strikes a rarer medium at an angle of incidence i (see figure). The reflected and refracted rays make an angle of 90° with each other. The angles of reflection and refraction are r and r'. The critical angle is



(a) $\sin^{-1}(\tan r)$ (b) $\sin^{-1}(\cot i)$

(c) $\sin^{-1}(\tan r')$ (d) $\tan^{-1}(\sin i)$

8. Angle of deviation (δ) by a prism (refractive index = [illegible] and supposing the angle of prism A to be small) can be given by

(a) $\delta = (\mu - 1)A$ (b) $\delta = (\mu + 1)A$

(c) $\delta = \dfrac{\sin\dfrac{A+\delta}{2}}{\sin\dfrac{A}{2}}$ (d) $\delta = \dfrac{[illegible]-1}{[illegible]+1}A$

9. Match the corresponding entries of column-I with column-II (where m is the magnification produced by the mirror):

	Column-I		**Column-II**
(P)	m = –2	(A)	Convex mirror
(Q)	$m = -\frac{1}{2}$	(B)	Concave mirror
(R)	m = +2	(C)	Real image
(S)	$m = +\frac{1}{2}$	(D)	Virtual image

(a) P → B and C, Q → B and C, R → B and D, S → A and D

(b) P → A and C, Q → A and D, R → A and B, S → C and D

(c) P → A and D, Q → B and C, R → B and D, S → B and C

(d) P → C and D, Q → B and D, R → B and C, S → A and D

10. An electromagnetic radiation of frequency n, wavelength λ, traveling with velocity v in air enters in a glass slab of refractive index ([illegible]). The frequency, wavelength and velocity of light in the glass slab will be respectively

(a) $n, \frac{\lambda}{[illegible]}$ and $\frac{v}{[illegible]}$ (b) $n, 2\lambda$ and $\frac{v}{[illegible]}$

(c) $\frac{n}{[illegible]}, \frac{\lambda}{[illegible]}$ and $\frac{v}{[illegible]}$

(d) $\frac{2\pi}{[illegible]}, \frac{\lambda}{[illegible]}$ and v

[CHEMISTRY]

11. A sample of aqueous $CuSO_4$ was divided into two equal parts. Through one of these, H_2S gas was passed and through the other a small amount of dilute NH_3 solution was added. The colour of the precipitates formed in these two cases will be respectively

