

**11**

The Competition in

**Advanced Mathematics Skills**

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**Advanced Maths Test I & II**

***MODEL PAPERS***

**Class : X**



**Eduranet**

Intellectual Olympiad Foundation

(Promoted by Eduranet Educational Society (Regd. 309/09))

**Hyderabad | India**

## **Eduranet Intellectual Olympiad Foundation**

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2010

### **First Published - 2012**

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**ISBN - 81- 89528- 03-3**

**SYLLABUS**

1. Real Numbers
2. Polynomials
3. Pair of Linear Equations in Two variables
4. Quadratic Equations
5. Arithmetic Progressions
6. Triangles
7. Coordinate Geometry
8. Introduction to Trigonometry
9. Some Applications of Trigonometry
10. Circles Constructions
11. Areas Related to Circles
12. Surface Areas and Volumes
13. Statistics
14. Probability.

***TABLE OF CONTENTS***

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- 1) Advanced Maths Test - I ..... 5 - 20
- 2) Advanced Maths Test - II ..... 21 - 32

# ADVANCED MATHS TEST - I

Code : 1101

## PRELIMS

**Max. Marks : 75**

**Duration : 75 Mins.**

### General Instructions :

1. Please find the Answer Sheets (OMR) with in the envelop given to you.
2. Mention your Test Code, Student ID, Name, Class, Section and School Name on the OMR Sheet as per Question Paper and Hall Ticket.
3. This question paper contains 75 Questions, duration is 75 minutes.
4. Do rough work in the empty sheet provided along with this question paper.
5. Answer questions in OMR sheet only.
6. Don't write or tick anything on the question paper.
7. Use only Black or Blue Ball Point Pen or Dark Percil to answer the question in OMR sheet.
8. Indicate the correct answer by darkening one of the 4 or 5 responses provided.
9. Submit only OMR sheet to the invigilator

- 
- 
1. **State whether the  $\frac{13}{64}$  rational number will have a terminating or non-terminating repeating decimal :**

- |                      |                  |
|----------------------|------------------|
| a) terminate         | b) non-terminate |
| c) improper fraction | d) none of these |

2. **Find the H.C.F of the polynomials.**

**150 (6x<sup>2</sup> + x - 1)(x - 3)<sup>3</sup> and**

**84(x - 3)<sup>2</sup> (8x<sup>2</sup> + 14x + 5)**

- |                                  |                                  |
|----------------------------------|----------------------------------|
| a) 6(2x + 1)(x - 3) <sup>2</sup> | b) 4(2x + 1)(x - 3) <sup>2</sup> |
| c) 4(2x + 1)(x - 3) <sup>3</sup> | d) 6(2x + 1)(x - 3) <sup>3</sup> |

3. convert  $23.\overline{426}$  in to  $\frac{p}{q}$  form, where p and q are co-prime  
(but  $q \neq 0$ ).

a)  $\frac{7801}{333}$

b)  $\frac{3866}{165}$

c)  $\frac{7801}{999}$

d)  $\frac{7909}{100}$

4. If p be a number between 0 and 1, which one of the following will be true ?

a)  $p > \sqrt{p}$

b)  $\frac{1}{p^2} > \sqrt{p}$

c)  $p > \frac{1}{p}$

d)  $p^3 > p^2$

5. If d is the H.C. F of 56 and 72 , then  $d = 56x + 72y$ . find the x, y

a)  $x = 3; y = 4$

b)  $x = 3; y = 2$

c)  $x = 4; y = -3$

d)  $x = 2; y = 4$

6. When  $2^{256}$  is divided by 17 the remainder would be

a) 1

b) 16

c) 14

d) None of these

7. Angles are measured in

a) compasses

b) protractor

c) degrees

d) centimetres

8. Maximum value of  $2 - 4x - x^2$  is \_\_\_

a) 2

b) 4

c) 6

d) 8

9. If  $x = 0.\overline{7}$  then  $2x$  is --

a)  $1.\overline{4}$

b)  $1.\overline{5}$

c)  $1.\overline{54}$

d)  $1.\overline{45}$

10. The value of the polynomial  $x^8 - x^5 + x^2 - x + 1$  is—

- a) positive for all the real numbers
- b) negative for all the real numbers
- c) 0
- d) depends on value of x

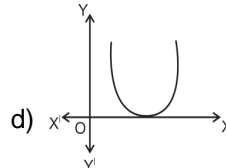
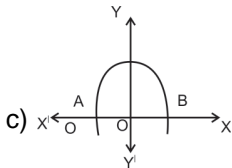
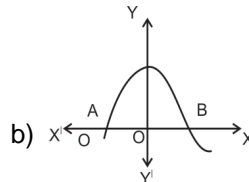
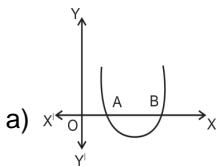
11. If  $f\left(\frac{-3}{4}\right) = 0$ ; then for  $f(x)$ , which of the following is a factor ?

