50111

ROLL No. | | | | | |

QN. BOOKLET No. **0451**

APTITUDE TEST FOR M.C.A.

Time: 2 Hours

Maximum Marks: 450

INSTRUCTIONS TO CANDIDATES

1. You are provided with a Question Booklet and an Optical Mark Reader (OMR) Answer Sheet to mark your responses. Do not soil your OMR Sheet. Read carefully all the instructions given on the OMR Sheet.
2. Write your Roll Number in the space provided on the top of **this page**.
3. Also write your Roll Number, Test Code, Test Centre Code, Test Centre Name, Test Subject and the date and time of the examination in the columns provided for the same on the **Answer Sheet**. Darken the appropriate bubbles with HB pencil.
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 **HB pencil** corresponding to the correct response as indicated in the example shown on the Answer Sheet. Also write the alphabet of your response with ball pen in the starred column against attempted questions and put an '×' mark by ball pen in the starred column against unattempted questions as given in the example in the OMR 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 question booklet.
8. You should return the Answer Sheet to the Invigilator before you leave the examination hall. However Question Booklet may be retained with the Candidate.
9. Every precaution has been taken to avoid errors in the Question Booklet. In the event of such unforeseen happenings, suitable remedial measures will be taken at the time of evaluation.
10. Please feel comfortable and relaxed. You can do better in this test in a tension-free disposition.

WISH YOU A SUCCESSFUL PERFORMANCE

SEAL

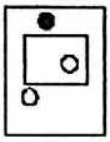
50111

APTITUDE TEST FOR M.C.A.

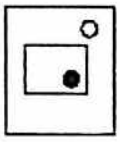
Direction (Question Nos. 1 and 2): In each of the questions four figures are given. Find out the figure which is not similar to the other three.

1.

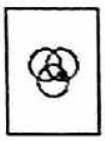
(A) 

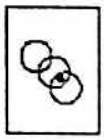
(B) 

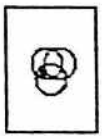
(C) 

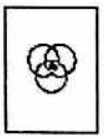
(D) 

2.

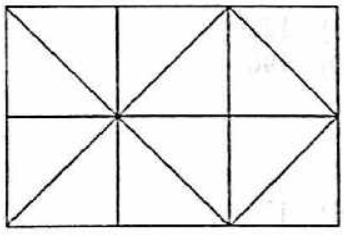
(A) 

(B) 

(C) 

(D) 

3. In the following figure the number of squares is

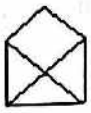


(A) 6
(B) 7
(C) 9
(D) 10

Direction (Question Nos. 4 – 6): Which one of the following figures is different from the other three? :

4.

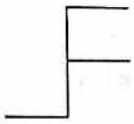
(A) 

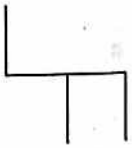
(B) 

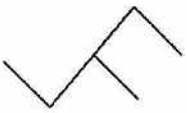
(C) 

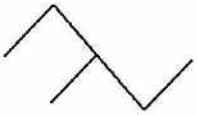
(D) 

5.

(A) 

(B) 

(C) 

(D) 

6.

(A) 

(B) 

(C) 

(D) 

Direction (Question Nos. 7 – 10): Find the odd term.

7. 196, 169, 144, 121, 80

(A) 80
(B) 121
(C) 169
(D) 196

8. 5, 10, 17, 24, 37

(A) 10
(B) 17
(C) 24
(D) 37

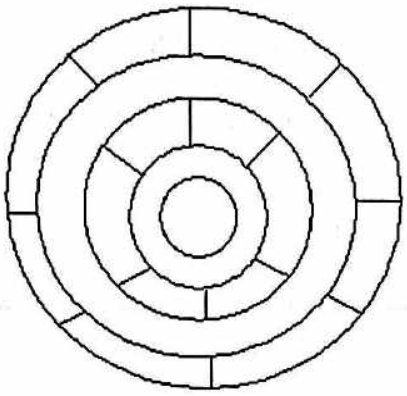
9. 325, 259, 202, 160, 127, 105, 94

(A) 94 (B) 127
(C) 202 (D) 259

10. 3, 4, 10, 32, 136, 685, 4116

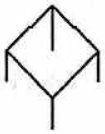
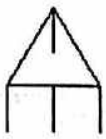
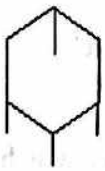
(A) 10 (B) 32
(C) 685 (D) 4116

