ROLL No.

TEST BOOKLET No. **2741**

APTITUDE TEST FOR M.C.A.

Time: 2 Hours

Maximum Marks: 450

INSTRUCTIONS TO CANDIDATES

1. You are provided with a Test Booklet and an Optical Mark Reader (OMR) Answer Sheet to mark your responses. Do not soil the Answer Sheet. Read carefully all the instructions given on the Answer Sheet.

2. Write your Roll Number in the space provided on the top of **this page**.

3. Also write your Roll Number, Test Code, and Test Subject in the columns provided for the same on the **Answer Sheet**. Darken the appropriate bubbles with a **Ball Point Pen**.

4. The paper consists of 150 objective type questions. All questions carry equal marks.

5. Each question has four alternative responses marked **A, B, C** and **D** and you have to **darken** the bubble fully by a **Ball Point Pen** corresponding to the correct response as indicated in the example shown on the Answer Sheet.

6. Each correct answer carries **3** marks and each wrong answer carries **1** minus mark.

7. Please do your rough work only on the space provided for it at the end of this Test Booklet.

8. You should return the Answer Sheet to the Invigilator before you leave the examination hall. However, you can retain the Test Booklet.

9. Every precaution has been taken to avoid errors in the Test Booklet. In the event of such unforeseen happenings the same may be brought to the notice of the Observer/Chief Superintendent in writing. Suitable remedial measures will be taken at the time of evaluation, if necessary.

SEAL

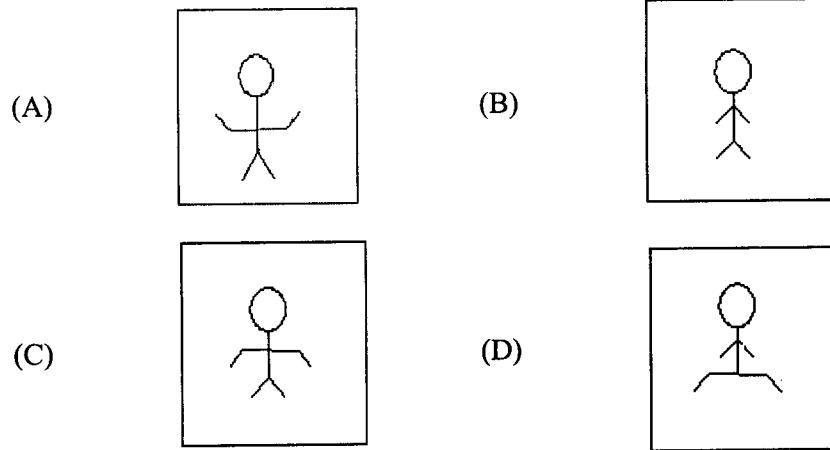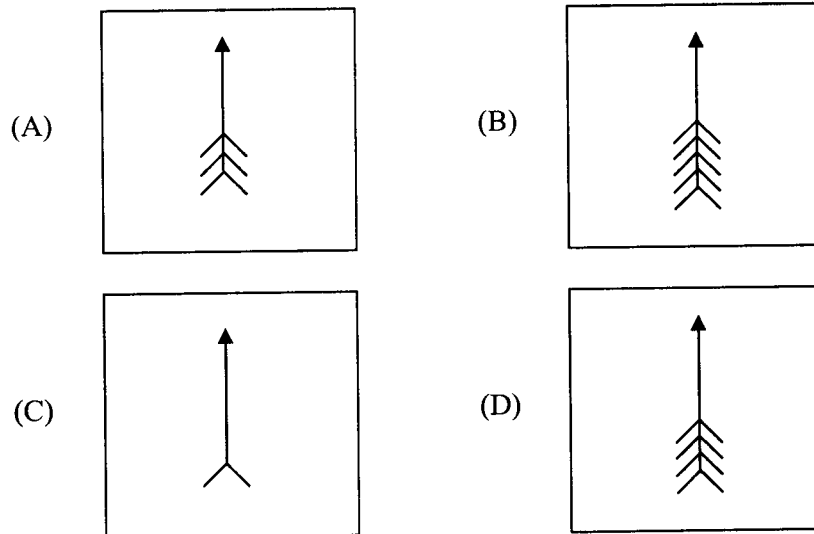# APTITUDE TEST FOR MCA

Direction: (Q. Nos. 1 – 5) In each of the following questions four figures are given of which three are similar. Identify the figure which is not similar to the other three.

1.

(A)

(B)

(C)

(D)

2.

(A)

(B)

(C)

(D)

3.

(A)

(B)

(C)

(D)

4.

(A)

(B)

(C)

(D)

5.