- a)  $3x - 4$
- b)  $4x + 3$
- c)  $-3x + 4$
- d)  $4x - 3$

12. The quotient when  $3x^4 - 5x^3 + 10x^2 + 11x - 61$  divided by  $(x - 3)$  is

- a)  $3x^3 + 4x^2 + 22x + 77$
- b)  $77x^3 + 22x^2 + 4x + 3$
- c)  $3x^2 + 4x^3 + 22x + 77$
- d) None of these

13. Which of the following is/are not graph of a quadratic ?



14. Find the quadratic polynomial with the sum and the product of its zeros as  $\frac{1}{4}$  and  $-1$  respectively.

- a)  $4x^2 - x - 4$
- b)  $4x^2 + x - 4$
- c)  $4x^2 + x + 4$
- d)  $4x^2 - x + 4$

15. If  $\alpha, \beta, \gamma$  be the zeroes of the polynomials  $ax^2 + bx^2 + cx + d$ , then the value of is

$$\alpha\beta + \beta\gamma + \gamma\alpha -$$

- a)  $-b/a$                       b)  $c/a$                       c)  $-c/a$                       d)  $d/a$
16. Factorise:  $x^2 - 31x + 220$
- a)  $(-14, 20)$                       b)  $(12, 15)$   
c)  $(9, 12)$                       d)  $(11, 20)$
17. 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. Find the number of days in which the work was completed.
- a) 20 days                      b) 22 days  
c) 25 days                      d) 30 days
18. There are four arithmetic means between 2 and  $-18$ . The means are
- a)  $-4, -7, -10, -13$                       b)  $1, -4, -7, -10$   
c)  $-2, -5, -9, -13$                       d)  $-2, -6, -10, -14$
19. If  $x, y$  are the A.M. and G.M. of two numbers respectively, find the numbers in terms of  $x$  and  $y$ .
- a)  $x \pm \sqrt{y^2 - x^2}$                       b)  $x \pm \sqrt{x^2 - y^2}$   
c)  $x \pm \sqrt{x - y^2}$                       d)  $x \pm \sqrt{y^2 - x}$
20. If the sum of the first  $2n$  terms of  $2, 5, 8, \dots$  is equal to the sum of the first  $n$  terms of  $57, 59, 61, \dots$ , then  $n$  is equal to –
- a) 10                      b) 12                      c) 11                      d) 13



21.  $x_1, x_2, x_3, \dots$  are in A.P. If  $x_1 + x_7 + x_{10} = -6$  and  $x_3 + x_8 + x_{12} = -11$ , find  $x_3 + x_8 + x_{22}$
- a) -15                  b) 18                  c) -21                  d) -20
22. The number of two digit numbers which are divisible by 3 is
- a) 33                  b) 31                  c) 30                  d) 29
23. Find the value of 'k' if  $2k + 7, 6k - 2, 8k - 4$  are in A.P. Also find the sequence
- a) 12, 15, 19 ---                  b) 13, 19, 23 ---  
c) 16, 24, 30 ---                  d) 14, 19, 24 ---
24. The point on the X- axis which is equidistant from the points A(-2, 3) and B(5, 4) is
- a) (0,2)                  b) (2,0)                  c) (3,0)                  d) (-2,0)
25. Find the area of the triangle whose vertices are (a,a), (a + 1, a + 1) ( a + 2 , a).
- a) 1 unit                  b) 2 unit                  c) 3 unit                  d) 4 unit
26. The line joining (-1,4) and (5,y) is parallel to the line joining  $\left(\frac{17}{2}, -1\right)$  and  $\left(\frac{5}{2}, -\frac{5}{2}\right)$ . Find the value of y.
- a)  $\frac{7}{2}$                   b)  $\frac{9}{2}$                   c)  $\frac{11}{2}$                   d)  $\frac{15}{2}$
27. The points A (-4,-1), B(-2,-4), C(4,0) and D(2,3) are the vertices of a –
- a) Parallelogram                  b) Rectangle  
c) Rhombus                  d) Square

