

A. General Instructions

1. Attempt ALL the questions. Answers have to be marked on the OMR sheets.
2. Time allowed to attempt this paper is **1 hour**.
3. This question paper contains **3 Sections**.
4. **Section- A** MAT (Mental Ability Test)
Section- B (Mathematics)
Section- C (Science) contains **3 Parts**
 - a) **Part-I** is Physics
 - b) **Part-II** is Chemistry
 - c) **Part-III** is Biology
5. Rough spaces are provided for rough work inside the question paper. No additional sheets will be provided for rough work.
6. Blank Papers, clip boards, log tables, slide rule, calculator, cellular phones, pagers and electronic devices, in any form, are not allowed.

B. Filling of OMR Sheet

1. Ensure matching of OMR sheet with the Question paper before you start marking your answers on OMR sheet.
2. On the OMR sheet, darken the appropriate bubble with black pen for each character of your Enrolment No. and write your Name, Test Centre and other details at the designated places.

C. Marking Scheme for All Three Sections.

- (i) **Section-A (01 to 10)** contains 10 multiple choice questions of **MAT** which have only one correct answer. Each question carries **+4 marks** for correct answer and **-1 mark** for wrong answer.
- (ii) **Section-B (11 to 30)** contains 20 multiple choice questions of **Mathematics** which have only one correct answer. Each question carries **+4 marks** for correct answer and **-1 mark** for wrong answer.
- (iii) **Section-C (31 to 60)** contains 30 multiple choice questions of **Science** which have only one correct answer. Each question carries **+4 marks** for correct answer and **-1 mark** for wrong answer.

Roll No:

Name:

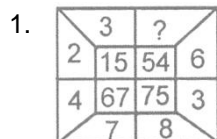
Batch:

Section – A

PART-I

MENTAL ABILITY TEST (MAT)

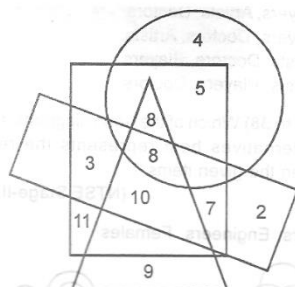
This part contains 25 questions. Each question has 4 choices (A), (B), (C) and (D) for its answer, out of which **ONLY ONE** is correct.



- (A) 4 (B) 5 (C) 6 (D) 7
2. Choose a number which is similar to the numbers in the set: 992, 733, 845
 (A) 114 (B) 326 (C) 425 (D) 947

Instructions for questions from 3-5

In the Venn diagram given below in which the triangle stands for lady, the rectangle stands for doctors, the circle stands for teachers and the square stands for engineers. Find out the correct answer of each question from the alternatives given under it.



3. How many persons are engineers as well as do teaching job?
 (A) 5 (B) 8 (C) 13 (D) 7
4. The numbers of lady doctors who are engineers but teach children of the village are -
 (A) 7 (B) 8 (C) 10 (D) 15
5. The numbers of gents teachers who are neither doctors nor engineers are -
 (A) 12 (B) 9 (C) 5 (D) 4
6. How many times are the hands of a clocks perpendicular in a day?
 (A) 42 (B) 48 (C) 44 (D) 46

Space for Rough Work

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A cube is painted red on two adjacent surfaces and black on the surfaces opposite to red surfaces and green on the remaining faces. Now the cube is cut into sixty four smaller cubes of equal size.

7. How many smaller cubes will have no surface painted?
(A) 0 (B) 4 (C) 8 (D) 16
8. How many smaller cubes have less than three surfaces painted?
(A) 8 (B) 24 (C) 28 (D) 48
9. How many smaller cubes have three surfaces painted?
(A) 4 (B) 8 (C) 16 (D) 24
10. Numbers from 1 to 6 are marked on different faces of the "Dice". The number opposite to 4 is:



