IMPORTANT INSTRUCTIONS

- The maximum marks are **300.** Time allotted is **90 MINTUES.**
- There are three sections in the question paper having total **75 questions:**
  - Section – A : Maths (20 Questions)
  - Section – B : Science (20 Questions)
  - Section – C : English (20 Questions)
  - Section – D : Aptitude (15 Questions)
- Each question carries **4 marks**
- **Negative Marking**: **1 / 4 (one-fourth) marks** will be deducted for every incorrect answer.
- **Use only BLUE / BLACK pen to fill the circles in bubble sheet.**
- Use of pencil is strictly **not allowed.**
- **Do not use marker or correction pen** to hide the mark.

SECTION – A MATHS

1. Find the greatest number of 5 digits that will give us remainder 5 when divided by 8 and 9 respectively.
   (a) 99921 (b) 99931 (c) 99941 (d) 99951

2. The difference of the roots of the quadratic equation $2x^2 - 2\sqrt{2}\,x + 1 = 0$ is
   (a) 1 (b) $\sqrt{2}$ (c) 0 (d) $2\sqrt{2}$

3. If the roots of $ax^2 + bx + c = 0$ are in the ratio m : n , then
   (a) $mn\,a^2 = (m+n)c^2$ (b) $mn\,b^2 = (m+n)\,ac$
   (c) $mn\,b^2 = (m+n)^2 ac$ (d) $mn\,b^2 = (m-n)^2 ac$

4. The roots of the quadratic equation: $\frac{1}{a+b+x} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}$, $a + b \neq 0$ are
   (a) $a,\ b$ (b) $-a, -b$ (c) $-a,\ b$ (d) $a, -b$

5. If $(p+q)^{th}$ term of an A.P. is m and $(p-q)^{th}$ term is n, then p^{th} term is
   (a) mn (b) $\sqrt{mn}$ (c) $\frac{1}{2}(m-n)$ (d) $\frac{1}{2}(m+n)$

6. The next term of the sequence:

   $\frac{1}{1+\sqrt{x}}, \frac{1}{1-x}, \frac{1}{1-\sqrt{x}}$ is $(x \neq 1)$.

   (a) $1 + 2\sqrt{x}$ (b) $1 - 2\sqrt{x}$ (c) $\frac{1+2\sqrt{x}}{1-x}$ (d) $\frac{1-2\sqrt{x}}{1-x}$

7. Match the column:

Column I	Column II
(1) $2x + 5y = 10$ $3x + 4y = 7$	(A) Unique solution
(2) $2x + 5y = 10$ $6x + 15y = 20$	(B) Infinitely many solutions
(3) $5x + 2y = 10$ $10x + 4y = 20$	(C) No common solution

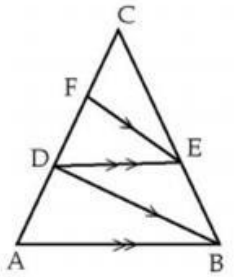
(a) 1 → A, 2 → B, 3 → C (b) 1 → B, 2 → C, 3 → A
(c) 1 → C, 2 → B, 3 → A (d) 1 → A, 2 → C, 3 → B

8. The value of the expression $1 - 6 + 2 - 7 + 3 - 8 +$……to 100 terms is
(a) – 250 (b) 0 (c) – 5 (d) None of these

9. The n^{th} term of the A.P.
$\frac{1}{m}, \frac{1+m}{m}, \frac{1+2m}{m}$, ….. is

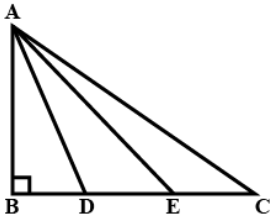
(a) $\frac{1-(n-1)m}{m}$ (b) $\frac{1+(n-1)m}{m}$ (c) $\frac{2-(n-1)m}{m}$ (d) $\frac{2+(n-1)m}{m}$

10. In the figure AB ∥ DE and BD ∥ EF then which of the following statement is true.



(a) $DC^2 = CF \times AC$ (b) $AB^2 = AC \times CB$
(c) $DC^2 = CE \times DF$ (d) None of these