(A) E

(B) F

(C) Z

(D) A
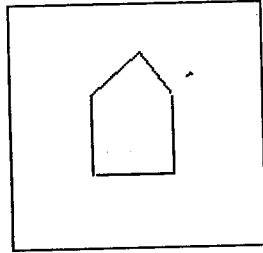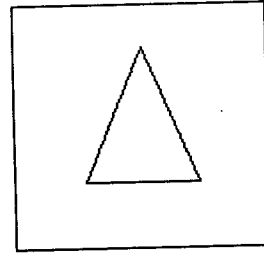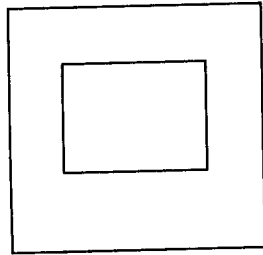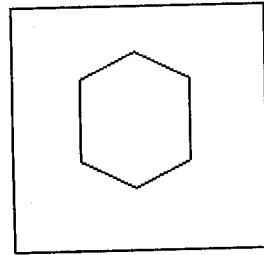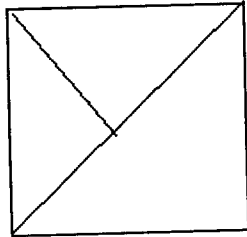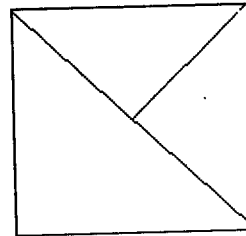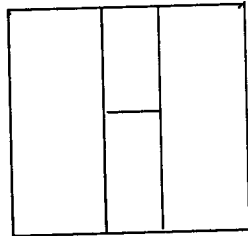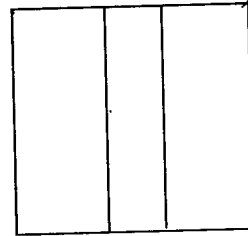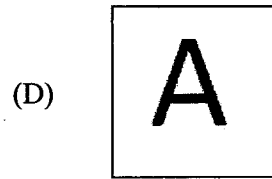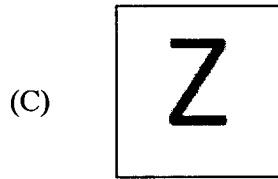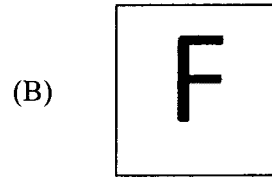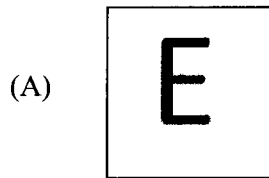
6. What is the minimum number of colours required to fill the spaces in the given diagram without any two adjacent spaces having the same colour?

(A) 6
(C) 4

(B) 5
(D) 3

7. Select a suitable figure from the four alternatives that would complete the figure matrix
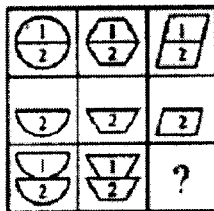
(A) 1
(C) 3

(B) 2
(D) 4

8. Find the number of triangles in the given figure.
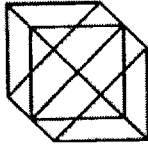
(A) 18   (B) 20
(C) 24   (D) 27

9. Find out from amongst the four alternatives as to how the pattern (X) would appear when the transparent sheet is folded at the dotted line.
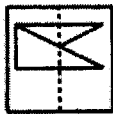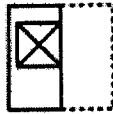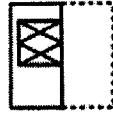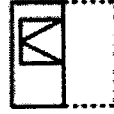
(A) 1   (B) 2
(C) 3   (D) 4

10. Running at the same constant rate, 6 identical machines can produce a total of 270 bottles per minute. At this rate, how many bottles could 10 such machines produce in 4 minutes?

(A) 648   (B) 1800
(C) 2700   (D) 10800

Direction: (Q. Nos. 11 – 12) Which figure will replace the question mark?

11.

(A)   (B)
(C)   (D)

12.   [·I ·I·I I·I·I ?

    (A) I·I·I   (B) ·I·I·I

    (C) I·I·I·   (D) I·I··

Direction: Questions 13 and 14 consist of two words each having a relationship to the other, followed by four pairs of words. Select the pair that has the same relationship as the original pair.

13.   Karnataka: Bangalore

        (A) Mysore : Brindavan   (B) Haryana : Sonapet
        (C) Gujarat : Anand   (D) Orissa : Bhuvaneswar

14.   Pulp : Paper

        (A) Rope : Hemp   (B) Rayon : Cellulose
        (C) Thread : Needle   (D) Yarn : Fabric

Direction: (Q. Nos. 15 and 16): In each of the following questions find out the alternative which will replace the question mark.

15.   Race : Fatigue :: Fast : ?

        (A) Food   (B) Laziness
        (C) Hunger   (D) Race

16.   Parts : Strap :: Wolf : ?

        (A) Fox   (B) Animal
        (C) Wood   (D) Flow

Direction: (Q. Nos. 17 – 20). Pick the odd one out.