11. The minimum number of colours to paint the figure so that no two adjacent regions receive the same colour is



(A) 3 (B) 4
(C) 5 (D) 6

12. Which one of the following figures is different from the other three?

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

13. *Forfeit* is related to *Surrender* in the same way as *Remit* is related to

(A) Perceive (B) Confiscate
(C) Exempt (D) Cancel

14. BEAT is written as GIDV, SOUP may be written as

(A) XSYR (B) XYXR
(C) XYRX (D) XSXR

15. GOLD is written as ALHY, IRON may be written as

(A) GOKI (B) GKOI
(C) GKUI (D) GUKI

16. If DELHI is coded as CCIDD, how would you encode BOMBAY?

(A) AJMTVT (B) AMJXVS
(C) MJXVSU (D) WXYZAX

17. If CIGARETTE is coded as GICERAETT, then DIRECTION will be coded as

(A) RIDTCENOI (B) NORTECDII
(C) NOIETCRID (D) IRDCTIONE

18. In a certain code, PAPER is written as SCTGW. How is MOTHER written in that code?

(A) ORVLGW (B) PQVJGT
(C) PQXJJT (D) PQXKJV

19. If DIAMOND is coded as VQYMKLV, how is FEMALE coded?

(A) TVNYNV (B) UVNZOV
(C) UVNYNV (D) TUMYNU

20. If in a certain language, SHIFT is coded as REFBO, which word would be coded as LKUMB?

(A) MNXQG (B) MLVNC
(C) KJVLA (D) MJVLC

21. If in a certain code, COVET is written as FRYHW, which word would be written as SHDUO?

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

22. If *water* is called *food*, *food* is called *tree*, *tree* is called *sky*, *sky* is called *wall*, on which of the following grows a *fruit*?

(A) Water (B) Food
(C) Sky (D) Tree

23. If *cushion* is called *pillow*, *pillow* is called *mat*, *mat* is called *bedsheet* and *bedsheet* is called *cover*, which will be spread on the *floor*?

(A) Cover (B) Bedsheet
(C) Mat (D) Pillow

24. If *air* is called *green*, *green* is called *blue*, *blue* is called *sky*, *sky* is called *yellow*, *yellow* is called *water and water* is called *pink*, then what is the colour of clear sky?

(A) Blue (B) Sky
(C) Yellow (D) Water

25. Pointing to a photograph, a lady tells Pramod, "I am the only daughter of this lady and her son is your maternal uncle." How is the speaker related to Pramod's father?

(A) Sister-in-law (B) Wife
(C) Either (A) or (B) (D) Neither (A) nor (B)

26. Rahul told Anand, 'Yesterday I defeated the only brother of the daughter of my grandmother.' Whom did Rahul defeat?

(A) Son (B) Father
(C) Brother (D) Father-in-law

Direction (Question Nos. 27 – 30): Choose the next correct sequence.

27. ABCA, BCDB, CDEC, DEFD, ...

(A) FGIK (B) MAAL
(C) IRJQ (D) EFGE

28. BCEG, CDFH, DEGI, EFHI, ...

(A) FGIK (B) MAAL
(C) IRJQ (D) EFGE

29. MAAL, AALM, ALMA, LMAA, ...

(A) FGIK (B) MAAL
(C) IRJQ (D) EFGE

30. AZBY, CXDW, EVFU, GTHS, ...

(A) FGIK (B) MAAL
(C) IRJQ (D) EFGE

31. Pick the word that is most nearly opposite in meaning to the word UNSCATHED

(A) Honest (B) Cleansed
(C) Injured (D) Gathered

Direction (Question Nos. 32 and 33): Select the pair of words which are related in the same way as the capitalised words are related to each other

32. LACHRYMOSE : TEARS

(A) Morose : Speeches (B) Profound : Sighs
(C) Verbose : Words (D) Ironic : Jests

33. SKINFLINT : STINGY

(A) Daredevil : Alert (B) Dichard : Stubborn
(C) Braggrart : Carefree (D) Blackguard : Protective

Direction (Question Nos. 34 – 36): The following questions have two words which are related. Which pair has the same relationship as the original pair?

34. Restaurant : Menu

(A) Library : Catalogue (B) Journal : Newspaper
(C) Book : Encyclopaedia (D) College : Account

35. Indigent : Wealthy

(A) Scholarly : Erudite (B) Gauche : Graceful
(C) Native : Affluent (D) Angry : Rich

36. Thrust : Spear

(A) Scabbard : Sword
(B) Mangle : Iron
(C) Bow : Arrow
(D) Fence : Epee

Directions (Question Nos. 37 – 39): Choose the correct conclusion based on the given statements.

37. **Statements :**

(1) Processed meat is a perishable food.
(2) All perishable foods are packed in sealed tins.
(3) Sealed tins sometimes do not contain processed meat.

Conclusions :

(A) Non- perishable foods are never packed in sealed tins.
(B) Processed meat is always packed in sealed tins.
(C) Processed meat is sometimes not packed in sealed tins.
(D) Sealed tins always contain perishable food.

38. **Statements :**

In a class, three-fourth of the boys play football, one-half play cricket, one-fourth of those who play cricket do not play football.

Conclusions :

(A) Two-Third of the boys play only football.
(B) One-Fourth of the boys play neither cricket nor football
(C) One-Third of the boys play neither cricket nor football.
(D) One-Eighth of the boys play neither cricket nor football

39. **Statements :**

(1) Only students can participate in the race.
(2) Some participants in the race are females.
(3) All female participants in the race are invited for coaching.

Conclusions :

(A) All participants in the race are invited for coaching.
(B) All participants in the race are males.
(C) All students are invited for coaching.
(D) All participants in the race are students.

