SET - II

Series: ACM

Code: 7/5

Roll No: __ _ __ _ __

ADARSH PUBLIC SCHOOL (CBSE) VITA

Kundal Road, Bhavaninagar, Vita

CLASS 10 - MATHEMATICS (STANDARD)

Practice Examination

Time Allowed: 3 hours **Maximum Marks: 80**

General Instructions:

1. All the questions are compulsory.
2. The question paper consists of 40 questions divided into 4 sections A, B, C, and D.
3. Section A comprises of 20 questions of 1 mark each. Section B comprises of 6 questions of 2 marks each. Section C comprises of 8 questions of 3 marks each. Section D comprises of 6 questions of 4 marks each.
4. There is no overall choice. However, an internal choice has been provided in two questions of 1 mark each, two questions of 2 marks each, three questions of 3 marks each, and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.
5. Use of calculators is not permitted.

Section A

1. If a is a non-zero rational and $\sqrt{b}$ is irrational, then $a\sqrt{b}$ is: **[1]**

   a) an integer b) a natural number

   c) an irrational number d) a rational number

2. For any positive integer 'a' and 3, there exist unique integers 'q' and 'r' such that a = 3q + r where 'r' must satisfy **[1]**

   a) 1 < r < 3 b) $0 < r \leqslant 3$

   c) $0 \leqslant r < 3$ d) 0 < r < 3

3. The mean of all the factors of 24 is **[1]**

   a) 7.5 b) 7

   c) 6.5 d) 24

4. $3x^2 + 2x - 1 = 0$ have **[1]**

   a) Real and Distinct roots b) Real roots

   c) real and equal root d) No Real roots

5. If the height of a tower is half the height of the flagstaff on it and the angle of elevation of the top of the tower as seen from a point on the ground is 30°, then the angle of elevation of the top of the flagstaff as seen from the same point is **[1]**

   a) 30° b) 60°

c) 45° d) none of these

6. If ΔABC is right angled at C, then the value of cos (A + B) is **[1]**

a) $\frac{1}{2}$ b) 0

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

7. $5 \cot^2 A - 5 \text{ cosec}^2 A =$ **[1]**

a) 0 b) 5

c) 1 d) -5

8. An unbiased die is thrown once. The probability of getting a prime number is **[1]**

a) $\frac{1}{5}$ b) $\frac{1}{4}$

c) $\frac{1}{2}$ d) $\frac{1}{3}$

9. The centroid of a triangle divides the median in the ratio **[1]**

a) 2 : 1 b) 1:2

c) 1 : 3 d) 3 : 1

10. If one end of a diameter of a circle is (2, 3) and the centre is (– 2, 5), then the other end is **[1]**

a) (0, 8) b) (0, 4)

c) (6, – 7) d) (– 6, 7)

11. Fill in the blanks: **[1]**

Total outer surface area of Right circular hollow cylinder = $2\pi rh$ + _____ sq units.

12. Fill in the blanks: **[1]**

Value of K, if K is a zero of p(x) = 5x + 3 is _____.

OR

Fill in the blanks:

A quadratic polynomial whose zeros are α and β is given by p(x) = _____.

13. Fill in the blanks: **[1]**

The probability of an event that is certain to happen is _____.

14. Fill in the blanks: **[1]**

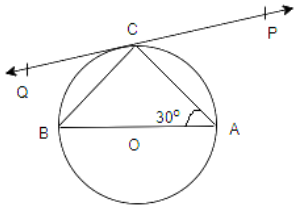
-81 is the _____ term of the AP: 21, 18, 15, ...

15. Fill in the blanks: **[1]**

If a point P lies on the circle, then _____ tangents can be drawn.

16. State whether $\frac{129}{2^2 \times 5^7 \times 7^{17}}$ will have terminating decimal expansion or a non-terminating repeating decimal expansion. **[1]**

17. In the following figure, PQ is a tangent at a point C to circle with centre O. If AB is a diameter and $\angle CAB = 30^o$, then find $\angle PCA$. **[1]**



18. To draw a pair of tangents to a circle which are inclined to each other at an angle of 30°, it is **[1]**

required to draw tangents at end points of two radii of the circle, what will be the angle between them?

19. Which term of the progression $20, 19\frac{1}{4}, 18\frac{1}{2}, 17\frac{3}{4}\ldots$ is the first negative? **[1]**

OR

Find k, if the given value of x is the k^{th} term of the given AP $5\frac{1}{2}$, 11, $16\frac{1}{2}$, 22, ..., x = 550.

20. Form a quadratic equation whose roots are 2 and 3. **[1]**

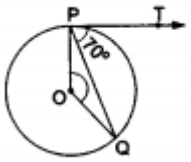
Section B

21. Five cards-ten, jack, queen, king, and an ace of diamonds are shuffled face downwards. One card is picked at random. **[2]**

i. What is the probability that the card is a queen?

ii. If a king is drawn first and put aside, what is the probability that the second card picked up is the (i) ace? (ii) king?

22. If PT is a tangent to a circle with centre O and PQ is a chord of the circle such that $\angle QPT$ = 70°, then find the measure of $\angle POQ$. **[2]**

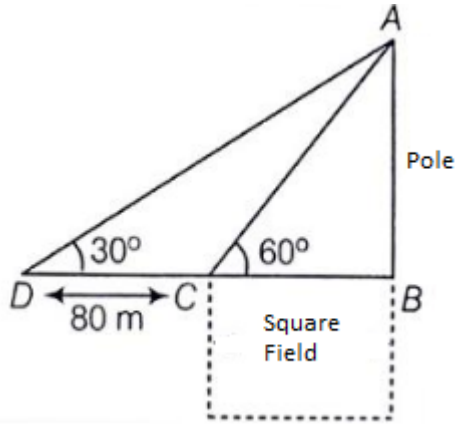


23. $\triangle$ABC is a right triangle right angled at A and AD $\perp$ BC. Show that $\frac{BD}{AD} = \frac{AB}{AC}$. **[2]**

OR

A right triangle has hypotenuse of length q cm and one side of length p cm. If (q - p) = 2, express the length of third side of the right triangle in terms of q.