28. Find the equation of the line, Which passes through (2,5) and cuts of equal intercepts on both the axes.

a)  $x - y + 3 = 0$

b)  $-x - y + 3 = 0$

c)  $x - y - 3 = 0$

d)  $x + y + 3 = 0$

29. The angle made by the line  $\sqrt{3}x - y + 3 = 0$  with the positive direction of X-axis is

a)  $30^\circ$

b)  $45^\circ$

c)  $60^\circ$

d)  $90^\circ$

30. Determine the ratio in which the point P (m,6) divides the join of A (-4,3) and B (2,8). Find the value of m.

a)  $m = \frac{2}{3}$

b)  $m = \frac{-2}{5}$

c)  $m = \frac{2}{7}$

d)  $m = \frac{-2}{9}$

31. The vertices of  $\Delta PQR$  are P (2,1), Q (-2,3) and R (4,5). Find equation of the median through the vertex R.

a)  $2x - 4y + 8 = 0$

b)  $3x - 6y - 8 = 0$

c)  $3x - 2y + 6 = 0$

d)  $3x - 4y + 8 = 0$

32. If  $\sin 3A = \cos (A - 26^\circ)$ , where  $3A$  is an acute angle, find the value of A.

a)  $39^\circ$

b)  $49^\circ$

c)  $29^\circ$

d)  $19^\circ$

33. If  $\tan 15^\circ = 2 - \sqrt{3}$ , then the value of  $\cot^2 75^\circ$  is -

a)  $7 + \sqrt{3}$

b)  $7 - 2\sqrt{3}$

c)  $7 - 4\sqrt{3}$

d)  $7 + 4\sqrt{3}$

34. If  $\tan\theta + \sin\theta = m$  and  $\tan\theta - \sin\theta = n$ , then the value of  $m^2 - n^2$  is equal to –

- a)  $4mn$       b)  $2\sqrt{mn}$       c)  $4\sqrt{mn}$       d)  $2\sqrt{m/n}$

35. If  $\sin\theta = \frac{24}{25}$  and  $\theta$  lies in the second quadrant, then  $\sin\theta + \tan\theta =$

- a)  $-7$       b)  $6$       c)  $4$       d)  $-5$

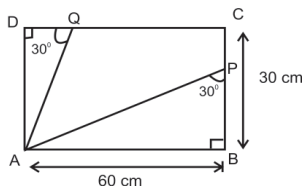
36. If  $\sin\theta = \frac{a^2 - b^2}{a^2 + b^2}$ , then find  $\operatorname{cosec}\theta + \cot\theta$ .

- a)  $\frac{b+a}{b-a}$       b)  $\frac{b-a}{b+a}$       c)  $\frac{a-b}{a+b}$       d)  $\frac{a+b}{a-b}$

37. A man is standing on the deck of a ship, which is 8m above water level. He observes the angles of elevation of the top of a hill as  $60^\circ$  and the angle of depression of the base of the hill as  $30^\circ$ . Calculate the distance of the hill from the ship and the height of the hill.

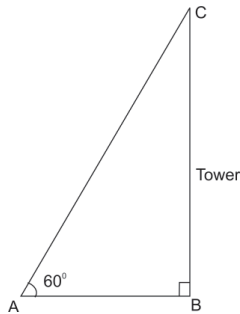
- a)  $2\sqrt{3}$  m      b)  $8\sqrt{3}$  m  
 c)  $6\sqrt{3}$  m      d)  $4\sqrt{3}$  m

38. In figure, ABCD is a rectangle in which segments AP and AQ are drawn as shown. Find the length of (AP + AQ).



- a) 100 cm      b) 120 cm  
 c) 180 cm      d) 200 cm

39. In the following figure, if the angle of elevation is  $60^\circ$  and the distance  $AB = 10\sqrt{3} \text{ m}$ , then the height of the tower is



- a)  $20\sqrt{3} \text{ cm}$     b) 10 m    c) 30 m    d)  $30\sqrt{3} \text{ m}$
40. If  $7\sin^2\theta + 3\cos^2\theta = 4$  then  $\sec\theta + \operatorname{cosec}\theta$  \_\_\_
- a)  $\frac{2}{\sqrt{3}} - 2$     b)  $\frac{2}{\sqrt{3}} + 2$     c)  $\frac{2}{\sqrt{3}}$     d) none
41. What is the probability that Gangan will hit the board within the space enclosed by the inner cycle –
- a)  $\frac{3}{4}$     b)  $\frac{33}{350}$     c)  $\frac{66}{350}$     d)  $\frac{99}{350}$
42. A five digit number is chosen at random. The probability that all the digits are distinct and digits at odd places are odd and digits at even places are even is
- a)  $\frac{3}{65}$     b)  $\frac{1}{75}$     c)  $\frac{2}{65}$     d)  $\frac{8}{75}$
43. A speaks truth in 60% and B in 50% of the cases, Find the probability that they contradict each other discussing the same incident.
- a)  $3/2$     b)  $1/2$     c)  $5/2$     d) none

44. A single letter is selected at random from the word "PROBABILITY". The probability that the selected letter is a vowel is –

- a)  $\frac{2}{11}$       b)  $\frac{3}{11}$       c)  $\frac{4}{11}$       d) 0

45. A bag contains 3 red and 3 white balls. Two balls are drawn one by one. Find the probability that they are of different colours.

