MATHEMATICS STANDARD 2022

TERM-1

SECTION - A

16 Marks

(Q. No. 1 to 20 are of 1 mark each. Attempt any 16 from Q. 1 to 20.)

1. The exponent of 5 in the prime factorisation of 3750 is:

(a) 3 (b) 4

(c) 5 (d) 6 1

2. The graph of a polynomial P(x) cuts the x-axis at 3 points and touches it at 2 other points. The number of zeroes of P(x) is:

(a) 1 (b) 2

(c) 3 (d) 5 1

3. The values of x and y satisfying the two equations $32x + 33y = 34$, $33x + 32y = 31$ respectively are:

(a) –1, 2 (b) –1, 4

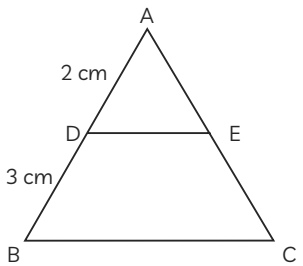
(c) 1, –2 (d) –1, –4 1

4. If $A\left(3, \sqrt{3}\right)$, B(0, 0) and C(3, k) are the three vertices of an equilateral triangle ABC, then the value of k is:

(a) 2 (b) –2

(c) $-\sqrt{3}$ (d) $-\sqrt{2}$ 1

5. In figure, DE || BC, AD = 2 cm and BD = 8 cm, then ar (ΔADE) is equal to:**



(a) 4 : 25 (b) 2 : 3

(c) 9 : 4 (d) 25 : 4 1

6. If $\cot\theta = \frac{1}{\sqrt{3}}$, the value of $\sec^2\theta + \text{cosec}^2\theta$ is:

(a) 1 (b) $\frac{40}{9}$

(c) $\frac{38}{9}$ (d) $5\frac{1}{3}$ 1

7. The area of a quadrant of a circle where the circumference of circle is 176 m, is:

(a) 2464 m^2 (b) 1232 m^2

(c) 616 m^2 (d) 308 m^2 1

8. For an E, P(E) + P($\bar{E}$) = x, then the value of $x^3 - 3$ is:

(a) –2 (b) 2

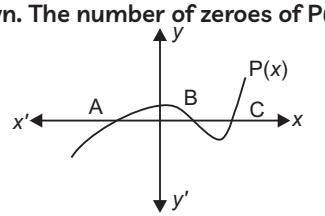
(c) 1 (d) –1 1

9. What is the greatest possible speed at which a girl can walk 95 m and 171 m in an exact number of minutes?

(a) 17 m/min (b) 19 m/min

(c) 23 m/min (d) 13 m/min 1

10. In figure, the graph a polynomial P(x) is shown. The number of zeroes of P(x) is:



(a) 1 (b) 2

(c) 3 (d) 4 1

11. Two lines are given to be parallel. The equation of one of the lines is $3x - 2y = 5$. The equation of the second line can be:

(a) $9x + 8y = 7$ (b) $-12x - 8y = 7$

(c) $-12x + 8y = 7$ (d) $12x + 8y = 7$ 1

12. Three vertices of a parallelogram ABDC are A(1, 4), B(–2, 3) and C(5, 8). The ordinate of the fourth vertex D is:

(a) 8 (b) 9

(c) 7 (d) 6 1

13. In ΔABC and ΔDEF, $\angle$F = $\angle$C, $\angle$B = $\angle$E and AB = $\frac{1}{2}$DE. Then, the two triangles are:

(a) congruent but not similar.

(b) similar but not congruent.

(c) neither congruent nor similar.

(d) congruent as well as similar. 1

14. In ΔABC right-angled at B, sin A = $\frac{7}{25}$, then the value of cos C is:

(a) $\frac{7}{25}$ (b) $\frac{24}{25}$

(c) $\frac{7}{24}$ (d) $\frac{24}{7}$ 1

15. The minute hand of a clock is 84 cm long. The distance covered by the tip of minute hand from 10:10 am to 10:25 am is:

(a) 44 cm (b) 88 cm

(c) 132 cm (d) 176 cm 1

16. The probability that the drawn card from a pack of 52 cards is neither an ace nor a spade is:

(a) $\frac{9}{13}$ (b) $\frac{35}{52}$

(c) $\frac{10}{13}$ (d) $\frac{19}{26}$ 1

17. Three alarm clocks ring their alarms at regular intervals of 20 min, 25 min and 30 min respectively. If they first beep together at 12 noon, at what time will they beep again for the first time?