(A) 1

(B) 2

(C) 5

(D) 6



Section-B

Mathematics

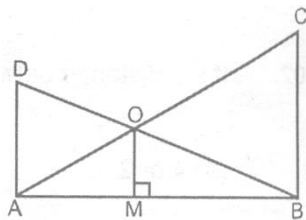
11. Value of $\frac{1}{1+\sqrt{2}} + \frac{1}{\sqrt{2}+\sqrt{3}} + \frac{1}{\sqrt{3}+\sqrt{4}} + \frac{1}{\sqrt{4}+\sqrt{5}} + \frac{1}{\sqrt{5}+\sqrt{6}} + \frac{1}{\sqrt{6}+\sqrt{7}} + \frac{1}{\sqrt{7}+\sqrt{8}} + \frac{1}{\sqrt{8}+\sqrt{9}}$
- (A) 2 (B) 3 (C) 4 (D) 5
12. What will be the last digit of $7^{23^{12^9}}$?
- (A) 7 (B) 9 (C) 1 (D) 3
13. If the places of last two digits of three digit number are interchanges, a new number greater then the original number by 27 is obtained. Find the difference between the last two digits of that number.
- (A) 6 (B) 3 (C) 8 (D) 9
14. A and B can do a job in 12 days; B and C can do it is 16 days. After A has worked for 5 days and B has worked for 7 days, C can finish the rest in 13 days. In how many days can C do the work alone?
- (A) 16 days (B) 24 days (C) 36 days (D) 48 days
15. Calculate the value of $2\left(\sqrt{3+\sqrt{3+\sqrt{3+\dots\infty}}}\right)$
- (A) $1+\sqrt{3}$ (B) $1-\sqrt{3}$ (C) Both of these (D) None of these
16. The area of a rectangle is given by $A = 8x^2 - 2x - 15$. if the length be larger that the breadth, it is -
- (A) $3x + 5$ (B) $5x + 3$ (C) $4x + 5$ (D) $2x + 3$
17. In a group of children, each child gives a gift to every other child. If the number of gifts is 240, find the number of children.
- (A) 15 (B) 16 (C) 20 (D) 24
18. 150 workers were engaged to finish a piece of work in a certain number of days. Four workers dropped the second day, four more workers dropped the third day and so on. It takes 8 more days to finish the work now, then the number of days in which the work was completed is
- (A) 15 (B) 20 (C) 25 (D) None of these
19. Value of m for which the point P (m, 6) divides the join of A (-4, 3) and B (2, 8) is
- (A) $-\frac{2}{5}$ (B) $\frac{2}{5}$ (C) -2 (D) None of these

Space for Rough Work

Pinnacle

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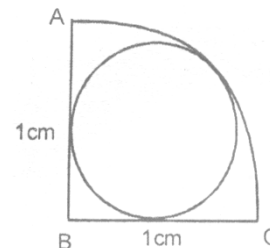
20. In the given figure $DA \perp AB$, $CB \perp AB$ and $OM \perp AB$. If $AP = 5.4$ cm, $OC = 7.2$ cm and $BO = 6$ cm, then the length of DO is :



- (A) 4.5 cm (B) 4 cm (C) 5 cm (D) 6.5 cm

21. If ABC is a quarter circle and a circle is inscribed in it and if $AB = 1$ cm, find radius of smaller circle.

- (A) $\sqrt{2} - 1$ (B) $(\sqrt{2} - 1)/2$ (C) $\sqrt{2} - 1/2$ (D) $1 - 2\sqrt{2}$

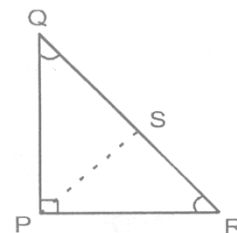


22. In the right-angled triangle QPR given below, PS is the altitude to the hypotenuse. The figure is followed by three possible inferences.

- I. Triangle PQS and Triangle RPS are similar.
- II. Triangle PSQ and Triangle RSP are congruent.
- III. Triangle PSQ and Triangle RPQ are similar.