24. A man standing in one corner of a square field observes that the angle subtended by a pole in the corner just diagonally opposite to this corner is 60^o. When he retires 80 m from the corner, along the same straight line, he finds the angle to be 30^o. **[2]**



i. Find the length of the square field.

ii. Find the height of the pole.

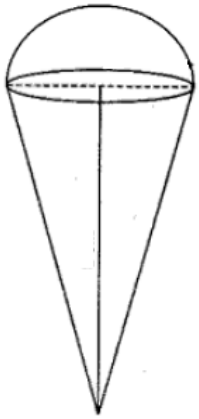
25. Find the roots of given quadratic equation: $2x^2 + x + 4 = 0$, by the method of completing the square **[2]**

OR

Solve: $3x^2 + 5\sqrt{5}x - 10 = 0$

26. An 'ice-cream seller used to sell different kinds and different shapes of ice-cream like rectangular shaped with one end hemispherical, cone-shaped and rectangular brick, etc. One **[2]**

day a child came to his shop and purchased an ice-cream which has the following shape: ice-cream cone as the union of a right circular cone and a hemisphere that has the same (circular) base as the cone. The height of the cone is 9 cm and the radius of its base is 2.5 cm.



By reading the above-given information, find the following:

i. The volume of the ice-cream without hemispherical end.

ii. The volume of the ice-cream with a hemispherical end.

Section C

27. Is product of a rational number and an irrational number, a rational number? Is product of two irrational numbers a rational number or irrational number? Justify giving examples. **[3]**

OR

Show that $3\sqrt{2}$ is an irrational number.

28. The base AB of two equilateral triangles ABC and ABC' with side 2a lies along the X-axis such that the mid-point of AB is at the origin. Find the coordinates of the vertices C and C' of the triangles. **[3]**

29. Solve for x and y: $\frac{1}{2(2x+3y)} + \frac{12}{7(3x-2y)} = \frac{1}{2}; \frac{7}{(2x+3y)} + \frac{4}{(3x-2y)} = 2$ where (2x + 3y)$\neq$0 and (3x - 2y))$\neq$0. **[3]**

OR

Find the values of a for which the following system of equations has infinitely many solutions:

2x + 3y - 7 =0

(a - 1)x + (a + 1)y = (3a -1)

30. Verify that 3, -1 and $\frac{-1}{3}$ are the zeros of the cubic polynomial p(x) = $3x^3$ - $5x^2$ - 11x - 3 and verify the relation between its zeros and coefficients. **[3]**

31. The 7^{th} term of an AP is -4 and its 13^{th} term is -16. Find the AP. **[3]**

32. If tan A = $\frac{3}{4}$, then show that sin A cos A = $\frac{12}{25}$. **[3]**

OR

If $\cos\theta = \frac{3}{5}$, find the value of $\left(\frac{5\text{cosec}\theta - 4\tan\theta}{\sec\theta + \cot\theta}\right)$.

33. The radius of a circle with centre O is 7 cm. Two radii OA and OB are drawn at right angles to each other. Find the areas of minor and major segments. **[3]**

34. Cards numbered 11 to 60 are kept in a box. If a card is drawn at random from the box, find the probability that the number on the drawn card is (i) an odd number, (ii) a perfect square number, (iii) divisible by 5, (iv) a prime number less than 20. **[3]**

Section D

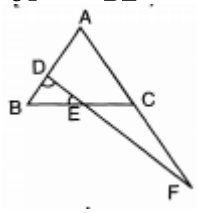
35. Draw a circle of radius 4 cm. Take a point P on it. Without using the centre of the circle, draw **[4]**

a tangent to the circle at point P.

OR

Draw a line segment of length 8 cm and divide it internally in the ratio 4: 5.

36. In the figure, $\angle BED = \angle BDE$ and In the figure, E is the midpoint of BC. Prove that $\frac{AF}{CF} = \frac{AD}{BE}$ **[4]**



37. 4 men and 6 boys can finish a piece of work in 5 days, while 3 men and 4 boys can finish it in 7 days. Find the time taken by 1 man alone or that by 1 boy alone. **[4]**

OR

Father's age is three times the sum of the ages of two children. After 5 years his age will be twice the sum of the ages of two children. Find the age of the father.

38. A friction clutch is in the form of a frustum of a cone, the diameter of the ends being 32 cm and 20 cm and length 8 cm. Find its bearing surface and volume. **[4]**

OR

How many spherical lead shots each of diameter 4.2 cm can be obtained from a solid rectangular lead piece with dimensions 66 cm, 42 cm and 21 cm?

39. A 1.2 m tall girl spots a balloon moving with the wind in a horizontal line at a height of 88.2 m from the ground. The angle of elevation of the balloon from the eyes of the girl at any instant is 60°. After some time, the angle of elevation reduces to 30°. Find the distance travelled by the balloon during the interval. **[4]**

40. Draw "more than ogive" for the frequency distribution and hence obtain the median. **[4]**

Class Interval	5-10	10-15	15-20	20-25	25-30	30-35	35-40
Frequency	2	12	2	4	3	4	3