17.
        (A) Circle   (B) Ellipse
        (C) Cube   (D) Square

18.
- (A) Direction
- (B) Compass
- (C) Needle
- (D) Magnet

19.
- (A) Physics
- (B) Thermodynamics
- (C) Optics
- (D) Mechanics

20.
- (A) 144
- (B) 100
- (C) 441
- (D) 48

Direction: (Q. Nos. 21 – 24) Choose the missing term.

21.   1, 3, 7, 13, 21, 31, _____

- (A) 43
- (B) 41
- (C) 51
- (D) 547

22.   25, 16, 9, 4, 1, 0, _____

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

23. $3\frac{1}{2}$, $7\frac{3}{4}$, 12, $16\frac{1}{4}$, _____

- (A) $20\frac{1}{2}$
- (B) $18\frac{1}{2}$
- (C) $22\frac{1}{2}$
- (D) None of the above

24. $\frac{3}{2}$, $\frac{1}{3}$, $\frac{1}{2}$, $\frac{1}{6}$, $\frac{1}{12}$, _____

- (A) $\frac{1}{72}$
- (B) $\frac{2}{72}$
- (C) $\frac{3}{72}$
- (D) None of the above

25. When 12+10 = 1205, 11 +8 = 885, 13 + 7= 91, 14 + 15 = ?

    (A) 210   (B) 2105
    (C) 2100   (D) None of the above

26. What number should come next in the series 14, 28, 20, 40, 32, 64, ____?

    (A) 52   (B) 56
    (C) 96   (D) 128

27. What number should fill the blank in the series 664, 332, 340, 170, ____ 89?

    (A) 85   (B) 97
    (C) 109   (D) 178

Direction: (Q. Nos. 28 – 34). Find the missing terms.

28. 8, 0, 15, 9, 22, 18, 29, 27, ____ , ____

    (A) 36, 37   (B) 36, 36
    (C) 37, 37   (D) 35, 36

29. 7, 10, 9, 12, 11, ____ , ____

    (A) 13,15   (B) 14,15
    (C) 14,13   (D) 15,13

30. 24, 72, 36, 108, 54, ____ , ____

    (A) 160,80   (B) 162,80
    (C) 160,81   (D) 162,81

31. 11, ____ , 17, 18, 23, 24, ____

    (A) 12,29   (B) 11,28
    (C) 12,28   (D) 11,29

32. 8, 3, 6, 4, 4, 5, ____ , ____

    (A) 2, 6   (B) 1, 5
    (C) 1, 6   (D) 2, 5

33.   2, 4, 5, 10, 11, 12, ____ , ____

       (A) 22, 45   (B) 23, 46

       (C) 22, 46   (D) 23, 45

34. $\frac{2}{3}$, $1\frac{2}{3}$, 2, $2\frac{2}{3}$, 3, $3\frac{1}{3}$, ____ , ____

       (A) $3, 3\frac{2}{3}$ (B) $4, 4\frac{2}{3}$

       (C) $3, 4\frac{2}{3}$ (D) $4, 3\frac{2}{3}$

Direction: (Q. Nos. 35 – 39) Answer the questions based on the following figure in which the triangle represents doctors, the circle represents players and the rectangle represents artists.
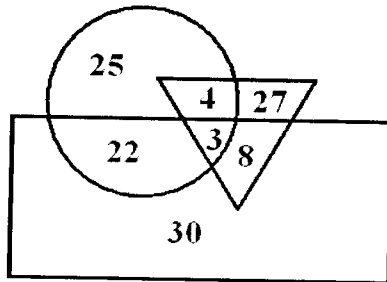
35.   How many doctors are both players and artists?

       (A) 4   (B) 3

       (C) 11   (D) None of the above

36.   How many artists are players?

       (A) 22   (B) 30

       (C) 25   (D) None of the above

37.   How many doctors are neither players nor artists?

       (A) 30   (B) 22

       (C) 27   (D) 8

38.   How many artists are neither players nor doctors?

(A) 22   (B) 29
(C) 25   (D) None of the above

39.   How many players are neither artists nor doctors?

(A) 4   (B) 3
(C) 22   (D) None of the above

Direction: (Q. Nos. 40 – 44) Answer the following questions after reading the following information.

Seven trees of species M, N, O, R, T, X and W are to be planted in a row along a garden path. Species R must be planted third in the row. Species X must be planted sixth in the row. Species N and T must be planted with exactly one tree between them. Species M and W may not be planted next to one another.

40.   Which of the following is an acceptable sequence?

(A) M, W, R, O, N, X, T   (B) T, N, R, W, O, X, M
(C) W, O, R, T, M, N, X   (D) O, T, R, N, W, X, N

41.   If species M is planted fifth in the row, species N could be planted in which row?

(A) First   (B) Second
(C) Third   (D) Sixth

42.   If species W is planted first in the row and species T is planted fifth, which of the following must be true?

(A) Species M is planted in Second row
(B) Species O is planted in Second row
(C) Species N is planted in Fourth row
(D) Species M is planted in Seventh row

43. If species M is planted fourth in the row, which species could be planted in the second row?

   (A) N   (B) O
   (C) R   (D) T

44. If species O is planted next to species N, which of the following species could be planted seventh in the row?

   (A) Either M or O   (B) Either M or W
   (C) Either N or O   (D) Either N or W

Direction: (Q. Nos. 45 – 47) Answer the questions based on the following information:

A, B, C, D and E are five different integers. When written in the ascending order of values, the difference between any two adjacent integers is 4. D is the greatest and A is the least. B is greater than E but less than C. The sum of the integers is equal to E.