(a) Black and Brown

(b) White and Black

(c) Brown and Black

(d) Black and Blue

12. Which of the following reaction is not a redox reaction?

(a) $Mg + Cl_2 \longrightarrow MgCl_2$

(b) $CuO + H_2 \longrightarrow Cu + H_2O$

(c) $AgNO_3 + NaCl \longrightarrow AgCl + NaNO_3$

(d) $MnO_2 + 4HCl \longrightarrow MnCl_2 + 2H_2O + 2Cl_2$

13. Choose the correct statements about the given chemical reaction:

$3MnO_2(s) + 4Al(s) \longrightarrow 3Mn(l) + 2Al_2O_3 + Heat$

A. Reaction is exothermic

B. Al is acting as oxidizing agent

C. MnO_2 is getting reduced

D. Al is more reactive than Mn

(a) A, C and D (b) A, B and C

(c) A, B and D (d) A, B, C and D

14. The reaction that differs from the rest of the reactions given is:

(a) Formation of calcium oxide from limestone

(b) Formation of aluminium from aluminium oxide

(c) Formation of sodium carbonate from sodium hydrogen carbonate

(d) Formation of mercury from mercuric oxide

15. Calculate the mass of calcium carbonate needed to react with 8000 kg of sulphur dioxide.

(a) 22500 kg (b) 6400 kg

(c) 12500 kg (d) 8000 kg

16. The substance A reacts with another substance B to produce the product C and a gas D. If a mixture of the gas D and ammonia is passed through an aqueous solution of C, baking soda is formed. The substances A, B and C are:
    (a) NaCl, NaOH and HCl
    (b) HCl, Na_2CO_3 and NaCl
    (c) Na, HCl and Na_2CO_3
    (d) Na_2CO_3, H_2O and NaOH
17. Which one of the following is amphiprotic in nature?
    (a) F^- (b) HPO_4^{2-}
    (c) PO_4^{3-} (d) Cl^-
18. The pH of solution obtained by dissolving 5×10^{-4} moles of $Ca(OH)_2$ (strong electrolyte) to 100 mL of solution at 298 K will be
    (a) 11 (b) 12
    (c) 9.8 (d) 2
19. The density (g/mL) of a 3.60 M sulphuric acid solution that is 29% H_2SO_4 (Molar mass = 98 g mol^{-1}) by mass will be:
    (a) 1.45 (b) 1.64
    (c) 1.88 (d) 1.22
20. Balance the chemical equation
    $MnO_2 + NaCl + H_2SO_4 \longrightarrow MnSO_4 + NaHSO_4 + Cl_2 + H_2O$
    (a) 1, 2, 3, 1, 2, 1, 2 (b) 2, 2, 1, 3, 2, 1, 2
    (c) 1, 3, 2, 2, 1, 2, 1
    (d) 1, 2, 3, 2, 1, 2, 2

[BIOLOGY]

21. Choose the function of pancreatic juice from the following:
    (a) Trypsin digests proteins and lipase digests carbohydrates
    (b) Trypsin digests emulsified fats and lipase digests proteins
    (c) Trypsin and lipase digest fats
    (d) Trypsin digests proteins and lipase digests emulsified fats
22. What prevents back flow of blood during contraction?
    (a) Valves in heart
    (b) Thick muscular walls of ventricles
    (c) Thin walls of atria
    (d) All of these
23. Where are proteins first digested?
    (a) Small intestine (b) Stomach
    (c) Large intestine (d) Mouth
24. Acetylcholine is a neurotransmitter that provides for communication between muscles and nerves. When there is a problem with the interaction between acetylcholine and the acetylcholine receptor sites on the muscles, which condition(s) can occur?
    (a) Myasthenia gravis (b) Botulism
    (c) Multiple sclerosis (d) Both (a) and (b)
25. The leaf defoliator utilized in the Vietnam war by the USA known as “Agent Orange” was
    (a) 2, 4-D and 2, 4, 5-T
    (b) Ethylene
    (c) 2, 4-D and NAA
    (d) 2, 4, 5-T, ethylene and NAA
26. In human the life process is regulated and controlled by _____.
    (a) Reproductive and endocrine systems
    (b) Respiratory and Nervous systems
    (c) Endocrine and digestive systems
    (d) Nervous and endocrine system
27. The term synergistic action of hormones refers to
    (a) When two hormones act together but bring about opposite effects
    (b) When two hormones act together and contribute to the same function
    (c) When one hormone affect more than one function
    (d) When many hormones bring about any one function
28. The substance that triggers the fall of mature leaves and fruits from plants is _____.
    (a) Auxin (b) Gibberellin
    (c) Abscisic acid (d) Cytokinin

29. The growth of tendrils in pea plant is due to _____ .
    (a) Effect of gravity
    (b) Effect of chemicals
    (c) Rapid cell divisions in tendriller cells that are away from support
    (d) Rapid cell division in tendriller cells in contact with the support

30. In which group of the organisms the food material is broken down outside the body?
    (a) Mushroom, green plants, amoeba
    (b) Yeast, mushroom, bread mould
    (c) Paramecium, amoeba, cuscuta
    (d) Cuscuta, lice, tapeworm

[MATHEMATICS]

31. Two bells toll in every 45 seconds and 60 seconds. If they toll together at 8:00 am, then which of the following is the probable time at which they can toll together?
    (a) 8:55 am (b) 8:50 am
    (c) 8:45 am (d) 8:40 am

32. Choose the correct value of
$\frac{1}{\sqrt{9}+\sqrt{10}}+\frac{1}{\sqrt{10}+\sqrt{11}}+\frac{1}{\sqrt{11}+\sqrt{12}}+\ldots..$ up to 91 terms from the following options:
    (a) 7 (b) 8
    (c) 6 (d) 9

33. If the LCM of f(x) and g(x) is $a^6 - b^6$, then their HCF can be _____.
    (a) $a - b$ (b) $a^2 + ab + b^2$
    (c) $a^2 - ab + b^2$ (d) All of these

34. The product of additive inverse and multiplicative inverse of $\frac{x-2}{x^2-4}$ is _____.
    (a) $x^2 + 4x + 4$ (b) $x^2 - 4x + 4$
    (c) $x^2 - 6x + 9$ (d) None of these