Direction (Question Nos. 40 – 43): Answer the questions based on the statements given below:

(i) Shankar and Mukul know English, French and German
(ii) Mukul and Ramesh know English, German and Russian
(iii) Ramesh and Krithika know English, Hindi and Russian
(iv) Krithika and Vimala know Hindi, French and Russian
(v) Shankar and Vimala know Hindi, French and German

40. Name the person who knows English, Hindi, French and German

(A) Shankar (B) Mukul
(C) Ramesh (D) Krithika

41. Name the person who knows English, French, German and Russian

(A) Shankar (B) Vimala
(C) Krithika (D) Mukul

42. Name the person who knows English, Hindi, German and Russian

(A) Shankar (B) Ramesh
(C) Mukul (D) Vimala

43. Name the person who does not know German language

(A) Shankar (B) Krithika
(C) Ramesh (D) Vimala

Direction (Question Nos. 44 – 47): Using the following symbols choose the correct answer.

θ represents 'equal to'
$\triangle$ represents 'greater than'
$+$ represents 'not greater than'
$\square$ represents 'not less than'
ϕ represents 'not equal to'
$\times$ represents 'less than'

44. $a \triangle b \triangle c$ does not imply

(A) $a \times b \theta c$ (B) $a \square b \triangle c$
(C) $c + b \times a$ (D) $c + b \phi a$

45. $a \square b \triangle c$ implies that

(A) $b \triangle a \triangle c$ (B) $a \triangle b \times c$
(C) $a + b \times c$ (D) $b + a \triangle c$

46. $a \theta b \phi c \theta d$ does not imply

(A) $a \theta c \theta d$ (B) $a \phi c$
(C) $b \phi c$ (D) $a \phi c \theta d$

47. $a + b \theta c$ implies that

(A) $c \square b + a$ (B) $b \phi a \phi c$
(C) $a \square c \theta b$ (D) $a \phi b \triangle c$

Direction (Question Nos. 48 – 52): Read the following information carefully and answer the questions given below it.

A family consists of six members P, Q, R, X, Y and Z. Q is the son of R but R is not the mother of Q. P and R are a married couple. Y is the brother of R. X is the daughter of P. Z is the brother of P.

48. Who is the brother-in-law of R?

(A) P (B) Z
(C) Y (D) X

49. How many children does P have?

(A) One (B) Two
(C) Three (D) Four

50. How many female members are there in the family?

(A) One (B) Two
(C) Three (D) Four

51. How is Q related to X?

(A) Husband (B) Father
(C) Brother (D) Uncle

52. Which is a pair of brothers?

(A) P and X
(B) P and Z
(C) Q and X
(D) R and Y

Direction (Question Nos. 53 - 55): Read the following information carefully and answer the questions given below it.

In a car exhibition, seven cars of seven different companies *viz.*, Cardilac, Ambassador, Fiat, Maruti, Mercedes, Bedford and Fargo were displayed in a row, facing east such that:

(1) Cardilac car was to the immediate right of Fargo.
(2) Fargo was fourth to the right of Fiat.
(3) Maruti car was between Ambassador and Bedford.
(4) Fiat, which was third to the left of Ambassador car, was at one of the ends.

53. Which of the following was the correct position of the Mercedes?

(A) Immediate right of Cardilac
(B) Immediate left of Bedford
(C) Between Bedford and Fargo
(D) Fourth to the right to Maruti

54. Which of the following is definitely true?

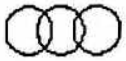
(A) Maruti is to the immediate left of Ambassador.
(B) Bedford is to the immediate left of Fiat.
(C) Bedford is at one of the ends.
(D) Fiat is second to the right of Maruti.

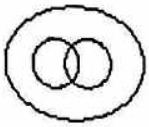
55. Which of the following groups of cars is to the right of the Ambassador car?

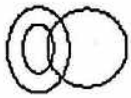
(A) Cardilac, Fargo and Maruti
(B) Maruti, Beford and Fiat
(C) Mercedes, Cardilac and Fargo
(D) Bedford, Cardilac and Fargo

56. Which is the most suitable Venn diagram among the following, which represent interrelationship among **Antisocial elements, Pick Pockets and Black Mailers**

(A) 

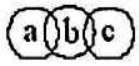
(B) 

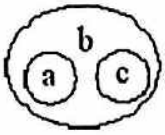
(C) 

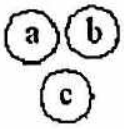
(D) 

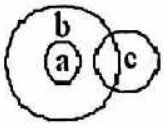
Direction (Question Nos. 57 - 60): Given below are four patterns represented by circles a, b and c which indicate the logical relationship between and among the respective descriptions. On the basis of description given for a, b and c respectively in the questions, decide which of the given patterns (A), (B), (C), or (D) best indicates the logical relationship.