45. The greatest number has the value

   (A) 9   (B) –5
   (C) 3   (D) 7

46. The sum of A and B is

   (A) –10   (B) –15
   (C) 10   (D) 15

47. The product of the integers is

   (A) –945   (B) 945
   (C) 315   (D) –549

Direction: (Q. Nos. 48 and 49): Find the blood relations.

48.   A $ B means A is the father of B; A # B means A is the sister of B; A * B means A is the daughter of B and A @ B means A is the brother of B. Which of the following indicates that M is the wife of Q?

  (A)   Q $ R # T @ M
  (C)   Q $ R * T # M

  (B)   Q $ R @ T # M
  (D)   Q $ R @ T * M

49.   A is the son of C; C and Q are sisters; Z is the mother of Q and P is the son of Z. Which of the following statements is true?

  (A)   P and A are cousins
  (C)   Q is the maternal grandfather of A

  (B)   P is the maternal uncle of A
  (D)   C and P are sisters

Direction: (Q. Nos. 50 – 52) For each question, two statements marked (A) and (B) are given followed by two conclusions marked (I) and (II) that can be logically drawn from the statements. Even if the statements vary from well known facts, assume them to be true. Choose the best alternative from the choices given below.

50.   **Statements**
      (A) Some parrots are not pests
      (B) All parrots are pets

      Conclusions
      (I)   Therefore no pets are pests
      (II)   Therefore some pests are not parrots

      (A)   I only
      (C)   Both I and II

      (B)   II only
      (D)   Neither I nor II

51.   **Statements**
      (A) All artists are egoists
      (B) Some artists are paupers

      Conclusions
      (I)   Some egoists are paupers
      (II)   Some paupers are egoists

      (A)   I only
      (C)   Both I and II

      (B)   II only
      (D)   Neither I nor II

52.   **Statements**
(A) All text books are books intended for careful study
(B) Some reference books are books intended for careful study

Conclusions
(I)   Therefore some reference books are text books
(II) Therefore both text books and reference books are intended for
careful study

    (A)   I only   (B)   II only
    (C)   Both I and II   (D)   Neither I nor II

53.   Four cousins, Saurabh, Deepak, Pooja and Gaurav have different hobbies and
play different games. The hobbies they are interested in are story-reading,
music, watching TV serials and going to movies. The children play cricket,
badminton, hockey and fly kites. Saurabh and Gaurav do not like TV serials
or movies. Pooja and Saurabh do not play cricket or hockey. Deepak and
Gaurav do not read stories or fly kites. Saurabh does not play badminton.
Music lovers do not like to play hockey. The badminton players do not watch
TV serials. What is Deepak's hobby and which game does he play?

    (A)   TV Serials : Hockey   (B)   Music : Badminton
    (C)   Movies : Cricket   (D)   Music : Cricket

**Direction: (Q. Nos. 54 and 55) Answer the questions based on the following
information.**

**All the faces of a cube are painted with blue colour. Then it is cut into 125 small
equal cubes.**

54.   How many small cubes will be formed having only one face coloured?

    (A)   54   (B)   8
    (C)   16   (D)   24

55.   How many small cubes will be formed having no face coloured?

    (A)   27   (B)   8
    (C)   16   (D)   24

Direction: (Q. Nos. 56 – 59): Choose the word which is most nearly the SAME in meaning as the word given in CAPITAL letters.