- a)  $\frac{1}{5}$       b)  $\frac{2}{5}$   
b)  $\frac{4}{5}$       d)  $\frac{3}{5}$

46. The domain of the function  $f(x) = \frac{1}{\sqrt{x^2 - 3x + 2}}$  is

- a)  $(-\infty, 1)$       b)  $(-\infty, 1) \cup (2, \infty)$   
c)  $(-\infty, 1] \cup [2, \infty)$       d)  $(2, \infty)$

47. If  $f(x) = \frac{x^2 + 1}{x - 2}$  then value of  $f(2)$

- a) 2      b) 10  
c) 5      d) does not exist

48. Range of the function  $y = \frac{x^2}{1 + x^2}$  is

- a)  $(-1, 1)$       b)  $[0, 1)$   
c)  $[1, 2]$       d)  $(-2, 2)$

49. Which of the following relation is a function?

- a)  $\{(a, b) (b, e) (c, e) (b, x)\}$       b)  $\{(a, d) (a, m) (b, e) (a, b)\}$   
c)  $\{(a, d) (b, e) (c, d) (e, x)\}$       d)  $\{(a, d) (b, m) (b, y) (d, x)\}$

50. Which of the following is a null set?

- a)  $\{0\}$   
 b)  $\{x:x>0 \text{ or } x<0\}$   
 c)  $\{x:x^2=4 \text{ or } x = 3\}$   
 d)  $\{x:x^2+1=0, x \in \mathbb{R}\}$

51. Consider the following equations:

1.  $A - B = A - (A \cap B)$   
 2.  $A = (A \cap B) \cup (A - B)$   
 3.  $A - (B \cup C) = (A - B) \cup (A - C)$

Which of these is/are correct?

- a) 1 and 3      b) 2 only      c) 2 and 3      d) 1 and 2
52. In a group of 65 people, 40 like cricket, 10 like both cricket and tennis, How many like tennis only and not cricket? How many like tennis ?
- a) 25              b) 20              c) 15              d) 10
53. In a class of 100 students there are 70 boys whose average marks in a subject are 75. If the average marks of the complete class are 72, then the average marks of the girls
- a) 73              b) 65              c) 68              d) 74
54. If the class- intervals are 10-19,20-29, 30-39,..... then the upper limit of the first class- interval is

- a) 19.5                                      b) 19  
 c) 20    d) None of these

55. Find the value of K if mean of the following data is 14

$x_i$	5	10	15	20	25
$f_i$	7	k	8	4	5

- a) 4                      b) 5                      c) 6                      d) 8







66. Find the determinant of  $\begin{vmatrix} x & \sin\theta & \cos\theta \\ -\sin\theta & -x & 1 \\ \cos\theta & 1 & x \end{vmatrix}$

then independent of  $\theta$  is \_\_\_

a)  $x^3$                                       b)  $-x^2$

c)  $-x^3$                                       d)  $x^2$

67. If  $A = \begin{vmatrix} 0 & i \\ -i & 0 \end{vmatrix}$ , then find the value of  $A^{40}$ .

a)  $\begin{vmatrix} 0 & i \\ -i & 0 \end{vmatrix}$                                       b)  $\begin{vmatrix} 1 & 0 \\ 0 & -1 \end{vmatrix}$

c)  $\begin{vmatrix} 0 & -i \\ i & 0 \end{vmatrix}$                                       d)  $\begin{vmatrix} 1 & 0 \\ 0 & 1 \end{vmatrix}$

68. If  $A = \begin{vmatrix} 2 & 1 & 4 \\ 4 & 1 & 5 \end{vmatrix}$  and  $B = \begin{vmatrix} 3 & -1 \\ 2 & 2 \\ 1 & 3 \end{vmatrix}$ , Write the order of  $AB$  and

$BA$ .

a)  $(2 \times 3) (3 \times 2)$                                       b)  $(3 \times 2) (2 \times 3)$

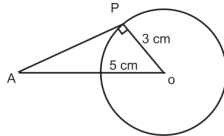
c)  $(3 \times 3) (2 \times 2)$                                       d)  $(2 \times 2) (3 \times 3)$

69. Find the slant height, curved surface area and the whole surface area of a cone of radius 21 cm and height 28 cm.

a)  $3696 \text{ cm}^2$                                       b)  $3966 \text{ cm}^2$

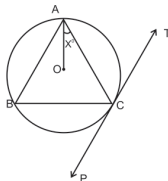
c)  $3669 \text{ cm}^2$                                       d)  $3666 \text{ cm}^2$

70. Find the length of tangent drawn from a point whose distance from the centre of a circle is 5cm. and the radius of the circle is 3 cm.