57. a. Doctor b. Male c. Actor

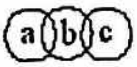
(A) 

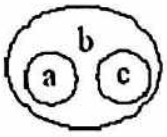
(B) 

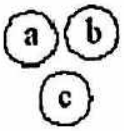
(C) 

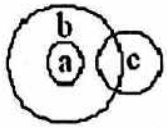
(D) 

58. a. Gold b. Ornament c. Silver

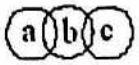
(A) 

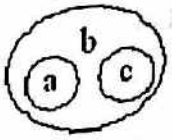
(B) 

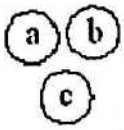
(C) 

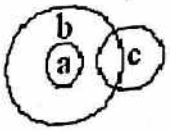
(D) 

59. a. Rose b. Flower c. Lotus

(A) 

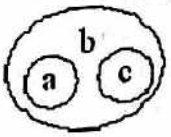
(B) 

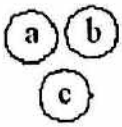
(C) 

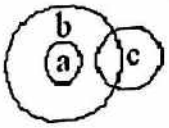
(D) 

60. a. Father b. Mother c. Child

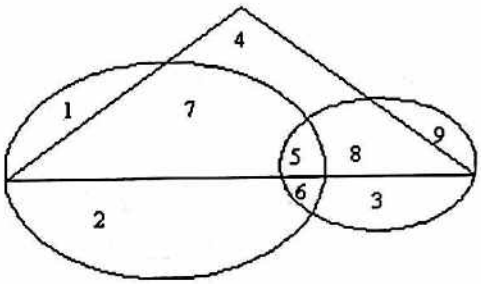
(A) 

(B) 

(C) 

(D) 

Direction (Question Nos. 61 - 65): These questions are based on the following diagram in which the triangle represents female graduates, small ellipse represents self-employed females and big ellipse represents self-employed females with bank loan facility. Numbers are shown in the different sections of the diagram. On the basis of these numbers, answer the following:



61. How many female graduates are self-employed?

(A) 12 (B) 13
(C) 15 (D) 20

62. How many female graduates are not self-employed?

(A) 4 (B) 10
(C) 12 (D) 15

63. How many non-graduate females are self-employed?

(A) 9 (B) 11
(C) 12 (D) 21

64. How many self-employed female graduates are with bank loan facility?

(A) 5 (B) 7
(C) 12 (D) 20

65. How many non-graduate self-employed females are with bank loan facility?

(A) 3 (B) 8
(C) 9 (D) 12

Direction (Question Nos. 66 - 68): Find the missing term:

66. 8, 10, 14, 18, ..., 34, 50, 66

(A) 24 (B) 25
(C) 26 (D) 27

67. 3, 12, 27, 48, 75, 108, ...

(A) 147 (B) 162
(C) 183 (D) 192

68. 1, 4, 2, 8, 6, 24, 22, 88, ...

(A) 86 (B) 90
(C) 154 (D) 352

Direction (Question Nos. 69 – 71): Find the next two numbers:

69. $2, \frac{1}{2}, 5, \frac{1}{5}, 8, \ldots, \ldots$

(A) $\frac{1}{9}, 12$ (B) $\frac{1}{8}, 11$
(C) $\frac{1}{9}, 11$ (D) $\frac{1}{8}, 12$

70. 8,0,15,9,22,18,29,27,... , ...

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

71. $\frac{2}{3}, 1\frac{2}{3}, 2, 2\frac{2}{3}, 3\frac{1}{3}$ ... , ...

(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 (Question No. 72): Choose the word from the given alternatives which has the same relation as that of the first two words in the question.

72. Darwin : Evolution : : Archimedes : ?

(A) Friction
(B) Lubrication
(C) Buoyancy
(D) Liquids

Direction (Question Nos. 73 and 74): Using the following definition, answer the questions.

For any positive integer n, $T(n)$ represents the number of positive divisors of n.

73. Which of the following are true?

I. $T(5)=T(7)$
II. $T(5).T(7)=T(35)$
III. $T(5)+T(7)=T(12)$

(A) I only
(B) II only
(C) I and II only
(D) I and III only

74. What is the value of $T(T(T(12)))$?

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

75. Find the odd man out

(A) Wise
(B) Arrogant
(C) Gentle
(D) Honest

76. If $f(x)=\begin{vmatrix} 1 & x & x+1 \\ 2x & x(x-1) & x(x+1) \\ 3x(x-1) & x(x-1)(x-2) & x(x-1)(x+1) \end{vmatrix}$, then $f(51)+f(52)+.....f(100)$ is equal to

(A) 0
(B) 725
(C) 1875
(D) 4250

77. The number of distinct real roots of $\begin{vmatrix} \sin x & \cos x & \cos x \\ \cos x & \sin x & \cos x \\ \cos x & \cos x & \sin x \end{vmatrix}=0$ in the interval $-\frac{\pi}{4}\le x\le\frac{\pi}{4}$ is

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

78. If $bc+ca+ab=18$, and $\begin{vmatrix} 1 & a^2 & a^3 \\ 1 & b^2 & b^3 \\ 1 & c^2 & c^3 \end{vmatrix}=\lambda\begin{vmatrix} 1 & 1 & 1 \\ a & b & c \\ a^2 & b^2 & c^2 \end{vmatrix}$ the value of λ is

(A) -1
(B) 0
(C) 9
(D) 18

79. If $\begin{pmatrix} a & a+b+c \\ a+b+c+d & a+b \end{pmatrix}=\begin{pmatrix} 2 & 5 \\ 6 & 4 \end{pmatrix}$, then

(A) $a=1, b=1, c=2, d=1$
(B) $a=2, b=3, c=4, d=2$
(C) $a=2, b=4, c=5, d=1$
(D) $a=2, b=2, c=1, d=1$