11. In the given figure D and E trisects BC. AB ⊥ BC, then which of the following statements is true.



(a) $4\,AE^2 = 3\,AC^2 + AD^2$ (b) $8\,AE^2 = 3\,AC^2 + 5\,AD^2$
(c) $8\,AE^2 = AC^2 + 5\,AD^2$ (d) none of these

12. Match the column:

Column I	Column II
1. In ΔABC & ΔPQR, $\frac{AB}{PQ} = \frac{AC}{PR}$, $\angle A = \angle P = \Delta ABC \sim \Delta PQR$	(A) AA similarity criterion
2. .In ΔABC & ΔPQR, $\angle A = \angle P, \angle B = \angle Q = \Delta ABC \sim \Delta PQR$	(B) SAS similarity criterion
3. In ΔABC & ΔPQR $\frac{AB}{PQ} = \frac{AC}{PR} = \frac{BC}{QR}$	(C) SSS similarity criterion
4. In ΔABC, DE ‖ BC $= \frac{AD}{BD} = \frac{AE}{CE}$	(D) BPT

(a) 1 → A, 2 → B, 3 → C, 4 → D
(b) 1 → D, 2 → A, 3 → C, 4 → B
(c) 1 → B, 2 → A, 3 → C, 4 → D
(d) 1 → C, 2 → B, 3 → D, 4 → A

13. 2 $(sin^6\theta + cos^6\theta) - 3\,(sin^4\theta + cos^4\theta)$ is equal to
(a) 0 (b) 6 (c) – 1 (d) none of these

14. Find the probability of 53 Sundays in the year 2012.
(a) 1/7 (b) 2/7 (c) 1 (d) none of these

15. Area of circle inscribed in a equilateral triangle is 154 cm^2. The perimeter of triangle is
(a) $14\sqrt{3}$ cm (b) 126 cm (c) 72.66 cm (d) 168 cm

16. If the point p (x, y) is equidistant from the points A (a + b, b – a) and B (a – b, a + b), then which of the following is true.
(a) ax = by (b) bx = ay (c) ab = xy (d) None of these

17. If tan θ + sin θ = m and tan θ − sin θ = n, then $m^2 - n^2$ equal to
(a) 2 $\sqrt{mn}$ (b) 6 $\sqrt{mn}$ (c) 4 $\sqrt{mn}$ (d) $\sqrt{mn}$

18. State whether true or false.
(A) $ax + by + c = 0$ where a, b and c are real numbers is always a linear equation.
(B) A linear equation $2x + 3y = 5$ has a unique solution.
(C) All the points (2, 0), (- 3, 0), (0, 0), (0, 5) lies on X-axis.
(D) The graph of the equation y = mx + c always passes through the origin.
(E) The line parallel to the y-axis at a distance of 4 units to the left of y-axis is given by the equation y = - 4.

(a) A → True, B → True, C → True, D → True, E → True
(b) A → True, B → False, C → False, D → False, E → False
(c) A → False, B → False, C → False, D → False, E → False
(d) none of these

19. If V is the volume of a cuboid of dimension l, b, h and S is its surface area, then $\frac{1}{V}$ is given by

(a) $\frac{1}{S}\left(\frac{1}{l}+\frac{1}{b}-\frac{1}{h}\right)$ (b) $\frac{2}{S}\left(\frac{1}{l}+\frac{1}{b}-\frac{1}{h}\right)$ (c) $\frac{1}{S}\left(\frac{1}{l}+\frac{1}{b}+\frac{1}{h}\right)$ (d) None of these

20. A man travels 370 km partly by train and remaining by car. If he covers 250 km by train and the rest by the car it takes him 4 hrs, but if he travels 130 km by train and the rest by car, he takes 18 minutes longer. Then the speed of train and that of car are:

(a) train 100 km/hr, car = 80 km/hr (b) train 120 km/hr, car = 80 km/hr
(c) train 100 km/hr, car = 50 km/hr (d) none of these

SECTION – B
SCIENCE

21. A student took a 2 cm long magnesium ribbon and weighed it. After that he burned the ribbon in air. What changes did he observe during this reaction?

