Bhavan's Tripura Vidyamandir

Pre-Board Test: (2024-2025)

Class:- 10 **Subject:- Mathematics**

Time:- 3 Hours Total :- 80 Marks

Name of the student : Roll: Section:

General Instructions:

Read the following instructions carefully and follow them:

- This Question Paper contains 38 questions.
- This Question Paper is divided into 5 Sections A, B, C, D and E.
- In Section A, Questions no. 1-18 are multiple choice questions (MCQs) and questions no. 19and 20 are Assertion- Reason based questions of 1 mark each.
- In Section B, Questions no. 21-25 are very short answer (VSA) type questions, carrying 02 markseach.
- In Section C, Questions no. 26-31 are short answer (SA) type questions, carrying 03 marks each.
- In Section D, Questions no. 32-35 are long answer (LA) type questions, carrying 05 marks each.
- In Section E, Questions no. 36-38 are case study based questions carrying 4 marks each with sub parts of the values of 1, 1 and 2 marks each respectively.
- All Questions are compulsory. However, an internal choice in 2 Question of Section B, 2 Questions of Section C and 2 Questions of Section D has been provided. An internal choice has been provided in all the 2 marks questions of Section E.
- Draw neat and clean figures wherever required.
- Take π =22/7 wherever required if not stated.
- Use of calculators is not allowed.

SECTION – A

1. The HCF of two numbers is 23 and their LCM is 1449. If one of the numbers is 161, then the other number is

(a) 23 (b) 207 (c) 1449 (d) none of these

2. The zeroes of the polynomial $x^2 + 7x + 10$ are

(a) 2 and 5 (b) -2 and 5 (c) -2 and -5 (d) 2 and -5

3. The solution of the equations x + y = 14 and x - y =4 is

(a) x = 9 and y = 5 (b) x = 5 and y = 9

(c) x = 7 and y = 7 (d) x = 10 and y = 4

4. The roots of the equation $x^2 + 7x + 10 = 0$ are

(a) 2 and 5 (b) -2 and 5 (c) -2 and -5 (d) 2 and -5

5. The roots of the quadratic equation x^2+x-1 = 0 are

(a) Irrational and distinct (b) not real

(c) rational and distinct (d) real and equal

6. If a, b, c, d, e and f are in AP, then e – c is equal to

(a) 2(c – a) (b) 2(f – d) (c) 2(d – c) (d) d – c

7. The number of points on x-axis which are at a distance of 2 units from (2, 4) is

(a) 2 (b) 1 (c) 3 (d) 0

8. The distance of A(5, -12) from the origin is

(a) 12 (b) 11 (c) 13 (d) 10

9. (sec A + tan A) (1 - sin A) =

(a) sec A (b) sin A (c) cosec A (d) cos A

10. If $\theta = 30^o$ then the value of $3\tan\theta$ is

(a) 1 (b) $\frac{1}{\sqrt{3}}$ (c) $\frac{3}{\sqrt{3}}$ (d) not defined

11. Which of the following statements is **not** true?

(a) A number of secants can be drawn at any point on the circle.

(b) Only one tangent can be drawn at any point on a circle.

(c) A chord is a line segment joining two points on the circle

(d) From a point inside a circle only two tangents can be drawn.

12. The common point of a tangent to a circle with the circle is called _____

(a) centre (b) point of contact (c) end point (d) none of these.

13. If TP and TQ are the two tangents to a circle with centre O so that ∠POQ = 110°, then ∠PTQ is equal to

(a) 60^0 (b) 70^0 (c) 80^0 (d) 90^0

14. The minute hand of a clock is 12 cm long. Find the area of the face of the clock described by the minute hand in 35 minutes.

(a) 265 cm^2 (b) 266 cm^2 (c) 264 cm^2 (d) none of these

15. The volume and the surface area of a sphere are numerically equal, then the radius of sphere is

(a) 0 units (b) 1 units (c) 2 units (d) 3 units

16. For a frequency distribution, mean, median and mode are connected by the relation

(a) mode = 3mean – 2median (b) mode = 2median – 3mean

(c) mode = 3median – 2mean (d) mode = 3median + 2mean

17. The arithmetic mean of 12 observations is 7.5. If the arithmetic mean of 7 of these observations is 6.5, the mean of the remaining observations is

(a) 5.5 (b) 8.5 (c) 8.9 (d) 9.2

18. A bag has 4 red balls and 2 yellow balls. A ball is drawn from the bag without looking into the bag. What is probability of getting a red ball?

