BUDHA DAL PUBLIC SCHOOL PATIALA
FIRST TERM EXAMINATION (20September 2025)
Class – X
Paper-Mathematics Standard (Set-A)

Time: 3hrs.

M.M. 80

General Instructions:

1. This Question Paper has 5 Sections A, B, C, D and E.
2. Section A has 20 MCQs carrying 1 mark each
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of assessment (04 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.

Section-A

1. If $HCF(a,8) = 4$ and $LCM(a,8) = 24$, then a is

   a) 8   b) 10   c) 12   d) 14

2. The zeros of the polynomial $x^2 + x - 2$ are

   a) 1, 2   b) $-1, -2$ c) $1, -2$ d) $-1, 2$

3. The value of k for which the pair of linear equations $3x - 2y - 7 = 0$ and $6x + ky + 11 = 0$ have a unique solution is (are)

   a) 4   b) all real umbers except 4   c) -4 d) all real numbers except -4

4. Find the value of k for which the equation $2x^2 + kx + 2 = 0$ has equal roots, is

   a) 4   b) ± 4 c) -4 d) 0

5. Which term of the A.P. $21, 42, 63, 84, \ldots$ is 210 ?

   a) 9th   b) 10th   c) 11th   d) 12th

6. If a pair of linear equations is inconsistent then their graph lines will be

   a) parallel   b) always coincident   c) always intersecting   d) intersecting or coincid

7. If one of the zeros of the quadratic polynomial $(k-1)x^2 + kx + 1$ is -3, then k is

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

8. If n is any natural number, then $6^n - 5^n$ always ends with

   a) 1   b) 3   c) 5   d) 7

9. The discriminant of $(x+2)^2 = 0$ is

   a) -2 b) 2   c) 4   d) 0

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10. The tenth term of the A.P. $\sqrt{3}, \sqrt{12}, \sqrt{27}....$ is

a) $\sqrt{300}$ b) $12\sqrt{5}$ c) $3\sqrt{10}$ d) $\sqrt{30}$

11. In $\triangle ABC$ and $\triangle DEF$; $\frac{AB}{DE} = \frac{BC}{FD}$ which of the following makes the two triangle similar
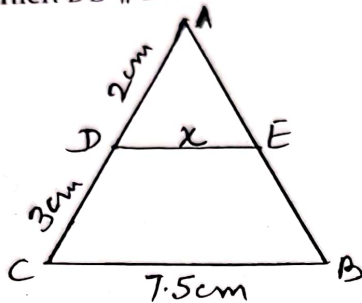
a) $\angle A = \angle D$ b) $\angle B = \angle D$ c) $\angle B = \angle E$ d) $\angle A = \angle F$

12. The pair of equations $x = 4$ and $y = 2$ graphically represents the lines which are

a) parallel   b) intersecting at (4, 2)   c) coincident   d) intersecting at (2, 4)

13. In figure, the value of x for which $DE \parallel BC$ is

a) 4

b) 1

c) 3

d) 2

14. If the height of a vertical pole is $\sqrt{3}$ times the length of its shadow on the ground, then the angle of elevation of the sun at that time is

a) 30^0 .   b) 60^0 c) 45^0 d) 75^0

15. $\frac{1-tan^2 45^0}{1+tan^2 45^0}$ is equal to

a) $\tan 90^0$ b) 1   c) $\sin 45^0$ d) $\sin 0^0$

16. The empirical relation for measuring mode is

a) Mode = 3 median – 2 mean   b) Mode = 3 mean – 2 median

c) Mode = 2 median – mean   d) Mode = 2 mean – median

17. In the formula $\bar{x} = a + \frac{\Sigma fidi}{\Sigma fi}$ for finding the mean of the grouped data, di's are deviation from

a (assumed mean) of

a) lower limits of the classes   b) upper limits of the classes

c) mid-points of the classes   d) frequencies of the classes

18. The HCF of two number 65 and 104 is 13. If LCM of 65 and 104 is 40 x, then the value of x is

a) 5   b) 13   c) 40   d) 8

19. Statement A (Assertion) : If α and β are zeros of the quadratic polynomial $x^2 - 5x - 3$, then th

value of $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$ is $\frac{31}{3}$

Statement R (Reason) : If α and β are the zeroes of the quadratic polynomial

$ax^2 + bx + c, a \neq 0$, then $\alpha + \beta = \frac{-b}{a}$ and $\alpha\beta = \frac{c}{a}$