- a) 8 cm      b) 10 cm      c) 4 cm      d) 2 cm

71. In the adjoining figure. PT is a tangent at point C of the circle. O is the circumcentre of  $\triangle ABC$  . If  $\angle ACP = 118^\circ$  . then the measure of  $\angle x$  . is

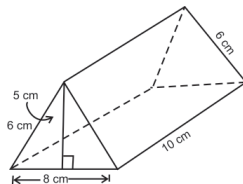


- a)  $28^\circ$       b)  $32^\circ$       c)  $42^\circ$       d)  $38^\circ$

72. Two circles of radii 20 cm and 37 cm intersect in A and B. If  $O_1$  and  $O_2$  are their centres and  $AB = 24$  cm, then the distance  $O_1O_2$  is equal to–

- a) 44 cm      b) 51cm      c) 40.5 cm      d) 45 cm

73. Calculate the surface area of the following Prism.

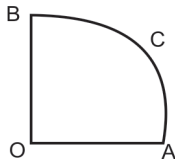


- a)  $200 \text{ cm}^2$       b)  $250 \text{ cm}^2$   
 c)  $240 \text{ cm}^2$       d)  $280 \text{ cm}^2$

74. The radius of the base and the height of a right circular cone are 7 cm and 24 cm respectively. Find the volume and total surface area of the cone.

- a)  $744 \text{ cm}^2$
- b)  $740 \text{ cm}^2$
- c)  $700 \text{ cm}^2$
- d)  $704 \text{ cm}^2$

75. In the adjoining figure,  $OACB$  is a quadrant of a circle of radius 7 cm. The perimeter of the quadrant is



- a) 11 m
- b) 18 m
- c) 25 m
- d) 36 m

**KEY TO MODEL PAPER - I**

- |       |       |       |       |       |       |
|-------|-------|-------|-------|-------|-------|
| 1. a  | 2. a  | 3. b  | 4. b  | 5. c  | 6. a  |
| 7. c  | 8. c  | 9. b  | 10. a | 11. b | 12. a |
| 13. d | 14. b | 15. b | 16. d | 17. c | 18. d |
| 19. b | 20. c | 21. c | 22. c | 23. d | 24. b |
| 25. a | 26. c | 27. b | 28. d | 29. c | 30. b |
| 31. d | 32. c | 33. c | 34. c | 35. a | 36. d |
| 37. b | 38. c | 39. c | 40. b | 41. b | 42. b |
| 43. b | 44. c | 45. d | 46. b | 47. d | 48. b |
| 49. c | 50. d | 51. d | 52. a | 53. b | 54. a |
| 55. c | 56. c | 57. d | 58. b | 59. b | 60. c |
| 61. b | 62. c | 63. c | 64. b | 65. a | 66. c |
| 67. d | 68. d | 69. a | 70. c | 71. a | 72. b |
| 73. c | 74. d | 75. c |       |       |       |

# ADVANCED MATHS TEST - II

Code : 1102

## FINALS

Max. Marks : 60

Duration : 60 Mins.

### General Instructions :

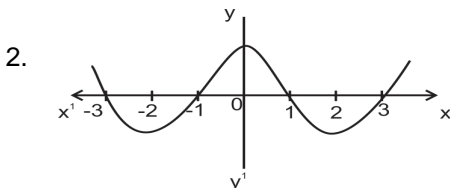
1. Please find the separate Answer Sheets along with the question paper.
2. Mention your Test Code, Student ID, Name, Class, Section, Contact no. and School Name on the Answer Sheet as per Question Paper and Hall Ticket.
3. This question paper contains VI sections, duration is 60 minutes.
4. Please read the instructions carefully before attempting the question.
5. Answer questions in Answer Sheet only.
6. Don't write or tick anything on the question paper.
7. Use only Black or Blue Ball Point Pen to answer the question in Answer Sheet.
8. Submit only answer sheet(s) to the invigilator.

### SECTION - I

$10 \times 1 = 10$

**DIRECTIONS : ( 1 - 10) -** Complete the following statements with an appropriate word/term to be written in the answer sheet.

1. Zero of a polynomial is always \_\_\_\_\_



zeros the function is \_\_\_\_\_

3. The value of  $4 - \frac{5}{1 + \frac{1}{3 + \frac{1}{2 + \frac{1}{4}}}}$  is \_\_\_\_\_
4. If the  $n^{\text{th}}$  term of an A.P. =  $7n + 4$ , then  $S_n =$  \_\_\_\_\_
5. Total surface area of frustum of a cone \_\_\_\_\_
6. If  $\sin \theta + \cos \theta = \sqrt{2}$  then  $\cos \theta - \sin \theta =$  \_\_\_\_\_
7. If  $A = \begin{bmatrix} ab & b^2 \\ -a^2 & -ab \end{bmatrix}$  then the value of  $A^5 =$  \_\_\_\_\_
8. Mean of 22 readings is 20. If each reading is multiplied by 4 and then 10 is added to it. the new mean is \_\_\_\_\_
9. When an unbiased coin is tossed thrice the probability of getting heads all the time is \_\_\_\_\_
10. X-axis divides the join of  $(x_1, y_1)$  and  $(x_2, y_2)$  in the ratio of \_\_\_\_\_

**SECTION - II****10 × 1 = 10**

**DIRECTIONS : (11-20)** - Read the following statements and write true or false with reasons or solutions; in the answer sheet.