56. ENLIGHTENMENT

    (A) Lightness   (B) Insight
    (C) Twilight   (D) Blinding

57. SUBLIMITY

    (A) Depression   (B) Reduction
    (C) Subversion   (D) Proficiency

58. EFFACE

    (A) Wipe out   (B) Weaken
    (C) Insult   (D) Repair

59. CALLOUS

    (A) Sensitive   (B) Soft
    (C) Kind   (D) Generous

60. If z = 52 and ACT = 48, then BAT =

    (A) 39   (B) 41
    (C) 44   (D) 46

61. In a certain code COVET is coded as FRYHW. Which word would be coded as SHDUO?

    (A) QUAKE   (B) REPAY
    (C) VKGXR   (D) PEARL

62. In a certain language 943 is coded as BED and 12448 is coded as SWEET. How is 492311 coded?

    (A) EDSWBS   (B) TSWBDD
    (C) DSWTEE   (D) EDWDSS

63. If Bank is coded as DCPM, then Book is coded as

    (A) MPGK   (B) DQQM
    (C) DQQN   (D) CQQL

64. If ZXGLI and YLLP stand for ACTOR and BOOK respectively, then PENCIL is written as

    (A) KUMXRO   (B) IGTWXZ
    (C) KUMRXD   (D) KUMXOR

65. If PAPER stands for QBQFS, the word GLASS will stand for

    (A) MTBHT   (B) MHTBT
    (C) HMBTT   (D) HMTBT

66. If A=1, BAN = 17, then INDIA =

    (A) 37   (B) 38
    (C) 36   (D) 35

67. If OFFICE is coded as 422168 and CEREAL is coded as 68857, then CLAIR is coded as

    (A) 67153   (B) 67512
    (C) 67513   (D) None of the above

68. If ROME = 7248, then MORE =

    (A) 2748   (B) 4278
    (C) 4178   (D) 4872

Direction: (Q. Nos. 69 and 70) Arrange the words given below in a meaningful sequence.

69. 1. Poverty 2. Population 3. Death 4. Unemployment 5. Disease

    (A) 2, 3, 4, 5, 1   (B) 3, 4, 2, 5, 1
    (C) 2, 4, 1, 5, 3   (D) 1, 2, 3, 4, 5

70. 1. Protect 2. Pressure 3. Relief 4. Rain 5. Flood

(A) 2, 4, 3, 1, 5   (B) 2, 4, 5, 1, 3
(C) 2, 5, 4, 1, 3   (D) 3, 2, 4, 5, 1

71. A, B, C, D and E are sitting on a bench. A is sitting next to B, C is sitting next to D, D is not sitting with E who is on the left end of the bench. C is on the second position from the right. A is to the right of B and E. A and C are sitting together. In which position A is sitting?

(A) Between B and D   (B) Between B and C
(C) Between E and D   (D) Between C and E

Direction: (Q. Nos. 72 – 74) In each of the following questions, choose the word which can be substituted for the given phrase/sentence.

72. Using of new words.

(A) Coinage   (B) Vocabulary
(C) Neologism   (D) Malapropism

73. One who deserts his religion

(A) Deserter   (B) Turncoat
(C) Fanatic   (D) Apostate

74. Careful in performing duties

(A) Punctual   (B) Punctilious
(C) Sincere   (D) Pugnacious

75. In MO : 13 11 :: HJ : ?, which will replace the question mark?

(A) 19 17   (B) 18 16
(C) 8 10   (D) 16 18

76. The centroid of a triangle is the point of concurrence of its

(A) angle bisectors   (B) perpendicular bisector
(C) altitudes   (D) medians

77. The area bounded by the curves $y = |x| - 1$ and $y = -|x| + 1$ is

(A) 1
(B) 2
(C) $\sqrt{2}$
(D) 4

78. A clock is started at noon. By 10 minutes past 5, the hour hand has turned through

(A) 145°
(B) 150°
(C) 155°
(D) 160°

79. In a $\triangle$ ABC, 'a' equals

(A) $b \cos B + c \cos C$
(B) $b \cos C + c \cos B$
(C) $\sqrt{b^2 - c^2}$
(D) None of the above

80. In a triangle $\cos A$ is

(A) $\dfrac{c^2 + a^2 - b^2}{2ca}$
(B) $\dfrac{a^2 + b^2 - c^2}{2cb}$
(C) $\dfrac{b^2 + c^2 - a^2}{2bc}$
(D) None of the above

81. The centre of a circle passing through the points (0, 0), (1, 0) and touching the circle $x^2 + y^2 = 9$ is

(A) [3/2,1/2]
(B) [1/2, 3/2]
(C) [1/2,1/2]
(D) [1/2,-2$^{1/2}$]

82. The equation to the plane through (3,4,5) parallel to the plane $2x + 3y - z = 0$ is

(A) $2x + 3y - z + 12 = 0$
(B) $2x + 3y - z - 12 = 0$
(C) $2x + 3y - z - 13 = 0$
(D) $2x + 3y - z + 13 = 0$

83. The equation of the normal at (4,0) to the circle $x^2 + y^2 = 16$ is

(A) $x = 4$
(B) $y = 0$
(C) $y = 4$
(D) $x + y = 4$

84. If a straight line makes 45° with each of x and y axes, then it makes an angle α with z-axis, where α is equal to

    (A) 30°   (B) 90°
    (C) 60°   (D) 0°

85. $ax^2 + 2hx + by^2 + 2yx + 2fy + c = 0$ represents a circle if

    (A) $a = b$ and $h = 0$ (B) $a = b$
    (C) $h = 0$ (D) None of the above

86. The matrix $\begin{bmatrix} 0 & 7 & 4 \\ -7 & 0 & -5 \\ -4 & 5 & 0 \end{bmatrix}$ is

    (A) symmetric   (B) skew symmetric
    (C) non-singular   (D) orthogonal

87. The rank of the matrix $\begin{bmatrix} 1 & -2 & 3 \\ -2 & 4 & -6 \\ 5 & 1 & -1 \end{bmatrix}$ is

    (A) 3   (B) 1
    (C) 2   (D) 0

88. Inverse of $\begin{bmatrix} \cos x & \sin x \\ -\sin x & \cos x \end{bmatrix}$ is

    (A) $\begin{bmatrix} \cos x & -\sin x \\ \sin x & \cos x \end{bmatrix}$ (B) $\begin{bmatrix} \cos x & \sin x \\ -\sin x & \cos x \end{bmatrix}$