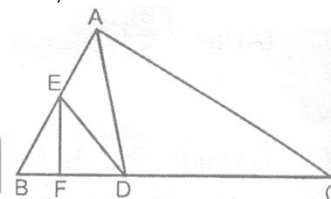
Mark the correct option

- (A) I and II are correct (B) I and III are correct
(C) only II is correct (D) All three are correct



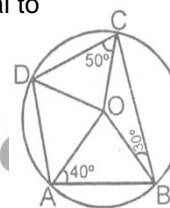
23. In the given figure $EF \parallel AD$ and $ED \parallel AC$. If $BF = 4$ cm, $FD = 6$ cm and $BE = 8$ cm, then $BC =$ _____

- (A) 12 cm (B) 15 cm
(C) 25 cm (D) none of these



24. $ABCD$ is cyclic quadrilateral inscribed in a circle with the centre O . Then $\angle OAD$ is equal to

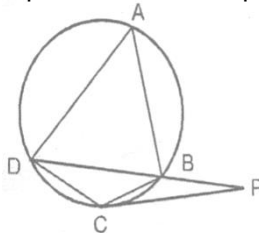
- (A) 30°
(B) 40°
(C) 50°
(D) 60°



Space for Rough Work

25. In the figure given below, PC is tangent to the circle from the point P and B is a point of the circle such that PB = CB. Find $\angle DCP$ if, $\angle DPC = 20^\circ$.

- (A) 120°
- (B) 140°
- (C) 120°
- (D) 100°

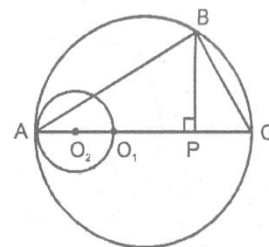


26. In the above diagram O_1 and O_2 are the centers of the circles 1 and 2 respectively and

O_1 lies on the smaller circle. Radius of the smaller circle is r . Given that $\frac{AB}{BC} = \frac{2}{1}$ and

$BP \perp AC$. Find the value of O_1P in terms of r .

- (A) $1.2r$
- (B) r
- (C) $0.8r$
- (D) Cannot be determined



27. A solid is in the form of a right circular cylinder with a hemisphere at one end and cone at the other end. Their common diameter is 4.5 cm and the height of the cylindrical and conical portions are respectively 1 cm and 8 cm. Taking $\pi = 3.14$. Find the cost of polishing the surface of the entire solid at the rate of Rs. 150 per cm^2 .

- (A) Rs. 38000
- (B) Rs. 39000
- (C) Rs. 39500
- (D) Rs. 38500.

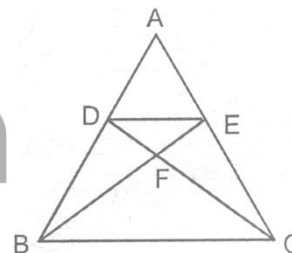
28. Find Value of $\sin^2 5^\circ + \sin^2 10^\circ + \sin^2 15^\circ + \dots + \sin^2 85^\circ + \sin^2 90^\circ$ is

- (A) 3
- (B) 9
- (C) $9\frac{1}{2}$
- (D) None of these

29. The mean of set of 20 measurements was calculated to be 56cm. But later it was found that a mistake had been in one of the measurement which was recorded as 64 cm, but should have been 61 cm. The correct mean will be

- (A) 53 cm
- (B) 54.5 cm
- (C) 55.85 cm
- (D) 56.15 cm

30. In the triangle ABC shown below DE is parallel to BC such that D divides AB in the ratio 1: 3



If the area of triangle ADE is 5 cm^2 . What is the area of the triangle EFC ?

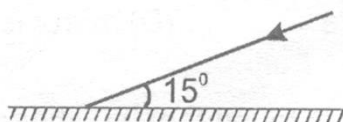
- (A) 12 cm^2
- (B) 14.4 cm^2
- (C) 15 cm^2
- (D) 20 cm^2

Space for Rough Work

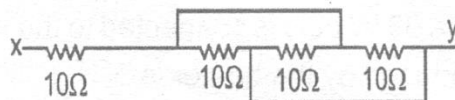
Section-C

Part-1
Physics

31. When a ray of light strikes a plane mirror at an angle of 15° with the mirror, what will be the angle through which the ray get deviated ?