11.  $\frac{1}{\sqrt{5}} X^{\frac{1}{2}} + 1$  is a polynomial
12. If  $f : x \rightarrow \log_2 x$  then  $f(16) = 2$
13. After rationalising the denominator of  $\frac{5}{3\sqrt{2} - 2\sqrt{3}}$ , we get denominator as 7.
14. 184 is a term of the sequence 3, 7, 11, \_\_\_\_\_
15. The three points (2,5), (3,4) and (6,x) will lie on a line then  $x = 1$

16. If  $\tan A = 1$  and  $\sin B = \frac{1}{\sqrt{2}}$ , then  $(A+B) = 90^\circ$
17.  $\begin{bmatrix} -3 & 0 \\ 0 & -2 \end{bmatrix}$  is a diagonal matrix of order 1
18. The width of a rectangle in a histogram represents frequency of the class.
19. If A is any event in a sample space, then  $P(\bar{A}) = 1 - P(A)$
20. Area is the length of the boundary of a closed figure.

**SECTION – III****10 × 1 = 10**

**DIRECTIONS : ( 21 - 30 )** - Each question contains statements given in two columns which have to be matched. Match the statements (21,22,...30) in column I with statements (A,B,...Q) in column II . Arrange the matched statements in order and write in the answer sheet.

**Column I****Column II**

- 21)  $5 + \sqrt{2}$  and  $5 - \sqrt{2}$  are roots  
then the equation is
- 22) (a,b) interval represents
- 23)  $2^{256}$  is divided by 17 then  
the remainder is
- 24) If the nth term of an A.P is  $3n+5$ ,  
then sum of first 12 terms is
- A) 2 : 1
- B)  $\frac{1}{2}$
- C) 96 .4
- D)  $\frac{1}{10}$
- E) 3 : 1

- 25) Centroid divides the median in the ratio F) - 26
- 26) The maximum value of  $\sin \theta \cdot \cos \theta$  is G)  $x^2 - 10x + 23$
- 27)  $\left| \begin{matrix} 2 & -4 \\ 9 & d-3 \end{matrix} \right| = 4$  then the H)  $\{x : a \leq x < b\}$
- 28) The median = 99.6 and mean = 101.2, then the mode is I) 1
- 29) Three men and three ladies sat around a round table for dinner. The chance that they sit alternately is J) 294
- 30) From a circular sheet of paper with a 20 cm, four circles of radius 5 cm each are cut out. Find the ratio of the uncut to the cut portion is.
- K) 1 : 2
- L) -13
- M) 69.4
- N)  $x^2 - 10x + 21$
- O)  $\{x : a < x \leq b\}$
- P) 2
- Q) 220



## SECTION – IV

 $10 \times 1 = 10$ 

**Directions : (31 – 40)** - Identify the correct answer from the given options and write in the answer sheet.

31. If  $\alpha, \beta$  are the zeroes of the quadratic polynomial  $x^2 + x - 2 = 0$ ,

$$\text{then } \left( \frac{1}{\alpha} - \frac{1}{\beta} \right)^2 =$$

- a)  $\frac{9}{4}$                       b)  $\frac{-9}{4}$                       c)  $\frac{2}{5}$                       d)  $\frac{-2}{5}$

32. If  $y = f(x) = \frac{1-x}{1+x}$ , then  $f(y) =$  \_\_\_\_\_

- a)  $x$                       b)  $-x$                       c)  $x^2$                       d)  $-x^2$

33. If  $\sqrt{4096} = 64$ , then the value of

$$\sqrt{40.96} + \sqrt{.4096} + \sqrt{.004096} + \sqrt{.00004096} \text{ is}$$

- a) 7.09                      b) 7.1014                      c) 7.1104                      d) 7.12

34. The incorrect term in the sequence 1, 2, 5, 11, 17, 23 is

- a) 23                      b) 5                      c) 7                      d) 1

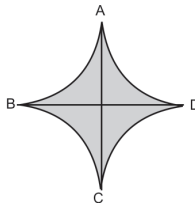
35. If A (7,7), B (6,-3) and C(3,6) then  $\triangle ABC$  is

- a) equilateral                      b) scalene  
c) right                      d) isosceles

36.  $\frac{\sin x}{1 + \cos x} =$  .....

- a)  $\operatorname{cosec} x - \cot x$                       b)  $\operatorname{cosec} x + \cot x$   
c)  $\frac{\cos x}{1 - \sin x}$                       d) None of the above

37. If  $A = \begin{bmatrix} 1 & 3 \\ 2 & 1 \end{bmatrix}$ , then determinant of the matrix  $A^2 - 2A$  is
- a) 25                      b) 26                      c) 37                      d) 38
38. The marks of 20 students in a test were as follows:  
5,6,8,9,10,11,11,12,13,13,14,14,15,15,15,16,16,18,19,20 the mean is
- a) 14                      b) 13                      c) 12                      d) 15
39. One hundred cards are numbered from 1 to 100. Find the probability that a card chosen at random has the digit 5.
- a)  $\frac{9}{100}$                       b)  $\frac{13}{100}$                       c)  $\frac{17}{100}$                       d)  $\frac{19}{100}$
40. Calculate the area of the shaded portion. The quadrants shown in the figure are each of radius 7 cm.