    (C) $\begin{bmatrix} -\cos x & \sin x \\ -\sin x & \cos x \end{bmatrix}$ (D) $\begin{bmatrix} \cos x & -\sin x \\ \sin x & -\cos x \end{bmatrix}$

89. The characteristics roots of $A = \begin{bmatrix} \alpha & 0 & 0 \\ 1 & \beta & 0 \\ 2 & 3 & \gamma \end{bmatrix}$ are

    (A) α, β, γ

    (C) $\alpha, 1, \beta$

    (B) 1, 2, 3

    (D) None of the above

90. If A is a 2×3 matrix and B is a $m \times n$ matrix, then AB is defined when

    (A) $m = 2, n = 3$

    (C) $n = 2$ and m is any value

    (B) $m = 2, n = 2$

    (D) $m = 3$ and n is any value

91. The projection of the vector $\vec{a} = i - 2j + k = 0$ on the vector $\vec{b} = 4i - 4j + 7\vec{k}$ is equal to

    (A) $\dfrac{\sqrt{6}}{9}$

    (C) $\dfrac{9}{19}$

    (B) $\dfrac{19}{9}$

    (D) $\dfrac{\sqrt{6}}{19}$

92. If $\overline{r} = xi + yi + zk$, then $\nabla \cdot \overline{r}$ is

    (A) 3

    (C) 1

    (B) 0

    (D) None of the above

93. $\nabla \cdot (\nabla \phi)$ is equal to

    (A) $\nabla^2 \phi$

    (C) $\overline{0}$

    (B) 0

    (D) None of the above

94. If $\overline{a}, \overline{b}, \overline{c}$ are three non-zero non collinear vector, then $\left[\overline{a}, \overline{b}, \overline{c}\right] = 0$ only if

    (A) mutually perpendicular

    (C) parallel

    (B) $\vec{a} = \vec{b} = \vec{c}$

    (D) $\overline{a}, \overline{b}, \overline{c}$ are coplanar

95. The directions cosines of a vector equally inclined to the axes are

(A) $\left(\dfrac{1}{\sqrt{3}}, \dfrac{1}{\sqrt{3}}, \dfrac{1}{\sqrt{3}}\right)$

(B) $(1,1,1)$

(C) $\left(\dfrac{1}{2}, \dfrac{1}{2}, \dfrac{1}{2}\right)$

(D) $(1,0,0)$

96. A ticket is drawn at random from the ticket align numbered 1 to 10. The probability that the ticket has a number which is multiple either of 2 or 3 is

(A) 1/10

(B) 7/10

(C) 2/7

(D) 3/5

97. Given $E\,(X + c) = 8$ and $E\,(X - c) = 12$, the value of c is

(A) –2

(B) 4

(C) –4

(D) 2

98. $Var\left(4X + 3\right)$ is

(A) $4\,Var\left(X\right)$

(B) $16\,Var\left(X\right)$

(C) $4\,Var\left(X\right) + 3$

(D) $16\,Var\left(X\right) + 9$

99. In 5 throws of a die, getting 1 or 2 is a success. The mean number of successes is

(A) $\dfrac{5}{3}$

(B) $\dfrac{3}{5}$

(C) $\dfrac{5}{9}$

(D) $\dfrac{9}{5}$

100. There are 12 boys and 8 girls in a class including a brother and a sister. If two pupils are chosen at random the probability that neither the brother nor the sister is chosen is

(A) $\dfrac{14}{19}$

(B) $\dfrac{153}{190}$

(C) $\dfrac{189}{190}$

(D) $\dfrac{379}{380}$

101. The range of the function $f(x) = \dfrac{x-2}{2-x}$ is

   (A) R   (B) R – {1}
   (C) {–1}   (D) R – {-1}

102. $\displaystyle\lim_{x \to 0}\left(\dfrac{\sin x}{x}\right) =$

   (A) ∞ (B) –1
   (C) 1   (D) Indeterminate

103. $1 - \dfrac{x}{1!} + \dfrac{x^2}{2!} - \dfrac{x^3}{3!} + \ldots$ is

   (A) convergent for $|x| \le 1$ (B) convergent for $|x| < 1$
   (C) divergent for all values of x (D) convergent for all values of x

104. If $f(x) = \begin{pmatrix} 1 \text{ when } x \text{ is rational} \\ -1 \text{ when } x \text{ is irrational} \end{pmatrix}$, then f is

   (A) continuous at $x = 1$
   (B) continuous at $x = -1$
   (C) continuous for some values of x
   (D) discontinuous for all values of x

105. The function $f(x) = \sin + 5 \cos x$ is

   (A) unbounded   (B) bounded
   (C) discontinuous at $x = 0$ (D) None of the above

