AP – POLYCET

2017

Time : 2 Hours **Total Marks : 120**

SECTION - I

Mathematics

1. In ΔABC if BC = 3, CA = 4, AB = 5, then cos $\angle BAC =$
   A. $\frac{3}{5}$
   B. $\frac{3}{4}$
   C. $\frac{4}{5}$
   D. $\frac{5}{3}$
2. $\sin^6 A + \cos^6 A + 3\sin^2 A\cos^2 A =$
   A. 1
   B. -1
   C. 0
   D. None
3. $\sin^2 30^o$,$\sin 45^o$ and $\sin^2 60^o$ are in

A. AP
B. GPP
C. HP
D. AGP

4. If $\sin\theta.\cos\theta = \frac{1}{2}$, then $\theta =$

A. 0^o
B. 30^o
C. 45^o
D. 60^o

5. If $\tan\theta = \frac{3}{4}$ then the value of $\frac{1-\cos\theta}{1+\cos\theta}$

A. 9
B. $\frac{1}{9}$
C. 4
D. $\frac{1}{4}$

6. A, B and C are interior angles angle of a triangle ABC, then $\tan\left(\frac{A+B}{2}\right) =$

A. $\sin\left(\frac{C}{2}\right)$

B. $\cos\left(\frac{C}{2}\right)$

C. $\tan\left(\frac{C}{2}\right)$

D. $\cot\left(\frac{C}{2}\right)$sn

7. If a 6 m height pole casts a shadow $2\sqrt{3}$ m long on the ground, then the sun's angle of elevation is
   A. 60°
   B. 45°
   C. 30°
   D. 90°
8. An iron spherical ball of volume 232848 cm^3 has been melted and converted into a cone with vertical angle of 120°. Then the height of the cone is
   A. $42\sqrt{3}$ cm
   B. 42 cm
   C. 21 cm
   D. None
9. From a point 30 m from the foot of a tower, the angle of elevation of the top is 30°. Then the Height of the tower is
   A. 10 m
   B. $10\sqrt{3}$ m

C. 15 m

D. 19 m

10. Under the usual notations in probability,

$P(E) + P(\overline{E}) =$

A. 0

B. $\frac{1}{2}$

C. 1

D. None

11. Two dice are thrown at the same time. What is the probability that the sum of the two numbers appearing on the top of the dice is 8?

A. $\frac{31}{36}$

B. $\frac{5}{36}$

C. $\frac{8}{36}$

D. 1

12. A box contains 5 red marbles, 8 white marbles and 4 green marbles. One marble is taken out of the box at random. The probability that the marble taken out will be white is

A. $\frac{5}{17}$

B. $\frac{8}{17}$

C. $\frac{4}{17}$

D. $\frac{8}{9}$

13. The mean of $a+1, +3, a+4$ and $a+8$

A. a + 7

B. a + 4

C. a – 3

D. none

14. the mean of n observation x_1, x_2, ……x_n. Repeated f_1, f_2,……. f_n time respectivey is

A. $\frac{\sum_{i=1}^{n} x_i}{\sum_{i=1}^{n} f_i}$

B. $\frac{\sum_{i=1}^{n} f_i x_i}{\sum_{i=1}^{n} f_i}$

C. $\frac{f_i x_i}{\sum_{i=1}^{n} f_i}$

15. The sum of lower limit of median class and upper limit of modal class is

Class Interval	10-20	20-30	30-40	40-50	50-60	60-70

Frequency	1	3	5	9	7	3

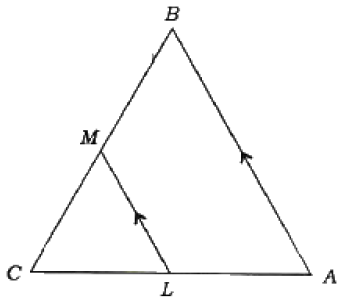
A. 60
B. 40
C. 90
D. 50

16. A data has 13 observations arranged in descending order. Which observation represents the median of the data?
    A. 17^{th}
    B. 6^{th}
    C. 7^{th}
    D. None
17. Cumulative frequency is used to calculate
    A. Median
    B. mode
    C. mean
    D. None
18. Under the usual notations, the formula for calculating mode for grouped frequency distribution is
    A. $i-\left(\frac{f_i-f_0}{2f_1-f_0-f_2}\right)$
    B. $i+\left(\frac{f_i-f_0}{f_1-f_0-f_2}\right)\times h$