- a)  $42 \text{ cm}^2$                       b)  $54 \text{ cm}^2$                       c)  $45 \text{ cm}^2$                       d)  $65 \text{ cm}^2$

**SECTION - V****10 × 1 = 10**

**Directions : (41 - 50) -** Choose the correct answers (More than one correct answer) from the given options and write in the answer sheet.

41. Which of the following is not a polynomial ?

- a)  $x^2 + \frac{1}{x}$                       b)  $2x^2 - 3\sqrt{x} + 1$
- c)  $x^3 - 3x + 1$                       d)  $2x^{\frac{3}{2}} - 5x$

42. Which of the following is/ are infinite set?
- a)  $A = \{x : x \in z \text{ and } x^2 - 5x + 6 = 0\}$   
 b)  $B = \{x : x \in z \text{ and } x^2 \text{ is even}\}$   
 c)  $C = \{x : x \in z \text{ and } x^2 = 36\}$   
 d)  $D = \{x : x \in z \text{ and } x^2 > -10\}$
43. The possible numbers that can be formed by using unit digit and ten's digit  $(274 \times 243 \times 131)$  lies between
- a) 23 and 45                                      b) 23 and 44  
 c) 26 and 46                                      d) 25 and 50
44. 15<sup>th</sup> term of the series 243,81,27,..... is
- a)  $\left(\frac{1}{3}\right)^9$     b)  $\left(\frac{1}{3}\right)^{10}$   
 c)  $\left(\frac{1}{3}\right)^{10} \left(\frac{1}{3}\right)^{-1}$     d)  $\left(\frac{1}{3}\right)^{10} \left(\frac{1}{3}\right)$
45. The equation of the line parallel to  $3x - 2y + 7 = 0$  and making an intercept  $-4$  on X-axis is
- a)  $3x - 2y + 12 = 0$     b)  $3x - 2y - 12 = 0$   
 c)  $3x + 2y - 12 = 0$     d)  $-3x + 2y - 12 = 0$
46. If  $\operatorname{cosec} A + \cot A = \frac{11}{2}$ , then  $\tan A$
- a)  $\frac{21}{22}$     b)  $\frac{15}{16}$     c)  $\frac{44}{117}$     d)  $\frac{88}{234}$

47. Which one of the following does not hold for matrix multiplication?

- a) Matrix multiplication is not commutative.
- b) It is not associative.
- c) It is not distributive over matrix addition
- d) The product of a matrix with a null matrix is a null matrix.

48. Which of the following is/are correct ?

a) Class mark =  $\frac{\text{upper class limit} + \text{lower class limit}}{2}$

b)  $Mode = l + \left( \frac{f_1 - f_0}{2f_1 - f_0 - f_2} \right) \times h$

c) 3 median = mode + 2 mean

d) if  $n$  is odd, then median =  $\left( \frac{n+1}{2} \right)^{th}$  term

Where,  $n$  is the number of terms.

49. The probability of occurrence of an event  $A$  in one trial is 0.4. The probability that the event  $A$  happens at least once in three independent trials is -

- a)  $1 - 0.784$
- b) 0.784
- c)  $1 - 0.216$
- d) 0.216

50. If the ratio of the areas of the two circles is 25 : 16, then the ratio of their circumference is

- a)  $\frac{625}{500}$
- b)  $\frac{4}{5}$
- c)  $\frac{5}{4}$
- d)  $\frac{500}{625}$

**Assertion & Reason**

**DIRECTIONS : (51 - 60)** - Each of these questions contains an Assertion followed by reason. Read them carefully and answer the question on the basis of following options. You have to select the one that best describes the two statements and write in the answer sheet.

- a) If both **Assertion** and **Reason** are **correct** and Reason is the **Correct explanation** of Assertion.
- b) If both **Assertion** and **Reason** are correct, but Reason is **not the correct explanation** of Assertion.
- c) If **Assertion** is **correct** but **Reason** is **incorrect**.
- d) If **Assertion** is **incorrect** but **Reason** is **correct**.

51. **Assertion:**  $x^3 + x$  has only one real zero.

**Reason :** A polynomial of  $n^{\text{th}}$  degree must have  $n$  real zeros.

52. **Assertion:** Set  $\{x : x \in R, 3 \leq x \leq 4\}$  can be written as  $[3,4]$  in the interval form.

**Reason:** If  $a, b$  are real numbers such that  $a < b$ , then the set  $\{x : x \in R, \text{and } a \leq x \leq b\}$  is called the closed interval  $[a,b]$ .