I. Magnesium ribbon converts into powder.
II. It burns with dazzling white light.
III. Weight of the powder is higher than the weight of magnesium ribbon taken.

(a) I and II (b) I and III (c) II and III (d) All of these

22. Food industry has picked up very fast pace throughout the world. The manufactures are adding certain substances called antioxidants to the food materials. When antioxidants are added to foods, the fats and oils present in them do not get oxidised easily and thus, do not get rancid. The role of antioxidants in food industry is:

I. to act as a oxidising agent.
II. to act as a reducing agent.
III. to check the oxidation of food.
IV. to slow down the rancidity.

(a) I and III (b) II and IV (c) II and III (d) III and IV

23. During the preparation of hydrogen chloride gas on a humid day, the gas is usually passed through the guard tube containing calcium chloride. The role of calcium chloride taken in the guard tube is to

(a) absorb the evolved gas (b) moisten the gas
(c) absorb moisture from the gas (d) absorb Cl^- ions from the evolved gas

24. In which reaction, hydrochloric acid is not behaving as an acid?

(a) HCl (aq) + $AgNO_3$(aq) → AgCl(s) + HNO_3(aq)
(b) 2HCl (g) + $CaCO_3$(s) → $CaCl_2$(aq) + H_2O (l) + CO_2(g)
(c) 2HCl (aq) + Fe(s) → $FeCl_2$(aq) + H_2(g)
(d) 6HCl(aq) + Fe_2O_3(s) → 2$FeCl_3$(aq) + 3H_2O(l)

25. A sample of soil is mixed with water and allowed to settle. The clear supernatant solution turns the pH paper yellowish-orange. Which of the following would change the colour of this pH paper to greenish-blue?

(a) Lemon juice (b) Vinegar (c) Common salt (d) An antacid

26. Some non-metallic elements are given below:

I. Iodine II. Diamond III. Graphite IV. Chlorine

Which of these is /are lustrous?

(a) II and III (b) Only II (c) I, II and III (d) All of these

27. When a metal X is treated with cold water, it gives a basic salt Y with molecular formula XOH (molecular mass = 40) and liberates a gas Z which easily catches fire. X, Y and Z respectively are

	X	Y	Z
(a)	Na	NaOH	H_2
(b)	K	KOH	H_2
(c)	Na	NaOH	H_2O
(d)	Ca	CaOH	H_2

28. Digestive enzymes are globular proteins that speed up the breakdown of food molecules into their components. Below is a list of enzymes. Select the odd one from it.
(a) Salivary amylase → Starch → Maltose
(b) Pepsin → Proteins → Peptones
(c) Lactase → Sucrose → Glucose
(d) Renin → Casein → Paracasein

29. Which of the following statements are true?
I. Sweat serves to eliminate mainly salt and water.
II. Left ureter carries urine from left kidney to the liver.
III. Urethra passes urine in female and both urine and seminal fluid in male.
IV. Urethra stores urine.
Codes:
(a) I and II (b) II and III (c) I and III (d) I and IV

30. I am part of your brain. I am responsible for what you think. I have several folds and grooves. I make up nearly seven-eights of your brain. Who am I?
(a) Cerebellum (b) Hypothalamus (c) Cerebrum (d) Medulla oblongata

31. Once Anita was travelling through a congested bus for a long distance. After half an hour, she vomited in the bus. Which type of response is this?
(a) Reflex action (b) Hormonal action (c) Chemical action (d) none of the above

32. One day, Rahul was returning home after his school. Suddenly he saw a stray dog following him with anger. Rahul runs very fast after seeing that dog. His breathing becomes very fast and blood pressure also increases Name the hormone found to be high in his blood and gland which produce it?