C. $i+\left(\frac{f_i - f_0}{2f_1 - f_0 - f_2}\right)$

D. $i+\left(\frac{f_i - f_0}{2f_1 - f_0 - f_2}\right)\times h$

19. In the given figure, LM || AB, AL = x - 3, AC = 2x, BM = x - 2 and BC = 2x + 3 Then the value of x is

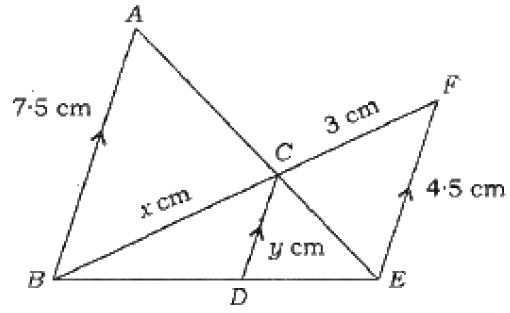


A. 7
B. 8
C. 9
D. Cannot be determined

20. The diagonals of a quadrilateral ABCD intersect each other at a point 0 such that $\frac{AO}{BO} = \frac{CO}{DO}$ Then the quadrilateral ABCD is

A. trapezium
B. square
C. rectangle
D. parallelogram

21. In the given figure, if AB || CD || EF, given that AB = 7.5 cm, DC = y cm, EF = 4.5 cm BC = x cm, then the value of x is



A. 4
B. 5
C. 6
D. None

22. The diagonals of a trapezium ABCD with AB || DC, intersect each other at the point 0. If AB = 2CD; then the ratio of areas of triangles AOB and COD is
A. 4: 1
B. 1 : 4
C. 3 : 4
D. 4 : 3

23. In an equilateral triangle ABC, D is a point on side BC such that BD = $\frac{1}{3}BC$ Then $9AD^2 =$
A. $5AB^2$
B. $7AB^2$
C. $11AB^2$

D. AB^2

24. A tangent PQ at a point P of circle of radius 5 cm meets a line through the centre 0 at the point Q such that OQ = 12 cm, then length of PQ is
    A. 12 cm
    B. 13 cm
    C. 8.5 cm
    D. $\sqrt{199}$ cm
25. If TP and TQ are two tangents to a circle with centre 0 so that LPOQ = 110°, then ZPTQ is equal to
    A. 60°
    B. 70°
    C. 80°
    D. 90°
26. What is the area of the shaded region in the figure? In which two circles with centres A and B touch each other at the point C, if AC = 8 cm and AB = 3 cm, is
    A. $24\pi\ cm^2$
    B. $39\pi\ cm^2$
    C. $11\pi\ cm^2$
    D. $5\pi\ cm^2$
27. If all the sides of a parallelogram touch a circle, then the parallelogram is
    A. a square
    B. a rhombus

C. a rectangle

D. None

28. PQ is chord of length 8 cm of 'a circle of radius 5 cm. The tangents at P and Q intersect at a point T. Then the length of TP is

A. $\frac{10}{3}$

B. $\frac{25}{3}$

C. $\frac{20}{3}$

D. $\frac{16}{3}$

29. $\sqrt{3}+\sqrt{5}$ is a

A. Positive rational number

B. Negative rational number

C. Positive irrational number

D. Negative irrational number

30. If a + b = 5, ab = 6 then $a^3 + b^3$ =

A. 5

B. 25

C. 35

D. 125

31. 2log 3 – 3 log 2 =

A. log 0

B. $\log 1$

C. $\log\left(\frac{9}{8}\right)$

D. $\log (72)$

32. $\log^2 \log^{25} 5 =$

A. 0

B. 1

C. -1

D. $-\frac{1}{2}$

33. If $a^x = \left(\frac{a}{k}\right)^y = k^m$, then $\frac{1}{x} - \frac{1}{y} =$

A. 0

B. 1

C. M

D. $\frac{1}{m}$

34. lf A= {1, 2,3, 4, 5, 6}, B= {4, 5 C 7, 8}, C= (4, 5, 6}, then $A \cap B =$

A. A

B. B

C. C

D. None

35. If A and B are subsets of a universal set μ, then $A \cap B^c =$

A. A – B

B. 15

C. 20

D. 25

36. If n(A) = 15, n(B) = 10, $n(A \cap B) = 5$, then $n(A \cup B) =$

A. 5

B. 15

C. 20

D. 25

37. If a and β are the zeros of the polynomial $p(x) = 3x^2 – x – 4$, then aβ =

A. $\frac{1}{3}$

B. $-\frac{1}{3}$

C. $\frac{4}{3}$

D. $-\frac{4}{3}$

38. If $p(x) = 5x^7 – 6x^5 + 7x – 6$, then the degree of p(x) is

A. 0

B. 1

C. 5

D. 7

39. A factor of $x^3 - 3x^2 + x + 1$ is

A. x + 1

B. 2x – 1

C. 2x + 1

D. x – 1

40. $\frac{10}{x+y} + \frac{2}{x-y}$ and $\frac{15}{x+y} - \frac{5}{x-y} = -2$, then