106. A solution of the differential equation $\left(\dfrac{dy}{dx}\right)^2 - x\left(\dfrac{dy}{dx}\right) + y = 0$ is

   (A) $y = 2$ (B) $y = 2x$
   (C) $4y = x^2$ (D) $y = 2x^2 - 4$

107. $Ae^x + Be^{2x} + \dfrac{x}{2} + \dfrac{3}{4}$ is the general solution of

(A) $\left(D^2 - 3D + 2\right)y = x$

(B) $\left(D^2 + 3D + 2\right)y = x$

(C) $\left(D^2 - 3D + 2\right)y = \dfrac{x}{2}$

(D) $\left(D^2 + 3D + 2\right)y = x + \dfrac{3}{2}$

108. The integrating factor of the linear differential equation $\dfrac{dy}{dx} + y\cot x = 2\cos x$ is

(A) $\cot x$
(C) $\sin x$

(B) $\cos x$
(D) $2\sin x$

109. If $y = e^{ax}$, then $D^n y$ is

(A) $a^{n+1}e^{ax}$
(C) $a^{n-1}e^{ax}$

(B) $a^n e^{ax}$
(D) $ae\, e^{ax}$

110. $L\left(t^n\right)$ is

(A) $\dfrac{n!}{s^{n+1}}$

(B) $\dfrac{n!}{s^n}$

(C) $\dfrac{n!}{s^{n-1}}$

(D) $\dfrac{(n+1)!}{s^n}$

111. $L^{-1}\left(\dfrac{1}{s(s+1)}\right)$ is

(A) $1 + e^{-t}$

(B) $\left(1 - e^{-t}\right)$

(C) $1 + e^t$

(D) $-1 + e^t$

112. If $L(f) = u(s)$ and $L(g) = v(s)$, then $L(3f + 4g)$ is equal to

(A) $(3a - 4b)\, u(s)$
(C) $3u(s) + 4v(s)$

(B) $(a + b)\, v(s)$
(D) $(3a + 4b)\, u(s)$

113. $L\left(e^{-a\tau}\right) = \dfrac{1}{s+a}$ provided,

    (A) $s \geq -a$ (B) $s < a$

    (C) $s \leq -a$ (D) $s > -a$

114. Two cards are drawn together from a pack of 52 cards. The probability that one is a spade and one is a heart is

    (A) 3/20   (B) 29/34

    (C) 47/100   (D) 13/102

115. $\displaystyle\int_{0}^{1}\int_{0}^{\pi/2} r^2 \sin\theta\, dr\, d\theta$ is

    (A) $\pi/2$ (B) 0

    (C) 1/3   (D) 1

116. $\displaystyle\int_{0}^{1}\int_{0}^{3} xy(x+y)\, dy\, dx$ is

    (A) $\dfrac{2}{3}$ (B) $\dfrac{3}{2}$

    (C) 6   (D) $\dfrac{1}{6}$

117. $1 + \log x + \dfrac{(\log x)^2}{2!} + \dfrac{(\log x)^3}{3!} + \ldots$ is

    (A) $\log x$ (B) e^x

    (C) x (D) None of the above

118. The value of x which makes $3x^2 + 6x - 4$ a minimum is

    (A) -7 (B) -4

    (C) -1 (D) 5

119. $1 + n\left(1 - \dfrac{1}{x}\right) + \dfrac{n(n+1)}{1.2}\left(1 - \dfrac{1}{x}\right)^2 + \ldots$ is equal to

(A) x^n

(B) $\left(1 - \dfrac{1}{x}\right)^n$

(C) $\left(1 + \dfrac{1}{x}\right)^{-n}$

(D) $\left(1 - \dfrac{1}{x}\right)^{-n}$

120. If $f(z) = \dfrac{\mathrm{Re}\,z}{|z|}, z \neq 0$ and $f(o) = 0$, then f is

(A) not continuous but differentiable at $z = 0$
(B) differentiable but not continuous at $z = 0$
(C) neither continuous nor differentiable at $z = 0$
(D) both continuous and differentiable at $z = 0$

121. The curve represented by $(\mathrm{Im}\,z)^2 = 1$ is a

(A) circle
(C) parabola

(B) rectangular hyperbola
(D) pair of straight lines

122. The number of subsets of $\{a,b,c,d,e\}$ having at least two elements is

(A) 25
(C) 26

(B) 12
(D) 24

123. If $|M \cap N| = 50$, $|M| = 30$, then $|N|$ is

(A) ≤ 20
(C) $= 20$

(B) ≥ 20
(D) > 20

124. The number of one to one functions from $\{a, b, c\}$ to $\{p, q, r, s\}$ is

(A) 24
(C) 20

(B) 7
(D) 12

125. In a classroom there are 500 candidates of whom 300 are intelligent and 250 are obedient. Assuming that each candidate is intelligent or obedient, how many candidates are both intelligent and obedient?