80. The rank of the matrix $A=\begin{pmatrix}4 & 0 & 3\\ 0 & 5 & 2\end{pmatrix}$ is

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

81. The product of two eigen values of the matrix $A=\begin{bmatrix}6 & -2 & 2\\ -2 & 3 & -1\\ 2 & -1 & 3\end{bmatrix}$ is 16. The third eigen value is

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

82. The eigen vectors of a 3×3 real symmetric matrix A corresponding to the eigen values 2, 3, 6 are $[1,0,-1]^T$, $[1,1,1]^T$ and $[-1,2,-1]^T$ respectively. The matrix A is

(A) $\begin{bmatrix}1 & 0 & -1\\ 1 & 1 & 1\\ -1 & 2 & -1\end{bmatrix}$ (B) $\begin{bmatrix}1 & 1 & -1\\ 0 & 1 & 2\\ -1 & 1 & -1\end{bmatrix}$

(C) $\begin{bmatrix}2 & 1 & -1\\ 0 & 3 & 2\\ -1 & 1 & 6\end{bmatrix}$ (D) $\begin{bmatrix}3 & -1 & 1\\ -1 & 5 & -1\\ 1 & -1 & 3\end{bmatrix}$

83. The inverse of $\begin{pmatrix}5 & 0\\ 0 & 1\end{pmatrix}$ is

(A) $\begin{pmatrix}\frac{1}{5} & 0\\ 0 & 1\end{pmatrix}$ (B) $\begin{pmatrix}1 & 0\\ 0 & \frac{1}{5}\end{pmatrix}$

(C) $\frac{1}{5}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}$ (D) $\frac{1}{5}\begin{pmatrix}0 & 1\\ 1 & 0\end{pmatrix}$

84. The value of 'a' for which the equations $x+y+z=3,\ x+2y+2z=6,\ x+ay+3z=2$ will have unique solution, is

(A) $a=3$ (B) $a\neq 3$
(C) $a=6$ (D) $a\neq 6$

85. If 1 is a root of $x^4-3x^3+7x^2+2x+a=0$ then a is

(A) 1 (B) -1
(C) 7 (D) -7

86. $x=1,\ y=1$ is a unique solution of

(A) $x+y=2,\ 5x+5y=10$ (B) $x+2y=3,\ x+y=0$
(C) $x+y=2,\ 2x+2y=3$ (D) $x-2y=0,\ 2x-y=0$

87. The number of functions from $\{a,b\}$ to $\{a,b,c\}$ is

(A) 4 (B) 2
(C) 9 (D) 3

88. If A,B,C are any three sets, then $(A\cap B)-C=$

(A) $(A-C)\cup(A-B)$ (B) $(A-C)\cup(B-C)$
(C) $(A-C)\cap(B-C)$ (D) $(A-C)\cap(A-B)$

89. How many proper subset of $\{1,2,3,4,5,6,7\}$ contain the numbers 1 and 7?

(A) 7 (B) 20
(C) 31 (D) 62

90. The maximum number of sets obtainable from A and B by applying union and difference operations is

(A) 5 (B) 6
(C) 7 (D) 8

91. If $|A \cup B| = 100$ and $|A| = 40$ then $|B|$ is

(A) ≤ 60
(B) $= 60$
(C) ≥ 60
(D) > 60

92. Identify the wrong statement from the following:

(A) For two sets A and B, $A - B = A \cap \overline{B}$
(B) For three sets A, B, C, $(A - B) - C = (A - C) - (B - C)$
(C) For two sets A and B, $\overline{A} \cup \overline{B} = \overline{A \cap B}$
(D) For three sets A, B, C, $A \cap B \cap \overline{C} \subseteq A \cap B$

93. Let L be the set of all lines in a plane and R be a relation on L defined by $l_1 R l_2$ if and only if $l_1 \perp l_2$, then R is

(A) reflexive
(B) symmetric
(C) transitive
(D) an equivalence relation

94. Let $A = \{1,2,3,4\}$ and R be the relation on A defined as follows: $R = \{(1,2),(2,2),(3,4),(4,1)\}$. Then R is

(A) symmetric relation
(B) antisymmetric relation
(C) neither symmetric nor antisymmetric
(D) reflexive relation

95. Let $f(x) = \dfrac{x - [x]}{1 + x - [x]}$, where $[x]$ denotes the greatest integer less than or equal to x, then the range of f is

(A) $[0,1)$
(B) $\left[0, \frac{1}{2}\right]$
(C) $\left[0, \frac{1}{2}\right)$
(D) $[0,1]$

96. The polar form of $-1-i$ is

(A) $\sqrt{2}\left(\cos\frac{\pi}{8}+i\sin\frac{\pi}{8}\right)$ (B) $\sqrt{2}\left(\cos\frac{3\pi}{4}+i\sin\frac{3\pi}{4}\right)$

(C) $\sqrt{2}\left\{\cos\left(-\frac{3\pi}{4}\right)+i\sin\left(-\frac{3\pi}{4}\right)\right\}$ (D) $\sqrt{2}\left(\cos\frac{\pi}{2}+i\sin\frac{\pi}{2}\right)$