A-2

a) Both A and R are true and Reason (R) is correct explanation of A

b) Both A and R are true but Reason (R) is not the correct explanation of A

c) A is true but R is false

d) A is false but R is true

20. Statement A (Assertion) : For any acute angle θ, the value of $\sin \theta$ cannot be greater than 1.

Statement R (Reason) : Hypotenuse is the longest side in any right angled triangle.

a) Both A and R are true and Reason (R) is correct explanation of A

b) Both A and R are true but Reason (R) is not the correct explanation of A

c) A is true but R is false

d) A is false but R is true

Section – B

21. Show that $5 + 3\sqrt{2}$ is an irrational number. Given that $\sqrt{2}$ is an irrational number.

OR

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

22. If α and β are the zero of the quadratic polynomial $x^2 - x - 6$, then find the value of $\alpha^3 + \beta^3$

23. Find the value(s) of k for which the pair of linear equations $kx + 3y - (k-3) = 0$ and $12x + ky - k = 0$ will have infinitely many solutions.

24. Form a quadratic equation whose roots are $\frac{3}{2}$ and $\frac{4}{5}$

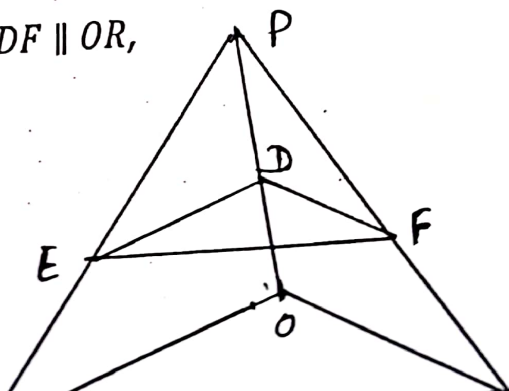25. In the following A.P., find the missing terms $2, \square, 26, \square$

Section – C

26. If $\tan A = \sqrt{2} - 1$, find the value of $\frac{\tan A}{1+\tan^2 A}$

27. Solve $2x + 3y = 11$ and $2x - 4y = -24$ and hence find the value of m for which $y = mx + 3$

28. Find the zeroes of $3x^2 - x - 4$ and verify the relationship between the zeroes and coefficients

29. Find the 11th term from the last term of the A.P. $10, 7, 4 \ldots\ldots, -62$

30. In the given figure $DE \parallel OQ$ and $DF \parallel OR$, show that $EF \parallel QR$

OR

CD and GH are respectively the bisectors of $\angle ACB$ and $\angle EGF$ such that D and H lie on the sides AB and FE of $\triangle ABC$ and $\triangle EFG$ respectively. If $\triangle ABC \sim \triangle FEG$ show that

a) $\triangle DCA \sim \triangle HGF$ b) $\dfrac{CD}{GH} = \dfrac{AC}{FG}$

31. Find the mean of the following frequency distribution : using step deviation method.

Class Interval	0-10	10-20	20-30	30-40	40-50
No. of workers	7	10	15	8	10

Section – D

32. The sum of a two digit number and the number obtained by reversing the digits is 66. If the digits of the number differ by 2, find the number. How many such numbers are there?

OR

Prove that if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio.

33. A train travels a distance of 480 km at a uniform speed. If the speed had been 8km/hr less, then it would have taken 3 hours more to cover the same distance. We need to find the speed of the train.

34. Prove the identity $\sqrt{\dfrac{1+\sin A}{1-\sin A}} = \sec A + \tan A$

35. The median of the following data is 525. Find the values of x and y, if the total frequency is 100

| Class interval	0-100	100-200	200-300	300-400	400-500	500-600	600-700	700-800	800-900	900-1000
Frequency	2	5	x	12	17	20	y	9	7	4

Section – E

Case Study :

5. In a pool at an aquarium, a dolphin jumps out of the water travelling at 20 cm per second. Its height above water level after t second is given by $h = 20t - 16t^2$

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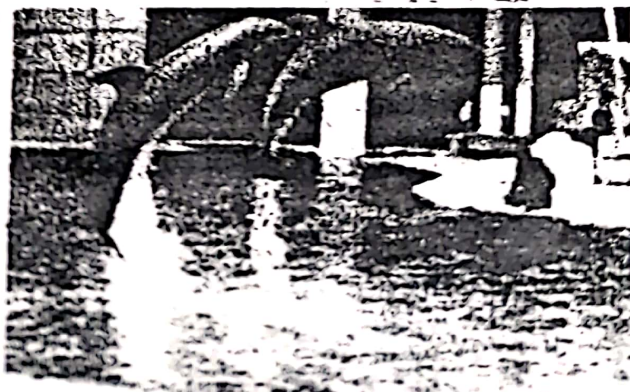
Based on the above information, answer the following questions:

1. Find zeroes of polynomial $p(t) = 20t - 16t^2$

2. Which of the following types of graph represents $p(t)$?


(a)   (b)   (c)   (d)
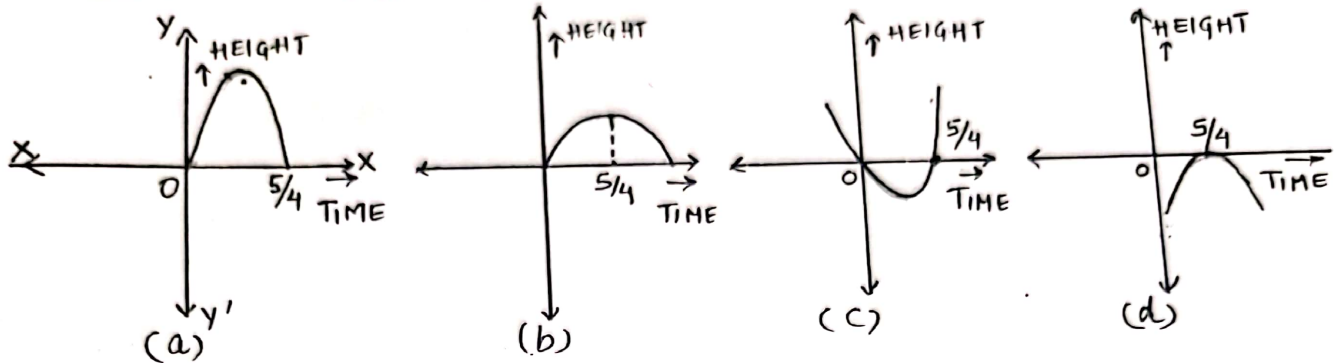
3. What would be the value of h at $t = \frac{3}{2}$? Interpret the result

OR

How much distance has the dolphin covered before hitting the water level again?

37. India is competitive manufacturing location due to the low cost of manpower and strong technical and engineering capabilities contributing to higher quality production. The production of air conditioner in a factory increases uniformly by a fixed number every year. It produced 12000 sets in 3rd year and 20400 sets in 10th year.
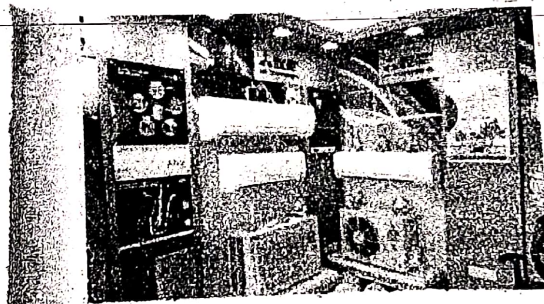
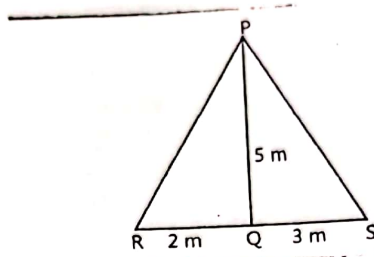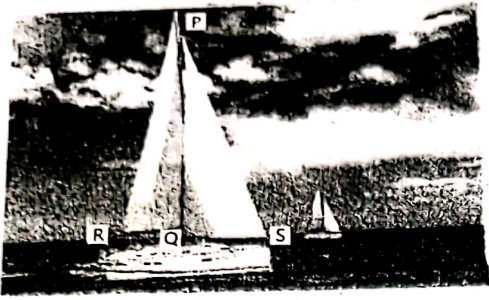**Based on the above information, answer the following questions:**

1. Find the production of air conditioners during first year.

2. Find the production of air conditioners during eight year.

3. Find the total production of air conditioners during first five years.

OR

In which year, the production is 30000?

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38. A sailing boat with triangular masts is as shown below. Two right triangles can be observed as triangles PQR and PQS, both right-angled at Q. The distance QR = 2m and QS = 3 m and height PQ = 5m.

Based on the above information, answer the following questions:

1. Find the value of sec S

2. Find the value of cosec R

3. Find the value of $\tan S + \cot R$

OR

Find the value of $\sin^2 R - \cos^2 S$