(a) 4 : 00 pm (b) 4 : 30 pm

(c) 5 : 00 pm (d) 5 : 30 pm 1

18. A quadratic polynomial, the product and sum of whose zeroes are 5 and 8 respectively is:

(a) $k[x^2 - 8x + 5]$ (b) $k[x^2 + 8x + 5]$

(c) $k[x^2 - 5x + 8]$ (d) $k[x^2 + 5x + 8]$ 1

19. Points A(–1, y) and B(5, 7) lie on a circle with centre O(2, –3y). The values of y are:

(a) 1, –7 (b) –1, 7

(c) 2, 7 (d) –2, –7 1

20. Given that sec $\theta = \sqrt{2}$, then the value of $\frac{1+\tan\theta}{\sin\theta}$ is:

(a) $2\sqrt{2}$ (b) $\sqrt{2}$

(c) $3\sqrt{2}$ (d) 2 1

SECTION - B

16 Marks

(Q. No. 21 to 40 are of 1 mark each. Attempt any 16 from Q. 21 to 40.)

21. The greatest number which when divides 1251, 9377 and 15628 leaves remainder 1, 2 and 3 respectively is:

(a) 575 (b) 450

(c) 750 (d) 625 1

22. Which of the following cannot be the probability of an event?

(a) 0.01 (b) 3%

(c) $\frac{16}{17}$ (d) $\frac{17}{16}$ 1

23. The diameter of a car wheel is 42 cm. The number of complete revolutions it will make in moving 132 km is:

(a) 10^4 (b) 10^5

(c) 10^6 (d) 10^3 1

24. If θ is an acute angle and $\tan\theta + \cot\theta = 2$, then the value of $\sin^3\theta + \cos^3\theta$ is:

(a) 1 (b) $\frac{1}{2}$

(c) $\frac{\sqrt{2}}{2}$ (d) $\sqrt{2}$ 1

25. The ratio in which the line $3x + y - 9 = 0$ divides the line segment joining the points (1, 3) and (2, 7) is:

(a) 3 : 2 (b) 2 : 3

(c) 3 : 4 (d) 4 : 3 1

26. If $x - 1$ is a factor of the polynomial $p(x) = x^3 + ax^2 + 2b$ and $a + b = 4$, then

(a) $a = 5, b = -1$ (b) $a = 9, b = -5$

(c) $a = 7, b = -3$ (d) $a = 3, b = 1$

27. If a and b are two co-prime numbers, then a^3 and b^3 are:

(a) co-prime (b) not co-prime

(c) even (d) odd 1

28. The area of a square that can be inscribed in a circle of area $\frac{1408}{7}$ cm^2 is:

(a) 321 cm^2 (b) 642 cm^2

(c) 128 cm^2 (d) 256 cm^2 1

29. If A (4, –2), B(7, –2) and C(7, 9) are the vertices of a ΔABC, then ΔABC is:

(a) equilateral triangle

(b) isosceles triangle

(c) right angled triangle

(d) isosceles right angled triangle 1

30. If α, β are the zeroes of the quadratic polynomial $p(x) = x^2 - (k + 6)x + 2(2k - 1)$, then the value of k, if $\alpha + \beta = \frac{1}{2}\alpha\beta$, is:

(a) –7 (b) 7

(c) –3 (d) 3 1

31. If n is a natural number, then $2(5^n + 6^n)$ always ends with:

(a) –1 (b) 4

(c) 3 (d) 2 1

32. The line segment joining the points P(–3, 2) and Q(5, 7) is divided by the y-axis in the ratio:

(a) 3 : 1 (b) 3 : 4

(c) 3 : 2 (d) 3 : 5 1

33. If $a \cot\theta + b \operatorname{cosec}\theta = p$ and $b \cot\theta + a \operatorname{cosec}\theta = q$, then $p^2 - q^2$ equal to:

(a) $a^2 - b^2$ (b) $b^2 - a^2$

(c) $a^2 + b^2$ (d) $b - a$ 1

34. If the perimeter of a circle is half to that of a square, then the ratio of area of circle to area of square is:

(a) 22 : 7 (b) 11 : 7

(c) 7 : 11 (d) 7 : 22 1

35. A dice is rolled twice. The probability that 5 will not come up either time is:

(a) $\frac{11}{36}$ (b) $\frac{1}{3}$

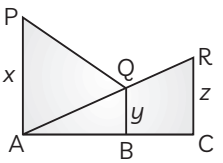
(c) $\frac{13}{36}$ (d) $\frac{25}{36}$ 1

36. The LCM of two numbers is 2400. Which of the following cannot be their HCF?

(a) 300 (b) 400

(c) 500 (d) 600 1

37. In fig. PA, QB and RC are each perpendicular to AC. If x = 8 cm and z = 6 cm, then y is equals to:



(a) $\frac{56}{7}$ cm (b) $\frac{7}{56}$ cm

(c) $\frac{25}{7}$ cm (d) $\frac{24}{7}$ cm 1

38. In a ΔABC, $\angle A = x°$, $\angle B = (3x - 2)°$, $\angle C = y°$. Also $\angle C - \angle B = 9°$. The sum of the greatest and the smallest angle of this triangle is:

(a) 107° (b) 135°

(c) 155° (d) 145° 1

39. If $\sec\theta + \tan\theta = p$, then $\tan\theta$ is:

(a) $\frac{p^2+1}{2p}$ (b) $\frac{p^2-1}{2p}$

(c) $\frac{p^2-1}{p^2+1}$ (d) $\frac{p^2+1}{p^2-1}$ 1

40. The base BC of an equilateral ΔABC lies on the y-axis. The co-ordinates of C are (0, – 3). If the origin is the mid-point of the base BC, what are the co-ordinates of A and B?

(a) A($\sqrt{3}$,0), B(0, 3)

(b) A($\pm 3\sqrt{3}$,0), B(3, 0)

(c) A($\pm 3\sqrt{3}$,0), B(0, 3)

(d) A($-\sqrt{3}$,0), B(3, 0) 1

SECTION - C

8 Marks

(Q. No. 41 to 45 are based on Case Study-I, you have to answer any (4) four questions.
Q. No. 46 to 50 are based on Case Study-II, you have to answer any (4) four questions.)

Case Study - I

A book store shopkeeper gives books on rent for reading. He has variety of books in his store related to fiction, stories and quizzes etc. He takes a fixed charge for the first two days and an additional charge for subsequent day. Amruta paid ₹ 22 for a book and kept for 6 days; while Radhika paid ₹ 16 for keeping the book for 4 days.

Assume that the fixed charge be ₹ x and additional charge (per day) be ₹ y.

Based on the given information, answer any four of the following questions:

41. The situation of amount paid by Radhika, is algebraically represented by:

(a) $x - 4y = 16$ (b) $x + 4y = 16$

(c) $x - 2y = 16$ (d) $x + 2y = 16$ 1

42. The situation of amount paid by Amruta, is algebraically represented by:

(a) $x - 2y = 11$ (b) $x - 2y = 22$

(c) $x + 4y = 22$ (d) $x - 4y = 11$ 1

43. What are the fixed charges for a book?

(a) ₹9 (b) ₹10

(c) ₹13 (d) ₹15

44. What are the additional charges for each subsequent day for a book?

(a) ₹6 (b) ₹5

(c) ₹4 (d) ₹3 1

45. What is the total amount paid by both, if both of them have kept the book for 2 more days?

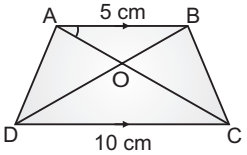
(a) ₹35 (b) ₹52

(c) ₹50 (d) ₹58 1

Case Study - II

A farmer has a field in the shape of trapezium, whose map with scale 1 cm = 20 m, is given below :

The field is divided into four parts by joining the opposite vertices.



Based on the above information, answer any four of the following questions:

46. The two triangular regions AOB and COD are:

(a) similar by AA criterion

(b) similar by SAS criterion

(c) similar by RHS criterion

(d) not similar 1

47. The ratio of the area of the ΔAOB to the area of ΔCOD, is:**

(a) 4 : 1 (b) 1 : 4

(c) 1 : 2 (d) 2 : 1 1

48. If the ratio of the perimeter of ΔAOB to the perimeter of ΔCOD is 1 : 4, then:

(a) AB = 2 CD (b) AB = 4 CD

(c) CD = 2 AB (d) CD = 4 AB 1

49. If in Δs AOD and BOC, $\frac{AO}{BC}=\frac{AD}{BO}=\frac{OD}{OC}$, then:

(a) $\Delta AOD \sim \Delta BOC$ (b) $\Delta AOD \sim \Delta BCO$

(c) $\Delta ADO \sim \Delta BCO$ (d) $\Delta ODA \sim \Delta OBC$ 1

50. If the ratio of area of two similar triangles AOB and COD is 1 : 4, then which of the following statements is true?**

(a) The ratio of their perimeters is 3 : 4.

(b) The corresponding altitudes have a ratio 1 : 2.

(c) The medians have a ratio 1 : 4.

(d) The angle bisectors have a ratio 1 : 16. 1

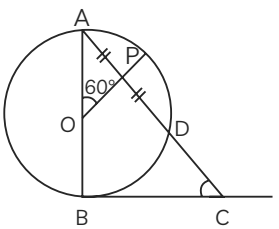
TERM-2

SECTION - A

12 Marks

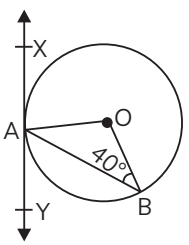
(Question Numbers 1 to 6 carry 2 marks each.)