97. If $f:R\to R$ be given by $f(x)=x^3-2$. Then f^{-1} equals

(A) $x+2$ (B) $x^{\frac{1}{3}}-2$

(C) $(x+2)^{\frac{1}{3}}$ (D) $(x-2)^3$

98. The value of $\int\frac{e^{-z}}{(1+z)}dz$ when C is $|z|=2$ is

(A) $2\pi ie$ (B) $-2\pi ie$

(C) $2\pi ie^{-1}$ (D) 0

99. The three points z_1,z_2,z_3 are connected by the relation $az_1+bz_2+cz_3=0$, where $a+b+c=0$, then the points are

(A) vertices of a right angled triangle
(B) vertices of an isosceles triangle
(C) vertices of an equilateral triangle
(D) collinear

100. The image of the hyperbola $xy=c^2$ by the transformation $\omega=2z$ is

(A) $uv=4c^2$ (B) $u+v>2$

(C) $v>0$ (D) $0<u<1, v<0$

101. The fixed points of the transformation $\omega=-\frac{2z+4i}{iz+1}$ are

(A) $(2i,i)$ (B) $(4i,-i)$

(C) $(-4i,i)$ (D) $(-2i,i)$

102. If a straight line make 30° and 90° with x and $y-$axes, then it makes an angle α with z axis where α is equal to

(A) 30° (B) 45°
(C) 60° (D) 0°

103. The residue of $e^z z^{-5}$ at $z=0$ is

(A) $\frac{1}{2}$ (B) $\frac{1}{6}$
(C) $\frac{1}{18}$ (D) $\frac{1}{24}$

104. If α, β, γ are the roots of $x^3+4x+3=0$ then

(A) $\alpha+\beta=\gamma$ (B) $\beta+\gamma=\alpha$
(C) $\gamma+\alpha=\beta$ (D) $\alpha+\beta=-\gamma$

105. The number of real roots of the equation $|x|^2-3|x|+2=0$ are

(A) 4 (B) 16
(C) 2 (D) infinite

106. The equation $\sqrt{x+3-4\sqrt{x-1}}+\sqrt{x+8-6\sqrt{x-1}}=1$ has

(A) no solution (B) exactly one solution
(C) exactly two solutions (D) more than two solutions

107. If $f(\xi)=\int_C \frac{3z^2+6z+1}{z-\xi}dz$ where C is the circle $x^2+y^2=4$, the value of $f(1-i)$ is

(A) $2\pi(12+7i)$ (B) $\pi(12+7i)$
(C) $12\pi i$ (D) 0

108. If a,b,c are in A.P., p,q,r are in H.P. and ap,bq,cr are in G.P., then $\frac{p}{r}+\frac{r}{p}$ is equal to

(A) $\frac{a}{c}-\frac{c}{a}$ (B) $\frac{b}{q}+\frac{q}{b}$

(C) $\frac{b}{q}-\frac{a}{p}$ (D) $\frac{a}{c}+\frac{c}{a}$

109. $\frac{1}{1.2}+\frac{1}{3.4}+\frac{1}{5.6}+\frac{1}{7.8}+\ldots$

(A) diverges (B) converges to $\log 2$

(C) converges to 1 (D) oscillates

110. $\lim_{x\to 0}\frac{\left(e^{x}-e^{-x}\right)}{\left(\log(1+x)\right)}$ is equal to

(A) 0 (B) 1

(C) 2 (D) 3

111. The coefficient of x^4 in the series

$1+\frac{1+x+x^2}{1!}+\frac{\left(1+x+x^2\right)^2}{2!}+\frac{\left(1+x+x^2\right)^3}{3!}+\ldots$ is

(A) $\frac{25}{12}e$ (B) $\frac{25}{18}e$

(C) $\frac{25}{24}e$ (D) $\frac{25}{27}e$

112. If p is a prime number, then sum of the series

$\log_p\left(p^{1/2}\right)-\log_p\left(p^{1/3}\right)+\log_p\left(p^{1/4}\right)-\ldots.$ is

(A) $1-\log_e 2$ (B) $1+\log_e 2$

(C) $2+\log_e e$ (D) $1+\log_e e$

113. With the usual notation, $C_0+2C_1+3C_2+....+(n+1)C_n$ is equal to

(A) 2^n (B) 2^{n-1}

(C) $2^{n-1}-1$ (D) $(n+2)2^{n-1}$

114. If $\sin x+\sin^2 x=1$, then

(A) $\cos x+\cos^2 x=1$ (B) $\cos x-\cos^2 x=1$

(C) $\cos^2 x+\cos^3 x=1$ (D) $\cos^2 x+\cos^4 x=1$

115. The value of $\lim_{n\to\infty}\left(1+\frac{1}{n}\right)^n$ is

(A) e (B) $\frac{1}{e}$

(C) $e+\frac{1}{e}$ (D) $e-\frac{1}{e}$

116. If $f(x)=\begin{cases}\frac{2^{x+2}-16}{4^x-16}, & \text{if } x\neq 2\\ A, & \text{if } x=2\end{cases}$ then the value of A so that f is continuous is

(A) 1 (B) $\frac{1}{2}$

(C) 2 (D) e

117. $1+x+\frac{x^2}{2!}+\frac{x^3}{3!}+...$ is

(A) convergent for all value of x (B) convergent for $|x|\leq 1$

(C) convergent for $|x|<1$ (D) divergent for all value of x

118. Let $g(x)=\int_0^x f(t)\,dt$ and $f(x)$ satisfies the equation $f(x+y)=f(x)+f(y)+2xy-1$ for all $x,y\in R$ and $f'(0)=2$, then