35. An examination consists of 100 questions. Two marks are awarded for every correct option. If one mark is deducted for every wrong option and half mark is deducted for every question left, then a person scores 135. Instead, if half mark is deducted for every wrong option and one mark is deducted for every question left, then the person scores 133. Find the number of questions left unattempted by the person.
    (a) 14 (b) 16
    (c) 10 (d) 12

36. A hybrid mango tree, whose life span is 10 years, starts giving fruits from the first year onwards. In the *n*th year it produces 11*n* raw mangoes. But during the first half of the tree's life, every year, a certain number, which is constant, fail to ripen into fruits. During the second half of the tree's life, every year, the number of raw fruits that fail to ripen is half the corresponding number in the first half of the tree's life. In the fourth years of the tree's life, it produces 36 ripe mangoes. How many mangoes ripen during the 9^{th} years of the tree's life?
    (a) 100 (b) 96
    (c) 95 (d) 86

37. $(x^2 + 1)^2 - x^2 = 0$ has
    (a) Four real roots (b) Two real roots
    (c) No real roots (d) One real roots

38. Rohan and Sohan were attempting to solve the quadratic equation, $x^2 - ax + b = 0$. Rohan copied the coefficient of x wrongly and obtained the roots as 4 and 12. Sohan copied the constant term wrongly and obtained the roots as –19 and 3. Find the correct roots.
    (a) –2 and –24 (b) 2 and 24
    (c) 4 and 12 (d) –4 and –12

39. S_{10} is the sum of the first 10 terms of a GP and S_5 is the sum of the first 5 terms of the same GP. If $\frac{S_{10}}{S_5} = 244$, then find the common ratio.
    (a) 3 (b) 4
    (c) 5 (d) 2

40. If the sum of 16 terms of an AP is 1624 and the first term is 500 times the common difference, then find the common difference.
    (a) 5 (b) $\frac{1}{2}$
    (c) $\frac{1}{5}$ (d) 2

41. If cotA = $\frac{5}{12}$ and A is not in the first quadrant, then $\frac{\sin A - \cos A}{1+\cot A}$ is _____.

(a) $\frac{-74}{25}$ (b) $\frac{-84}{221}$

(c) $\frac{-87}{223}$ (d) None of these

42. If $\cos 9\alpha = \sin\alpha$ and $9\alpha < 90^\circ$, then the value of $\tan 5\alpha$ is

(a) $\frac{1}{\sqrt{3}}$ (b) $\sqrt{3}$

(c) 1 (d) 0

43. $\sqrt{-4+\sqrt{8+16\,\text{cosec}^4\alpha+\sin^4\alpha}}$ = _____.

(a) $\text{cosec}\,\alpha - \sin\alpha$

(b) $\sin\alpha - 2\text{cosec}\,\alpha$

(c) $2\text{cosec}\,\alpha - \sin\alpha$

(d) $\text{cosec}\,\alpha - 2\sin\alpha$

44. $\sin^2 2^\circ + \sin^2 4^\circ + \sin^2 6^\circ + \ldots\ldots + \sin^2 90^\circ$ = _____.

(a) 22 (b) 23

(c) 44 (d) 45

45. Find the ortho-centre of the triangle formed by the lines 3x – 4y = 10, 8x + 6y = 15 and Y-axis.

(a) $\left(\frac{3}{5},\frac{7}{5}\right)$ (b) $\left(\frac{12}{5},\frac{-7}{10}\right)$

(c) $\left(\frac{3}{5},\frac{12}{5}\right)$ (d) $\left(\frac{12}{5},\frac{-3}{10}\right)$

46. Find the equation of a line which divides the line segment joining the points (1, –2) and (3, –1) in the ratio 3 : 1 perpendicularly?

(a) x – 2y – 5 = 0 (b) 6x + 4y – 5 = 0

(c) 3x + 2y – 5 = 0 (d) 8x + 4y – 15 = 0

47. In what ratio does the line 4x + 3y – 13 = 0 divide the line segment joining the points (2, 1) and (1, 4)?

(a) 3 : 2 internally (b) 2 : 3 externally

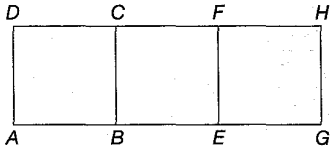
(c) 2 : 3 internally (d) 3 : 2 externally

48. From a point on the ground, the angle of elevation of an aeroplane flying at an altitude of 500 m changes from 45° to 30° in 5 seconds. Find the speed of the aeroplane (in kmph).