1. In figure, AB is diameter of a circle centred at O. BC is tangent to the circle at B. If OP bisects the chord AD and $\angle AOP = 60°$, then find $m\angle C$.



OR

In fig. XAY is a tangent to the circle centred at O. If $\angle ABO = 40°$, then find $m\angle BAY$ and $m\angle AOB$.



2

2. If mode of the following frequency distribution is 55 then find the value of *x*.

Class	Frequency
0 – 15	10
15 – 30	7
30 – 45	x
45 – 60	15
60 – 75	10
75 – 90	12

2

3. In an A.P. if the sum of third and seventh term is zero, find its 5^{th} term.

OR

Determine the A.P. whose third term is 5 and seventh term is 9. 2

4. Solve the quadratic equation $x^2 + 2\sqrt{2}x - 6 = 0$ for *x*. 2

5. Find the sum of first 20 terms of an A.P. whose n^{th} term is given as $a_n = 5 - 2n$. 2

6. A solid piece of metal in the form of a cuboid of dimensions 11 cm × 7 cm × 7 cm is melted to form '*n*' number of solid spheres of radii $\frac{7}{2}$ cm each. Find the value of *n*. 2

SECTION - B

12 Marks

(Questions Numbers from 7 to 10 carry 3 marks each.)

7. **The mean of the following frequency distribution is 25. Find the value of *f*.**

Class	Frequency
0 – 10	5
10 – 20	18
20 – 30	15
30 – 40	*f*
40 – 50	6

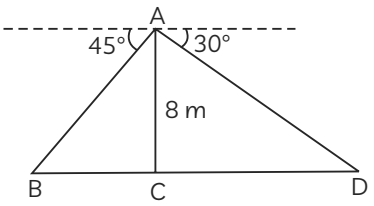
OR

Find the mean of the following data using assumed mean method:

Class	Frequency
0 – 5	8
5 – 10	7
10 – 15	10
15 – 20	13
20 – 25	12

3

8. **From a point on a bridge across a river, the angles of depression of the banks on opposite sides of the river are 30° and 45°. If the bridge is at a height of 8 m from the banks, then find the width of the river.**



3

9. **Height of 50 students of class X of a school are recorded and following data is obtained:**

Height (in cm)	Number of Students
130 – 135	4
135 – 140	11
140 – 145	12
145 – 150	7
150 – 155	10
155 – 160	6

Find the median height of the students. 3

10. **Construct a pair of tangents to a circle of radius 4 cm from a point P lying outside the circle at a distance of 6 cm from the centre.**[**]

3

SECTION - C

16 Marks

(Question Numbers from 11 to 14 carry 4 marks each)

11. **A 2-digit number is such that the product of its digits is 24. If 18 is subtracted from the number, the digits interchange their places. Find the number.**

OR

The difference of the squares of two numbers is 180. The square of the smaller number is 8 times the greater number. Find the two numbers. 4

12. **Prove that a parallelogram circumscribing a circle is a rhombus.** 4

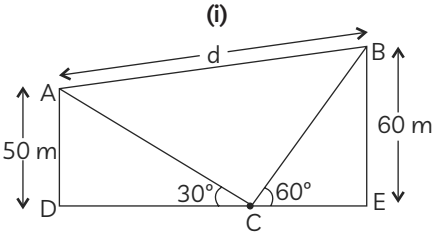
13. **Case Study-1:**

Kite Festival

Kite festival is celebrated in many countries at different times of the year. In India, every year 14th January is celebrated as International Kite Day. On this day many people visit India and participate in the festival by flying various kinds of kites.

In the picture given below, three kites are flying together.

(i)



(ii)

In Fig. (ii) the angles of elevation of two kites (Points A and B) from the hands of a man (Point C) are found to be 30° and 60° respectively. Taking AD = 50 m and BE = 60 m, find:

(A) the lengths of strings used (take them straight) for kites A and B as shown in the figure. 2

(B) the distance '*d*' between these two kites. 2

14. **Case Study-2:**

A 'circus' is a company of performers who put on shows of acrobats, clowns etc. to entertain people started around 250 years back in open field, now generally performed in tents.
One such 'Circus Tent' is shown below:

The tent is in the shape of a cylinder surmounted by a conical top. If the height and diameter of cylindrical part are 9 m and 30 m respectively and height of conical part is 8 m with same diameter as that of the cylindrical part, then find:

(A) the area of the canvas used in making the tent. 3

(B) the cost of the canvas bought for the tent at the rate ₹ 200 per sq. m, if 30 sq. m canvas was wasted during stitching. 1