(A) 50   (B) 550
(C) 500   (D) 200

126. $\int\limits_{|z|=3} \dfrac{dz}{z-4}$ is equal to

(A) 0   (B) $\dfrac{1}{2\pi i}$

(C) 1   (D) $\dfrac{3}{2\pi i}$

127. The residue of $(z-1)^{-2} e^z$ at $z=1$ is

(A) 1   (B) e
(C) e^{-1} (D) 0

128. The complex function whose real part is $\dfrac{x}{x^2+y^2}$ is equal to

(A) $\dfrac{1}{z}$ (B) $\bar{z}$

(C) $\dfrac{1}{\bar{z}}$ (D) $\dfrac{1}{z^2}$

129. If w is a cube root of unity, then

(A) $1 + w^2 + w^4 + \ldots = w + w^3 + w^5 + \ldots$
(B) $w^3 = 0$
(C) $w^3 = 1$
(D) $w = w^3$

130. $x + 2y + 3z = 5,\ 2x + 4y + 6z = 10$ have

(A) no solution   (B) a unique solution
(C) infinite no. of solutions   (D) None of the above

131. If α and β are the roots of $x^2 + 3x + 4 = 0$, then $\alpha^2 + \beta^2$ is

 (A) 0

 (B) 1

 (C) −1

 (D) 4

132. $\dfrac{1}{(1+x)(1+2x)}$ can be expanded as a series in ascending powers of x when

 (A) $|x| < |$

 (B) $|x| < 2$

 (C) $|x| < \dfrac{1}{2}$

 (D) $|x| \leq \dfrac{1}{2}$

133. The series $\sum_{n=1}^{\infty} \dfrac{3n}{4n+1}$

 (A) converges to 0

 (B) converges to $\dfrac{3}{4}$

 (C) converges to 1

 (D) diverges

134. The series $1 - 1 + 1 - 1 + \ldots\ldots\ldots$

 (A) converges to 1

 (B) converges to −1

 (C) diverges

 (D) oscillates

135. The area of the triangle bounded by $y = x$, $y = 3x$ and $x = 1$ is

 (A) 3

 (B) 2

 (C) 1

 (D) 3/2

136. If the sides of a triangle are in the ratio $1 : 1 : \sqrt{2}$, then the largest angle is

 (A) 45°

 (B) 60°

 (C) 30°

 (D) 90°

137. A large cube is formed from the material obtained by melting three smaller cubes of 3 cm, 4 cm and 5 cm side. What is the ratio of the total surface areas of the smaller cubes and the large cube?

(A) 2 : 1   (B) 3 : 2
(C) 25 : 18   (D) 27 : 20

138. The coefficient of the middle term in the expansion of $(2+3x)^4$ is

(A) 6   (B) 5!
(C) 8!   (D) 216

139. The binary equivalent of $(231)_{10}$ is

(A) 11100111   (B) 10111001
(C) 01110011   (D) None of the above

140. 2's complement of 0100 is

(A) 1011   (B) 1100
(C) 0101   (D) None of the above

141. The hexadecimal subtraction of $(56)_{16}$ from $(427)_{16}$ results in

(A) $(3B1)_{16}$ (B) $(331)_{16}$
(C) $(371)_{16}$ (D) $(3D1)_{16}$

142. A hexadecimal odometer displays F 52 F. The next reading will be

(A) F52E   (B) G52F
(C) F53F   (D) F53O

143. What is the maximum decimal number that can be accommodated in a byte?

(A) 128   (B) 256
(C) 255   (D) 512

Direction: (Questions 144 and 145) In each question below, there is a sentence of which some parts have been jumbled up. Rearrange these parts which are labelled **P, Q, R** and **S** to produce the correct sentence. Choose the proper sequence.

144.   I read an advertisement that said

    P : posh, air-conditioned
    Q : gentleman of taste
    R : are available for
    S : fully furnished rooms

        (A)   PQRS   (B)   PSRQ
        (C)   PSQR   (D)   SRPQ

145.   It is very easy

    P : a great deal more than one realises
    Q : may mean
    R : that a phrase that one does not quite understand
    S : to persuade oneself

        (A)   RSQP   (B)   SPQR
        (C)   SRQP   (D)   RQPS

Direction: (Q. Nos. 146 – 148): Fill in the blanks in the following sentence by selecting the most appropriate alternative from amongst the four choices given under each sentence.

146.   The bill in the Parliament was ………. by fifty five people.

        (A)   accepted   (B)   voted
        (C)   carried   (D)   opposed

147.   His death is a great blow, most terrible to …………

        (A)   bear   (B)   imagine
        (C)   accept   (D)   sustain

148. The little girl ………. for the light switch in the dark.

    (A) groped   (B) grappled
    (C) gripped   (D) groveled

149. Mean = Variance for

    (A) Binomial distribution   (B) Poisson distribution
    (C) Normal distribution   (D) Exponential distribution

150. The order and degree of the differential equation $\left(1+\dfrac{d^2y}{dx^2}\right)^{2/3} = \dfrac{d^4y}{dx^4}$ are respectively

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

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