(A) g increases on $(0,\infty)$ and decreases on $(-\infty,0)$

(B) g increases on $(0,\infty)$

(C) g decreases on $(0,\infty)$ and increases on $(-\infty,0)$

(D) g decreases on $(-\infty,\infty)$

119. The focal length of a mirror is given by the formula $\frac{1}{f}=\frac{1}{v}-\frac{1}{u}$. If equal errors k are made in the determination of u and v, the percentage error in f is

(A) $100k\left(\frac{1}{u}+\frac{1}{v}\right)$ (B) $k\left(\frac{1}{u}+\frac{1}{v}\right)$

(C) $100k\left(\frac{1}{v}-\frac{1}{u}\right)$ (D) $k\left(\frac{1}{v}-\frac{1}{u}\right)$

120. If $u=(x-y)^4+(y-z)^4+(z-x)^4$, then the value of $\frac{\partial u}{\partial x}+\frac{\partial u}{\partial y}+\frac{\partial u}{\partial z}$ is equal to

(A) $2u$ (B) $4u$

(C) u^2 (D) 0

121. The equation of the tangent to the circle $x^2+y^2=169$ at $(5,12)$ is

(A) $x+y=169$ (B) $5x+12y=169=0$

(C) $5x+12y=0$ (D) $5x+12y=13$

122. A coin is tossed three times. The probability of getting head and tail alternatively is

(A) $\frac{1}{11}$ (B) $\frac{2}{3}$

(C) $\frac{3}{4}$ (D) $\frac{1}{4}$

123. The mean and variance of the exponential density function $f(x)=\frac{3}{7}e^{-3x/7}$, $x \geq 0$ are given by

(A) $\frac{3}{7}$ and $\frac{4}{49}$ (B) $\frac{3}{7}$ and $\sqrt{\frac{3}{7}}$

(C) $\frac{7}{3}$ and $\frac{49}{3}$ (D) $\frac{7}{3}$ and $\frac{7}{3}$

124. $L\left[e^{-at}\cos bt\right]$ is equal to

(A) $\frac{s-a}{\left((s-a)+b^2\right)}$ (B) $\frac{s+a}{(s+a)^2+b^2}$

(C) $\frac{s+a}{(s+a)^2-b^2}$ (D) $a\,L\left[\cos bt\right]$

125. $L^{-1}\left(\frac{(s+2)}{s^2+4s+13}\right)$ is

(A) $e^{-2t}\sin 3t$ (B) $e^{2t}\sin 3t$

(C) $e^{2t}\cos 3t$ (D) $e^{-2t}\cos 3t$

126. $\int\left\{\frac{\log x-1}{1+(\log x)^2}\right\}^2 dx$ is equal to

(A) $\frac{xe^x}{1+x^2}+c$ (B) $\frac{x}{(\log x)^2+1}+c$

(C) $\frac{\log x}{(\log x)^2+1}+c$ (D) $\frac{x}{x^2+1}+c$

127. The area between the curves $y=2-x^2$ and $y=x^2$ is

(A) $\frac{8}{3}$ (B) $\frac{4}{3}$

(C) $\frac{2}{3}$ (D) $\frac{5}{3}$

128. Whenever $a < b$, the value of $\int_a^b \frac{|x|}{x} dx$ is

(A) $b-a$ (B) $a-b$
(C) $|b|-|a|$ (D) $|b|+|a|$

129. The degree of the differential equation satisfying $\sqrt{1+x^2}+\sqrt{1+y^2} = A\left(x\sqrt{1+y^2} - y\sqrt{1+x^2}\right)$ is

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

130. If $y = e^{ax}$ then $D^n y$ is equal to

(A) $a^n e^{ax}$ (B) $a^{n+1} e^{ax}$
(C) $a^{n-1} e^{ax}$ (D) ae^{nx}

131. $A\cos 3x + B\sin 3x + \left(\frac{1}{25}\right)e^{-4x}$ is the general solution of

(A) $\left(D^2-9\right)y = e^{-4x}$ (B) $\left(D^2+9\right)y = e^{-4x}$
(C) $\left(D^2+9\right)y = e^{-5x}$ (D) $(D-3)^2 y = e^{-4x}$

132. The general solution of $(D-1)(D-2)^2 y = 0$ is

(A) $(A+Bx)e^x + Ce^{2x}$ (B) $\left(A+Bx+Cx^2\right)e^{2x}$
(C) $Ae^x + (Bx+C)e^{2x}$ (D) $\left(A+Bx+Cx^2\right)e^x$

133. If $\vec{a}, \vec{b}, \vec{c}$ are three non-coplanar vectors and $\vec{p}, \vec{q}, \vec{r}$ are vectors defined by the relations $\vec{p} = \frac{\vec{b}\times\vec{c}}{\left[\vec{a}\,\vec{b}\,\vec{c}\right]}$, $\vec{q} = \frac{\vec{c}\times\vec{a}}{\left[\vec{a}\,\vec{b}\,\vec{c}\right]}$, $\vec{r} = \frac{\vec{a}\times\vec{b}}{\left[\vec{a}\,\vec{b}\,\vec{c}\right]}$ then $\left(\vec{a}+\vec{b}\right)\cdot\vec{p} + \left(\vec{b}+\vec{c}\right)\cdot\vec{q} + \left(\vec{c}+\vec{a}\right)\cdot\vec{r}$ is