(a) $720\left(\sqrt{3}-1\right)$ (b) $720\left(\sqrt{3}+1\right)$

(c) $360\left(\sqrt{3}-1\right)$ (d) $360\left(\sqrt{3}+1\right)$

49. In the figure given below (not to scale), ABCD, BEFC and EGHF are three squares. Find $\angle FAE + \angle HAG$.



(a) 30° (b) 45°

(c) 60° (d) 90°

50. The following sentences are the steps involved in proving the result $\frac{\cos x}{1-\tan x}+\frac{\sin x}{1-\cot x}$ = cos x + sin x.

Arrange them in sequential order from first to last.

(i) $\frac{\cos^2 x}{\cos x - \sin x}+\frac{\sin^2 x}{\sin x - \cos x}$

(ii) $\frac{\cos^2 x - \sin^2 x}{\cos x - \sin x}$

(iii) $\frac{\cos x}{1-\frac{\sin x}{\cos x}}\;\;\frac{\sin x}{1-\frac{\cos x}{\sin x}}$

(a) (i), (ii) and (iii)

(b) (iii), (i) and (ii)

(c) (iii), (ii) and (i)

(d) None of these

[MAT]

Direction (Q. 51)

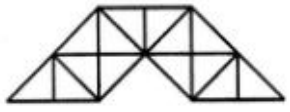
Write which number is sequence replaces the question mark (?)

51. 6, 15, 35, 77, 143, ?

(a) 222 (b) 287

(c) 221 (d) 225

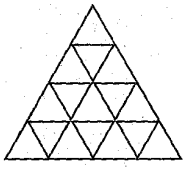
52. Find the number of triangles in the given figure.



(a) 23 (b) 27

(c) 29 (d) 31

53. Count the number of triangle in the given figure.



(a) 27 (b) 28

(c) 29 (d) 30

Direction (Q. 54)

In this type of coding, we deal with questions, in which the letters of a word are replaced by certain other letters or numbers according to a specific pattern/rule to form a code. You are required to detect the coding pattern/rule and answer the question(s) that are asked, based on that coding pattern/rule.

54. If in a certain code

'INTELLIGENCE' is written as

'ETNIGILLECNE'. Then how can

'MATHEMATICAL' be written in the same code?

(a) AMHTMETACILA

(b) TAMMEHITALAC

(c) HTAMTAMELACI

(d) LACITAMEHTAM

Direction (Q. 55)

In the following question, three/four out of the four/five alternatives are same in a certain way and so form a group. Find the odd one that does not belong to the group.

55. (a) Foal (b) Hen

(c) Lamb (d) Leveret

Direction (Q. 56)

In each of the following question, a letter series is given. Some of the letters of the series are missing. This missing letters are given in same order as one of the four/five alternatives below the series. Find out the correct alternative.

56. aa_aabb_b_aa_aabb_bb

(a) bbbaa (b) bbbba

(c) aabbb (d) babba

Direction (Q. 57)

Find the missing character in each of the following question.

57.

96	100	132
6	4	6
5	7	3
21	32	?

(a) 25 (b) 30

(c) 32 (d) 20

58. Pointing to a photograph, X said to his friend Y, "She is the only daughter of the father of my mother". How X is related to the person of photograph?

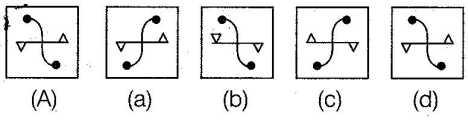
(a) Daughter (b) Son

(c) Nephew (d) Can not be decide

Direction (Q. 59)

In each of the following question, a figure marked (A) is followed by four other figures (a), (b), (c) and (d) showing the possible water images of figure (A). Choose the correct water image of the figure (A) out of given four alternatives.

59.



Direction (Q. 60)

In this question, two/three statement followed by two conclusion are given. You have to take the give statements to be true even if they seem to be at variance from commonly known facts and then decide, which of the given conclusions logically follows disregarding commonly known facts.

60. **Statements**

All copies are book.

No book is a pencil.

All pencils are rubbers.

Conclusions

I. No rubber is a book.

II. Some copies are rubbers.

(a) If only conclusion I follows

(b) If only conclusion II follows

(c) If both conclusion I and II follows

(d) If none of the conclusion follows

For Rough Work