	Hormone	**Gland**
(a)	Oxytocin	Pituitary
(b)	Adrenaline	Adrenal gland
(c)	Thyroxine	Thyroid
(d)	Adrenaline	Pituitary

33. During the image formation from a spherical mirror, only paraxial rays are considered because
(a) they are easy to handle geometrically
(b) it has maximum intensity
(c) it forms a point image of a point source
(d) there is a minimum dispersion

34. Consider the following statement and choose which of the following code is correct?
I. Light seems to travel in a straight line.
II. Because of high velocity of light, it takes some time for people to realise that speed of light is finite and measurable.
III. The highest attainable speed of light is in the medium having refractive index 1.
(a) I (b) I and III (c) II and I (d) I, II and III

35. An object of size 10 cm is placed at a distance of 30 cm in front of a concave mirror of local length 12 cm. At what distance should a screen be placed from the mirror to obtain a sharp image? Also find the nature and size of the image.
(a) 8.57 cm, virtual, erect and diminished, 2.85 cm (b) 8.57 cm, real, inverted and enlarged, 6.67 cm
(c) 20 cm, real, inverted and enlarged, 6.67 cm (d) 20 cm, virtual, erect and diminished, 6.67 cm

36. Consider the following statements and choose the incorrect one.
I. Magnification is the ratio of object height to the image height.
II. Magnification is equal to the ratio of object distance to the image distance.
III. Magnification is positive for real and inverted and erect images.
(a) Only I (b) Only II (c) Only III (d) All are incorrect

37. Consider the following statements and choose the incorrect one.
I. Rod cells respond to intensity of light.
II. Cone cells respond to colour by generating electrical nerve impulse.
III. Iris muscles control the focal length of eye lens.
IV. Contraction of iris muscles increase the focal length of eye lens.
(a) I, II (b) III, IV (c) Only IV (d) I, II, III

38. Four processes are used to charge an isolated metal sphere.
P. The sphere is earthed by touching it.
Q. The earth connection is removed from the sphere.
R. A charged rod is brought close to the sphere.
S. The charge rod is removed.
Which of the following option arranges the four processes sequentially?
(a) P Q R S
(b) P R S Q
(c) R P Q S
(d) R S P Q

39. The direction of electric field at any point is unique. This statement can be verified by which of the following:
I. Two electric lines of force cannot intersect each other.
II. Tangent drawn at any point on the electric lines of force gives the direction of electric field.
III. Electric field lines originate from positive charge and ends at negative charge.
(a) I and II (b) II and III (c) I and III (d) I, II and III

40. There are two resistors R_1 and R_2 ($R_1 > R_2$) connected through a battery of emf V volt.
Choose the correct option regarding the above statement.
(a) When the resistors are connected in series, current through R_2 resistors is more than that of R_1.
(b) They have same potential difference across each resistor, when connected in series.
(c) Resistor R_2 has more current than R_1 when connected in parallel
(d) They have same current when connected in parallel

SECTION – C
ENGLISH

Directions (41-44): Read the PASSAGE carefully and answer the questions by choosing the most suitable option given below.

The shape of a creeper depends on the support it gets. Likewise, the personality of a child mainly depends on his/her parental support, love, affection and guidance. A child cannot grow well in the absence of the support of his motivating and encouraging parents. There should be no inhibition, no forcing of thoughts and attitudes and no communication gap in parent-child relationship to avoid all kinds of misunderstandings and complications. Parents should be like sheltering trees where their children can look for refuge. As a moral duty, they should try to discuss and solve the problems that their children face. They should be treated in a friendly manner so that they can share the good and bad experiences of everyday life. Childhood experiences are lasting and they influence the development of entire personality positively. Children might be lost in the maze of life in absence of proper guidance or if parents don't understand their feelings, dreams and aspirations. Children learn things from their parents. They behave in the manner their parents do. Interaction between parents-child plays a vital role in the learning process of the child. So more and more interaction and amicable treatment should be the basis of parents-child relationship.