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

134. If $\varphi = x + y^2 + z^3$ then at $\nabla\varphi(1,2,3)$ is

(A) $i+4j+27k$ (B) $i+4j+9k$
(C) $i+j+k$ (D) $i+2j+3k$

135. $\bar{A}\cdot(\bar{B}\times\bar{C})=0$ implies

(A) $\bar{A}=0$ (B) $\bar{B}=0$
(C) $\bar{C}=0$ (D) $\bar{A},\bar{B},\bar{C}$ are coplanar

136. The mean and standard deviation of the normal distribution, whose *p.d.f* is $f(x)=\left(\frac{1}{2\sqrt{\pi}}\right)e^{-\frac{x^2}{4}}, -\infty < x < \infty$

(A) 1, 2 (B) 0, 2
(C) $0,\sqrt{2}$ (D) $1,\sqrt{2}$

137. In a Poisson distribution if $P[X=3]=\frac{1}{4}P[X=4]$, then $P[X=5]=kP[X=7]$ where k equals to

(A) $\frac{1}{7}$ (B) $\frac{21}{128}$
(C) $\frac{128}{21}$ (D) $\frac{21}{256}$

138. A bag contains 10 white and 15 black balls. Two balls are drawn in succession. The probability that one of them is black and the other is white is

(A) $\frac{1}{10}+\frac{1}{15}$ (B) $\left(\frac{1}{10}\right)\left(\frac{1}{15}\right)$
(C) $\frac{2}{25}$ (D) $\frac{1}{2}$

139. In a continuous distribution whose frequency density function is given by $f(x)=\begin{cases} Ax(2-x), & 0\le x\le 2 \\ 0 \quad , & \text{otherwise} \end{cases}$, the value of the constant A is

(A) $\frac{4}{3}$ (B) $\frac{1}{4}$

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

140. The number of 3×3 binary matrices (a matrix is binary if its entries are either 0 or 1)

(A) 2^9 (B) 2^6

(C) 2^3 (D) 9

141. The curve represented by $\left(\mathrm{Re}(z)\right)^2=1$ is a

(A) circle (B) straight line

(C) parabola (D) rectangular hyperbola

142. If the mean and standard deviation of a binominal distribution are 5 and 2 respectively, then $P(X=1)$ is

(A) $25\left(\frac{4}{5}\right)\left(\frac{1}{5}\right)^{24}$ (B) $25\left(\frac{1}{5}\right)\left(\frac{4}{5}\right)^{24}$

(C) $\left(\frac{1}{5}\right)^{25}$ (D) $\left(\frac{4}{5}\right)^{25}$

143. $\int_0^{\frac{\pi}{2}} \cos^6 x\,dx$ is equal to

(A) $\frac{5\pi}{32}$ (B) $\frac{5}{32}$

(C) $\frac{1}{6}$ (D) $\frac{1}{5}$

144. Let $g=\begin{pmatrix}1 & 2 & 3\\ 2 & 1 & 3\end{pmatrix}$ and $h=\begin{pmatrix}1 & 2 & 3\\ 3 & 1 & 2\end{pmatrix}$ then $h\circ g$ is

(A) $\begin{pmatrix}1 & 2 & 3\\ 3 & 2 & 1\end{pmatrix}$ (B) $\begin{pmatrix}1 & 2 & 3\\ 3 & 1 & 2\end{pmatrix}$

(C) $\begin{pmatrix}1 & 2 & 3\\ 1 & 2 & 3\end{pmatrix}$ (D) $\begin{pmatrix}1 & 2 & 3\\ 1 & 3 & 2\end{pmatrix}$

145. If the lines $x+2ay+a=0$, $x+3by+b=0$ and $x+4cy+c=0$ are concurrent, then a,b,c are in

(A) A.P. (B) G.P.
(C) H.P. (D) None of these

146. If the equation $ax^2+2\left(a^2+ab-16\right)xy+by^2+2ax+2by-4\sqrt{2}=0$ represents a circle, the radius of the circle is

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

147. The point where the line $\frac{x}{1}=\frac{y-1}{1}=\frac{z-3}{2}$ meets the plane $x-y+z=0$ is

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

148. The identity element for binary operation * defined by $a*b=\frac{a+b}{a-b}$ is

(A) $\frac{a(1-a)}{1+a}$ (B) $\frac{a(1+a)}{1-a}$

(C) $\frac{a(a-1)}{a+1}$ (D) $\frac{a-1}{a+1}$

149. $\int_0^1 \int_0^3 dx\,dy$ is equal to

(A) 1
(B) 4
(C) 3
(D) $\sqrt{2}$

150. In a binomial distribution, the mean and variance are 15 and $\frac{15}{4}$. Then the value of the probability $P[X \leq 1]$ is equal to

(A) $\frac{61}{4^{20}}$
(B) $\frac{60}{4^{20}}$
(C) $\frac{61}{4^{19}}$
(D) $\frac{60}{4^{19}}$

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