(a) $\frac{1}{6}$ (b) $\frac{2}{3}$ (c) $\frac{1}{3}$ (d) 1

DIRECTION: In the question number 19 and 20, a statement of **Assertion (A)** is followed by a statement of **Reason (R)**.

Choose the correct option

A) Both assertion (A) and reason (R) are true and reason (R) is the correctexplanation of assertion (A)

B) Both assertion (A) and reason (R) are true and reason (R) is not the correctexplanation of assertion (A)

Assertion (A) is true but reason (R) is false.D)Assertion (A) is false but reason (R) is true.

19. ASSERTION: Three unbiased coins are tossed together, then the probability of getting exactly 1 head is $\frac{3}{8}$

REASON: Favourable number of outcomes do not lie in the sample space of total number of outcomes.

20. ASSERTION: The curved surface area of a cone of base radius 6 cm and slant height 10 cm is 60π cm^2.

REASON: Curved surface area of a cone = $\pi r^2 h$.

SECTION- B

21. Find the H.C.F and L.C.M of 480 and 720 using the Prime factorisation method.

OR

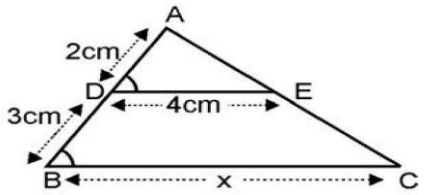
Given that HCF (306, 657) = 9, find the LCM (306, 657).

22. Two dice are rolled together bearing numbers 4, 6, 7, 9, 11, 12. Find theprobability that the product of numbers obtained is an odd number

OR

How many positive three digit integers have the hundredths digit 8 and unit's digit 5? Find the probability of selecting one such number out of all three digitnumbers.

23. In the given figure, if DE || BC, then x equals



24. If the point P(x, y) is equidistant from the points A(5, 1) and B(-1, 5), prove that x = y.

25. Evaluate: $\sin 60^0 \cos 30^0 + \cos 60^0 \sin 30^0$

SECTION- C

26. Prove that $\sqrt{3}$ is an irrational number.

27. If α and β are the zeroes of the quadratic polynomial $f(x) = 6x^2 + x - 2$, then find the value of $\alpha^2 + \beta^2$

28. The sum of two numbers is 18 and the sum of their reciprocals is 9/40. Find thenumbers.

OR

Find the value of k for which the quadratic equation $(k + 4)x^2 + (k+1)x + 1 = 0$ has two real equal roots.

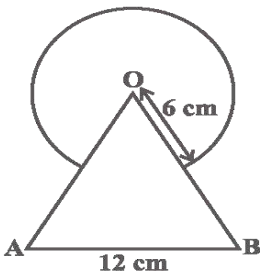
29. Prove that "If a line divides any two sides of a triangle in the same ratio, then the line is parallel to the third side."

30. If $\cos\theta + \sin\theta = 1$, then prove that $\cos\theta - \sin\theta = \pm 1$

OR

$\frac{tan\theta - cot\theta}{sin\theta.cos\theta} = \tan^2\theta - \cot^2\theta$

31. Find the area of the shaded region in below figure, where a circular arc of radius 6 cm has been drawn with vertex O of an equilateral triangle OAB of side 12 cm as centre.

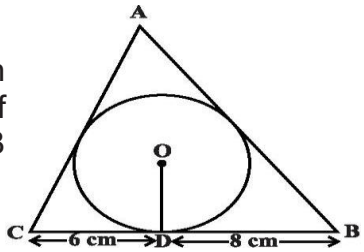


SECTION : D

32. A two-digit number is 3 more than 4 times the sum of its digit. If 18 is added to the number, the digits are reversed. Find the number.