53. **Assertion:** If L.C.M  $\{p,q\} = 30$  and H.C.F  $\{p,q\} = 5$ , then  $p.q = 150$

**Reason :** L.C.M. of  $a,b \times$  H.C.F of  $a,b = a.b$ .

54. **Assertion:**  $1,2,4,8,\dots$  is a G.P.,  $4,8,16,32$  is a G.P. and  $1+4, 2+8,4+16,8+32,\dots$  is also G.P.

**Reason:** Let general term of a G.P. with common ratio  $r$  be  $T_{k+1}$  and general term of another G.P. with common ratio  $r$  be  $T'_{k+1}$  then the series whose general term  $T''_{k+1} = T'_{k+1} + T'_{k+1}$  is also a G.P. with common ratio  $r$ .

55. **Assertion:** If  $A(2a,4a)$  and  $B(2a,6a)$  are two vertices of an equilateral triangle ABC then the vertex C is given by  $(2a + a\sqrt{3}, 5a)$

**Reason:** In an equilateral triangle all the coordinates of three vertices can be rational.

56. **Assertion:** In a right-angled triangle, if  $\cos \theta = \frac{1}{2}$  and  $\sin \theta = \frac{\sqrt{3}}{2}$ , then  $\tan \theta = \sqrt{3}$

**Reason :**  $\tan \theta = \frac{\sin \theta}{\cos \theta}$

57. **Assertion:** An  $m \times n$  matrix is said to be a square matrix, if  $m = n$  and is known as a square matrix of order  $n$ .

**Reason:** A matrix having  $m$  rows and  $n$  columns is called a matrix of order  $m \times n$ .

58. **Assertion :** If the number of runs scored by 11 players of a cricket team of India are 5, 19, 42, 11, 50, 30, 21, 0, 52, 36, 27 then median is 30.

**Reason :**  $Median = \left(\frac{n+1}{2}\right)^{th}$  value, if  $n$  is odd.

59. **Assertion:** If  $p(A) = 0.25$ ,  $P(B) = 0.50$  and  $p(A \cap B) = 0.14$ , then the probability that neither A nor B occurs is 0.39.

**Reason :**  $\overline{A \cup B} = \overline{A} \cap \overline{B}$

60. **Assertion:** If the circumference of a circle is 176 cm, then its radius is 28 cm.

**Reason:** Circumference =  $2\pi \times radius$

**SOLUTIONS TO MODEL PAPER - II****SECTION – I****Fill in the Blanks**

- 1) Zero                      2)  $-3, -1, 1, 3$                       3)  $\frac{1}{8} = 0.125$
- 4)  $\frac{n}{2}[15+7n]$                       5)  $\pi l(r_1 + r_2) + \pi(r_1^2 + r_2^2)$
- 6) 0                              7) 0                                      8) 90
- 9)  $\frac{1}{8}$                               10)  $-y_1 : y_2$

**SECTION – II****True / False**

- 11) False                      12) False                      13) False                      14) False
- 15) True                              16) True                              17) False                      18) False
- 19) False                              20) False

**SECTION – III****Match the Following**

- 21)  $\rightarrow G$                       22)  $\rightarrow H$                       23)  $\rightarrow I$                       24)  $\rightarrow J$
- 25)  $\rightarrow A$                               26)  $\rightarrow B$                               27)  $\rightarrow L$                               28)  $\rightarrow C$
- 29)  $\rightarrow D$                               30)  $\rightarrow E$

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**SECTION – IV****Multiple Choice Questions**

- 31) a            32) a            33) c            34) d  
35) b            36) a            37) a            38) b  
39) d            40) a

**SECTION – V****More than One Correct Answers**

- 41) a, b, d    42) b, d    43) a, b    44) a, c  
45) a, d    46) c, d    47) b, c    48) a, b, c, d  
49) b, c    50) a, c

**SECTION – VI****Assertion & Reason**

51. c) If **Assertion** is **correct** but **Reason** is **incorrect**.
52. b) If both **Assertion** and **Reason** are **correct**, but **Reason** is **not the correct explanation** of **Assertion**.
53. a) If both **Assertion** and **Reason** are **correct** and **Reason** is the **Correct explanation** of **Assertion**.
54. a) If both **Assertion** and **Reason** are **correct** and **Reason** is the **Correct explanation** of **Assertion**.
55. c) If **Assertion** is **correct** but **Reason** is **incorrect**.
56. a) If both **Assertion** and **Reason** are **correct** and **Reason** is the **Correct explanation** of **Assertion**.
57. a) If both **Assertion** and **Reason** are **correct** and **Reason** is the **Correct explanation** of **Assertion**.
58. d) If **Assertion** is **incorrect** but **Reason** is **correct**.
59. c) If **Assertion** is **correct** but **Reason** is **incorrect**.
60. a) If both **Assertion** and **Reason** are **correct** and **Reason** is the **Correct explanation** of **Assertion**.