A. x = 3, y = 2

B. x = 3, y = -2

C. x = -3, y = 2

D. x = -3, y = -2

41. The larger of two supplementary angles exceeds the smaller by 18°. The angles are

A. 80°, 100°

B. 81°, 99°

C. 82º, 98º

D. 83º, 97º

42. $\frac{2}{\sqrt{x}} + \frac{3}{\sqrt{y}} = 2$ and $\frac{4}{\sqrt{x}} - \frac{9}{\sqrt{y}} = -1$, then

A. x = 3, y =2

B. x = 3, y = 4

C. x = 2, y = 3

D. x = 4, y = 3

43. The value of k for which the pair of equations 3x + 4y + 2 = 0 and 9x + 12y+ k = 0 represent coincident lines is

A. 2

B. 3

C. 6

D. 12

44. If $2^x + 3^y = 17, 2^{x+2} - 3^{y+1} = 5$, then

A. x = 3, y = 2

B. x = 3, y = 4

C. x = 2, y = 3

D. x = 4, y = 3

45. if the sum of the squares of the roots of $x^2 + px - 3 = 0$ is 10, then p =

A. ±2

B. ±3

C. ±5

D. ±6

46. If one root of $x^2 - 8x + 13 = 0$ is $4 + \sqrt{3}$, then the other root is

A. $2 + \sqrt{3}$

B. $2 - \sqrt{3}$

C. $-4+\sqrt{3}$

D. $4-\sqrt{3}$

47. If a and β are the roots of a quadratic equation $x^2 - px + q = 0$, then $\frac{\alpha}{\beta}+\frac{\beta}{\alpha}=$

A. $\frac{p^2-2q}{q}$

B. $\frac{p^2+2q}{q}$

C. $\frac{p^2-q}{q}$

D. $\frac{p^2+q}{q}$

48. The root of the quadratic equation $2x^2-2\sqrt{2}x+1=0$ are

A. $\sqrt{2},\frac{1}{\sqrt{2}}$

B. $\frac{1}{2},\frac{1}{2}$

C. $\frac{1}{\sqrt{2}},\frac{1}{\sqrt{2}}$

D. $\sqrt{2},\sqrt{2}$

49. If the product of five numbers in GP is 1024, then the middle number is
    A. 8
    B. 4
    C. 2
    D. None
50. If the second term of a GP is 2 and the sum of infinite terms is 8, then the first term is
    A. 8
    B. 6
    C. 4
    D. 3
51. If a, b and c are in AP and also in GP, then
    A. $a = b \neq c$
    B. $a \neq b = c$
    C. $a \neq b \neq c$
    D. $a = b = c$
52. The end points of a line are (Z 3), (4, 5). Then its slope is
    A. 4
    B. 3
    C. 2
    D. 1
53. The value of k for which the points (7, - 2), (5, 1), (3, k) are collinear is

A. 4
B. 3
C. 2
D. None

54. The points A(7, 3), B(6, 1), C(8, 2) and D(9, 4) taken in that order are the vertices of a
A. square
B. rhombus
C. parallelogram
D. trapezium

55. The points of trisection of the line segment joining (2, - 2), (-7, 4) are
A. (1, 0), (-4, 2)
B. (- 1. 0), (-4, 2)
C. (-1, 0), (-4, -2)
D. (1, 0), (4, 2)

56. The points which divide the line segment joining A(-2, 2) and B(Z 8) into four equal parts are,
A. $\left(-1, \frac{7}{2}\right), (0,5), \left(1, \frac{13}{2}\right)$
B. $\left(-1, \frac{7}{2}\right), (0, -5), \left(1, -\frac{13}{2}\right)$
C. $\left(1, \frac{7}{2}\right), (0,5), \left(1, \frac{13}{2}\right)$.

D. $\left(1, \frac{7}{2}\right), (0, -5), \left(1, \frac{13}{2}\right)$

57. If a cylinder and cone have bases of equal radii and are equal heights, then the ratio of their ' volumes is
    A. 1 : 3
    B. 2 : 3
    C. 3 : 1
    D. 3 : 2
58. If the curved surface area of a cone is 4070 cm2 and its diameter is 70 cm, then its slant height is
    A. 27 cm
    B. 37 cm
    C. 47 cm
    D. 57 cm
59. Under the usual notations, the total surface area of a cuboid is
    A. $lb + bh + hl$
    B. $\frac{lb + bh + hl}{2}$.
    C. $2(lb + bh + hl)$
    D. None
60. If $\sec\theta + \tan\theta = 3$, then $\cos\theta =$
    A. $\frac{3}{4}$

B. $\frac{3}{5}$

C. $\frac{2}{3}$

D. $\frac{2}{5}$