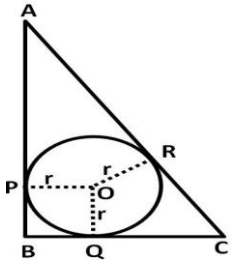
33. A boy whose eye level is 1.35 m from the ground, spots a balloon moving with the windin a horizontal line at some height from the ground. The angle of elevation of the balloon from the eyes of the boy at an instant is 60^o. After 12 seconds, the angle of elevation reduces to 30°. If the speed of the wind is 3m/s then find the height of the balloon from the ground. Take $\sqrt{3}$ = 1.73

34. A triangle ABC is drawn to circumscribe a circle of radius 4 cm such that the segments BD and DC into which BC is divided by the point of contact D are of lengths 8 cm and 6 cm respectively. Find the sides AB and AC.



OR

In fig. ABC is a right triangle right angled at B such that BC = 6 cm and AB = 8 cm. Find the radius of its incircle.



35. The percentage of marks obtained by 100 students in an examination are given below:

Marks	30-35	35-40	40-45	45-50	50-55	55-60	60-65
No. of Students	14	16	18	23	18	8	3

Determine the median percentage of marks. OR The mean of the following distribution is 24. Find the value of p.

Marks	0-10	10-20	20-30	30-40	40-50	50-60
No. of Students	15	20	35	P	10	42

SECTION- E

36. Ms. Sheela visited a store near her house and found that the glass jars are arrangedone above the other in a specific pattern. On the top layer there are 3 jars. In the next layer there are 6 jars. In the 3rd layer from the top there are 9 jars and so on till the 8th layer.

On the basis of the above situation answer the following questions.

(i) Write an A.P whose terms represent the number of jars in different layers startingfrom top. Also, find the common difference.
(ii) Is it possible to arrange 34 jars in a layer if this pattern is continued? Justify youranswer.
(iii) (A) If there are 'n' number of rows in a layer then find the expression for finding the total number of jars in terms of n. Hence find $S8$.

OR

(iii) (B) The shopkeeper added 3 jars in each layer. How many jars are there in the 5th layer from the top?

37. Metallic silos are used by farmers for storing grains. Farmer Girdhar has decided to build a new metallic silo to store his harvested grains. It is in the shape of a cylinder mounted by a cone. Dimensions of the conical part of a silo is as follows:

Radius of base = 1.5 m Height = 2 m
Dimensions of the cylindrical part of a silo is as follows:
Radius = 1.5 m Height = 7 m

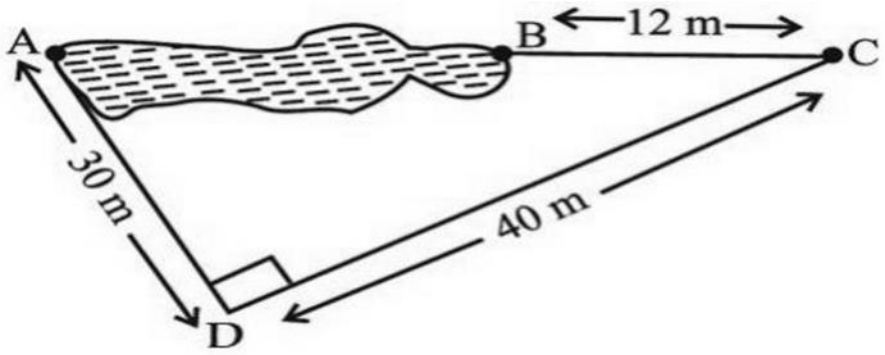
On the basis of the above information answer the following questions.

(i) Calculate the slant height of the conical part of one silo.
(ii) Find the curved surface area of the conical part of one silo.
(iii) (A) Find the cost of metal sheet used to make the curved cylindrical part of 1 silo at the rate of ₹2000 per $m2$.

OR

(iii) (B) Find the total capacity of one silo to store grains.

38. Rohan wants to measure the distance of a pond during the visit to his native. He marks points A and B on the opposite edges of a pond as shown in the figure below. To find the distance between the points, he makes a right-angled triangle using rope connecting B with another point C are a distance of 12m, connecting C to point D at a distance of 40m from point C and the connecting D to the point A which is are a distance of 30m from D such the ADC=900.



i) Which property of geometry will be used to find the distance AC?

ii) What is the distance AC?

iii) Find the length of the rope used.

Or

Find the length AB?