- (A) 15° (B) 30° (C) 75° (D) none of these
32. A spherical mirror and spherical lens have each focal length of -10cm . The mirror and lens are:
 (A) both convex (B) both concave
 (C) mirror is convex and lens is concave (D) mirror is concave and lens is convex
33. Two lenses of powers $+6.0\text{ D}$ and -4.0 D are put in contact with each other. The power of the combination is :
 (A) $+2.0\text{ D}$ (B) -2.0 D (C) $+5.0\text{ D}$ (D) -5.0 D
34. A long sighted person has a minimum distance of distinct vision of 50 cm . He wants to reduce it to 25 cm . He should use a:
 (A) concave lens of focal length 25 cm . (B) concave lens of focal length 50 cm .
 (C) convex lens of focal length 25 cm . (D) convex lens of focal length 50 cm .
35. The smallest resistance that can be obtained from a combination of 'n' identical resistor each of resistance R is :
 (A) $\frac{R}{n}$ (B) $\frac{R}{n^2}$ (C) nR (D) n^2R
36. The equivalent resistance between x and y is :



- (A) $\frac{10}{3}\Omega$ (B) $\frac{40}{3}\Omega$ (C) $\frac{3}{10}\Omega$ (D) 10Ω
37. Two identical heater wires are first connected in series and then in parallel with a source of electricity. The ratio of heat produced in the two cases is:
 (A) $2 : 1$ (B) $1 : 2$ (C) $4 : 1$ (D) $1 : 4$
38. The direction of magnetic lines of force of a bar magnet is:
 (A) from south pole to north pole
 (B) from north pole to south pole
 (C) across the bar magnet
 (D) from south pole to north pole inside the magnet and from north pole to south pole outside the magnet.

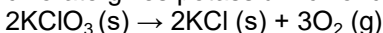
Space for Rough Work

39. A young son works quickly for two hours and prepares 16 items in a day. His old father works slowly for eight hours and prepares 24 items in a day:
 (A) son has more power (B) son has more energy
 (C) both have equal power (D) both have equal energy
40. A 150 m long train accelerates uniformly from rest. If the front of the train passes a railway worker 50 m away from the station at a speed of 25 m/s, what will be the speed of the back part of the train as it passes the worker?
 (A) 100 m/s (B) 20 m/s (C) 50 m/s (D) 12.5 m/s

Part-2 Chemistry

Comprehension for question 61-63

Oxygen is prepared by catalytic decomposition of potassium chlorate (KClO_3). Decomposition of potassium chlorate gives potassium chloride (KCl) and oxygen (O_2). The following reaction takes place :



41. Mark the correct statement
 (A) 2 moles of KClO_3 gives 3 moles of oxygen
 (B) 1 mole of KClO_3 gives 1 mole of oxygen
 (C) 3 moles of oxygen are formed by 1 mole of KClO_3
 (D) 200g of KClO_3 gives 300g of O_2
42. How many moles of KClO_3 are required to produce 2.4 moles of O_2
 (A) 2 (B) 3 (C) 1.6 (D) 1.5
43. How many grams of KClO_3 are required to produce 128g of O_2 : [Atomic mass of O-16u, K-39u, Cl-35.5u]
 (A) 196g (B) 200g (C) 122g (D) 327g

Comprehension for question 64-66

A neutral organic compound A of molecular formula $\text{C}_2\text{H}_6\text{O}$, on oxidation with potassium dichromate and sulphuric acid gives an acidic compound B. The compound A reacts with B on warming in presence of conc. H_2SO_4 to give a sweet smelling substance C. C on heating with D gives back A.

44. In the given reactions A is
 (A) $\text{CH}_3\text{CH}_2\text{OH}$ (B) CH_3COOH (C) $\text{CH}_3\text{COOC}_2\text{H}_5$ (D) CH_3OH
45. In the above sequence of reactions compound B is
 (A) Ethanol (B) Ethanoic acid (C) Ethyl ethanoate (D) Water
46. Compound C in the above reaction is
 (A) an alcohol (B) an ester (C) a hydrocarbon (D) hydrogen
47. Match the entries in Column A with the appropriate ones in Column B.