41. What factors decide the personality of a child?
(a) Parental support, affection and guidance (b) When parents fulfill all of his/her wishes
(c) If a child studies hard (d) None of these

42. What should be the role of parents towards their children?
(a) They should pay their school fee regularly
(b) They should interact with them on a daily basis
(c) They need to support, stay in touch with them without forcing their ideas on him
(d) They should teach their child at home when they get time

43. Why should the children be treated in a friendly manner?
(a) So that they can share their problems and experiences frankly
(b) So that they may not be spoiled
(c) Because they seek friends in their parents
(d) Because it is the need of the hour

44. What is the meaning of the word 'creeper' as expressed in the passage?
(a) A kind of fruit (b) A child (c) Shrub (d) Vine

Word and Structure Knowledge

45. Find the Odd one out.
(a) Chetan Bhagat (b) Vikram Seth (c) Ruskin Bond (d) Shoba De

46. Find out the MISSPELLED word?
(a) INDISTRUCTIBLE (b) IMPRESSIVE (c) MAINTAIN (d) UNCOUTH

47. Choose the correct ANTONYM of the bold word from the options: **Vice**
(a) Virtue (b) Dreadful (c) Valuable (d) Faithful

48. What is the meaning of the word "insolent"?
(a) spirited (b) quiet (c) rude (d) orderly

49. Choose the correct meaning of the PHRASE from the options:
Spill the beans.
(a) To make someone fool (b) To come at the right time
(c) To cast spell (d) To reveal someone's secret

50. Choose **One Word** from the options given below that matches the definition correctly.
The habit of talking in one's sleep.
(a) Somniloquy (b) Somnambulism (c) Stammer (d) Monogamy

- Fill in the blanks with correct word from the options given below.

51. I have worked here _____ I left college.
(a) for (b) till (c) up to (d) since

52. He is _____ young to perform such a difficult task.
(a) very (b) much (c) too (d) enough

53. Five parts of a sentence are given. You are provided with the beginning (S1) and the ending (S5) of this sentence and other parts are jumbled up. Choose the correct order of the JUMBLED parts of sentence (P, Q, R) that can complete it logically.
S1 : The Government did not accept the demand of 'Poorn Swaraj.
S2: _____
S3: _____
S4: _____
S5: Congress was declared an illegal party.
P: Civil Disobedience Movement was started.
Q: Thousands of people started breaking laws.
R: Gandhiji started from his Sabarmati Ashram towards the village Dandi to break the salt law.
Choose the correct option.
(a) PQR (b) RQP (c) QPR (d) PRQ

54. Select the appropriate conjunction to complete the sentence:
_____ of several warnings, he continued to be mischievous.
(a) Although (b) In spite of (c) Because (d) However

55. Choose the appropriate articles for the given sentence:
Smoking can cause _____ variety of lung problems. Primarily, smoking damages _____ airways and air sacs in _____ lungs. Often, lung disease caused by smoking can take years to become noticeable, this means _____ it is often not diagnosed.
(a) a, the, the, no article (b) a, an, a, no article (c) a, a, an, no article (d) a, a, an, the

56. Choose the indirect object of noun from the given sentence:
My father decorated my room for my birthday.
(a) Birthday (b) Father (c) Room (d) My

57. Choose the suitable option which expresses the same sentence in passive/active voice:
Why did she break the garden wall?
(a) Why the garden wall was broken by her? (b) Why had the garden wall been broken by her?
(c) Why was the garden wall broken by her? (d) Why will the garden wall be broken by her?

58. Choose the most suitable word/phrase for the blank.
We have to let the law _____ and wait for the court's verdict in this matter.
(a) take it course (b) make its course (c) take course (d) take its course

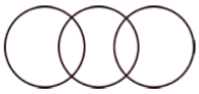
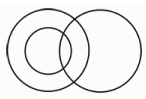
59. Choose the correct sentence to complete the dialogue.
Kartik: We're going trekking to the Narmada valley. Please come.
Nisha: I wish I could come _____
(a) the trip sounds fantastic and I am sure will be great fun
(b) the Narmada is a river that must be seen
(c) but my grandparents will be visiting us and I have to be home
(d) it will be lovely to be with all of you for so many days

60. Fill in the blank with appropriate adjective:
There I met a girl _____.
(a) with blue eyes (b) with blue eye (c) with bluiesh eye (d) with eye

SECTION – D
APTITUDE

61. Introducing a man to her husband a woman said, "His brother's father is the only son of my grandfather". How is the woman related to the man?
(a) Mother (b) Aunt (c) Sister (d) Daughter

62. If in a certain code SCRIPT is written as TCQIQT, how will DIGEST be written?
(a) EIFETT (b) TIHETT (c) EIFERT (d) EIHETT