Column A		Column B	
A.	Photolysis	1	$\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$
B.	Electrolysis	2	$2\text{H}_2\text{O} \rightarrow 2\text{H}_2 + \text{O}_2$
C.	Double decomposition	3	$2\text{AgBr} \rightarrow 2\text{Ag} + \text{Br}_2$
D.	Combustion	4	$\text{Pb}(\text{NO}_3)_2 + 2\text{HCl} \rightarrow \text{PbCl}_2 + 2\text{HNO}_3$

- | | A | B | C | D |
|-----|---|---|---|---|
| (A) | 2 | 1 | 3 | 4 |
| (B) | 4 | 3 | 1 | 2 |
| (C) | 3 | 2 | 4 | 1 |
| (D) | 4 | 3 | 2 | 1 |

Space for Rough Work

48. Which of the following is the gaseous product obtained in roasting?
(A) SO_2 (B) O_2 (C) SO_3 (D) H_2S
49. Which of the following properties of diamond is not attributed to its rigid giant polymeric tetrahedral structure?
(A) good thermal conductivity
(B) good abrasive nature
(C) poor electrical conductivity
(D) both (1) and (2)
50. The IUPAC name of $\text{CH}_3\text{CH}(\text{C}_3\text{H}_7)\text{CH}(\text{C}_2\text{H}_5)\text{CH}(\text{C}_2\text{H}_5)\text{CH}_3$
(A) 3,4-dimethyl-4-ethyl Octane
(B) 4-ethyl-3, 5-dimethyl Octane
(C) 2,3-dimethyl-4-Propyl pentane
(D) 3,4-dimethyl-2-Propyl pentane

Part-3

Biology

51. Eutrophication leads to death of fish due to
(A) increased O_2 content (B) increased algal content
(C) decreased algal content (D) decreased O_2 content
52. During inspiration, air passes into lungs due to
(A) increase in volume of thoracic cavity and fall in lung pressure
(B) fall in pressure inside the lungs
(C) increased volume of thoracic cavity
(D) muscular expansion of lungs
53. Luteinising hormone in female
(A) helps in the appearance of secondary sexual characters.
(B) stimulates ovary to secrete oestrogen
(C) helps in release of the ovum from the ovary
(D) control of blood pressure
54. A person, who met with an accident, was partially paralysed and lacked a sense of feeling after treatment. Which part of the nervous system was affected by the accident?
(A) The olfactory lobes seemed to have become defective
(B) The spinal cord seemed damaged
(C) The left cerebral hemisphere was damaged
(D) The oculomotor nerve seemed damaged
55. Hypothalamus is
(A) helpful for sleep (B) has centres for thirst and hunger
(C) control body temperature (D) all of the above
56. If the basic sequence of the strands of DNA is CAT TAG CAT CAT GAC. What will be base sequence of complementary RNA strand ?
(A) GTA ATG ATG GUA CUG (B) TAG ATG GTA GAT GAT CTS
(C) GUA AUC GUA GUA CUG (D) GTA ACC GAT GAT CAT CAT

Space for Rough Work

57. Find the correct combination that can form a nucleotide of RNA
 (A) Adenine + deoxyribose + phosphate (B) Uracil + ribose + phosphate
 (C) Thymine + ribose + phosphate (D) Guanine + deoxyribose + phosphate
58. Placenta is the region where
 (A) food is supplied by Lymph (B) embryo is attached to mother by yolk
 (C) foetus receives nutrition (D) embryo enclosed by membranes
59. 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 nuclei
 (C) both are correct
 (D) both are incorrect
60. Each molecule of NADPH releases how many number of ATP molecules
 (A) 5 (B) 2 (C) 3 (D) 4

Space for Rough Work



Pinnacle

Answer Key *JEE | NEET | Pre-Foundation*

1. a	2. c	3. a	4. b	5. d	6. c	7. c	8. d	9. b	10. b
11. a	12. a	13. b	14. b	15. a	16. c	17. b	18. c	19. c	20. a
21. a	22. b	23. c	24. d	25. b	26. a	27. b	28. c	29. c	30. a
31. a	32. b	33. a	34. d	35. a	36. b	37. d	38. d	39. a	40. c
41. a	42. c	43. d	44. a	45. b	46. b	47. c	48. a	49. c	50. b
51. d	52. a	53. c	54. c	55. d	56. c	57. b	58. c	59. b	60. c