63. Which of the following diagrams correctly represents Elephants, Wolves, Animals?
(a)  (b)  (c)  (d) 

64. Seema and Rajat start together from a point. They walk 10 kms towards North. Seema turns to her left and walk 5 kms, while Rajat turns Right and walk only 3 kms. Now Seema turns towards her left and Rajat towards his right and both walk 15 kms forward. How far they from each other?
(a) 2 kms (b) 8 kms (c) 13 kms (d) 15 kms

65. If P denotes +, Q denotes −, R denotes × and S denotes ÷, which of the following statement is correct. Select the appropriate number among the given choices.
36 R 4 S 8 Q 7 P 4 = ?
(a) 58 (b) 55 (c) 63 (d) 15

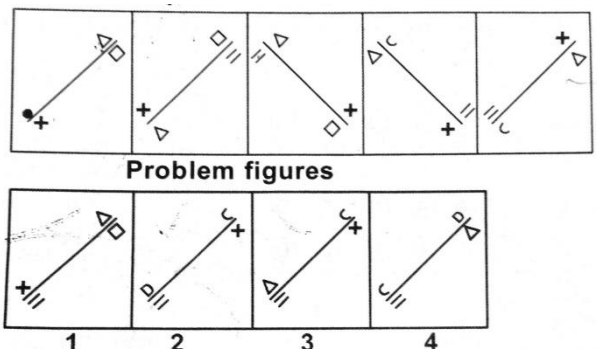
66. Six bells commence tolling together and toll at intervals of 2, 4, 6, 8, 10 and 12 seconds respectively. In 30 minutes, how many times do they toll together?
(a) 4 (b) 10 (c) 15 (d) 16

67. A shopkeeper mixes two varieties of tea, one costing ₹ 35 per kg and another at ₹ 45 per kg in the ratio 3 : 2. If he sells the mixed variety at ₹ 41.60 per kg, his gain or loss percent is _____.
(a) $6\frac{2}{3}$% gain (b) $6\frac{2}{3}$% loss (c) 4% gain (d) 4% loss

68. The difference in C.I. and S.I. for 2 years on a sum of money is ₹ 160. If the S.I. for 2 years be ₹ 2880, the rate percent is _____.

(a) $5\frac{5}{9}\%$ (b) $12\frac{1}{2}\%$ (c) $11\frac{1}{9}\%$ (d) 9%

69. Which one of the five answer figures should come after the problem figures, if the sequence is continued?



(a) 1 (b) 2 (c) 3 (d) 4

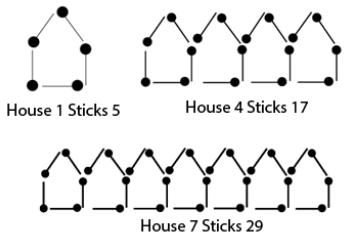
70. What is the third vertex of a triangle, if two of its vertices are at (- 3, 1) and (0, - 2) and the centroid is at the origin?

(a) (2, 1) (b) (3, 1) (c) (3, 2) (d) (4, 1)

71. If a tyre rotates at 150 revolutions/min when the truck is travelling 40 km/h, What is the circumference of the tyre?

(a) 4.44 m (b) 5 m (c) 5.44 m (d) 6 m

72. The following house-patterns were created using match sticks:



Which one of the numbers given below cannot be the number of sticks used to create a complete row of houses?

(a) 2361 (b) 2369 (c) 2309 (d) 2008

73. Find the value of x in $\sqrt{x+2\sqrt{x+2\sqrt{x+2\sqrt{3x}}}} = x$.

(a) 1 (b) 3 (c) 6 (d) 12

74. A circular swimming pool is surrounding by a concrete walk 4 m wide. If the area of the walk is $\frac{11}{25}$ that of the pool, then the radius of the pool is _____.

(a) 20 m (b) 8 m (c) 30 m (d) 16 m

75. If a box there are coins and rings which are either silver or gold. If 30% of the objects in the box are coins and 40% of the rings are silver, what percentage of the object in the box are gold rings?

(a) 60% (b) 30% (c) 42% (d) 70%