Exam ID. | | | | | | |

Candidates must write the Set No. on the title page of the OMR Sheet.

DAV PUBLIC SCHOOLS, ODISHA ZONE –I
PA-II EXAMINATION, 2021-22

- **Check that this question paper contains 08 printed pages.**
- **Set number given on the right-hand side of the questions paper should be written on the OMR SHEET by the candidate.**
- **Check that this question paper contains 50 questions.**

CLASS – X

SUB : MATHEMATICS STANDARD (041)

Time :90 Minutes **Maximum Marks:40**

General Instruction:

1. ***The question paper contains three parts A, B and C.***
2. ***Section A consists of 20 questions of 1 mark each. Any 16 questions are to be attempted.***
3. ***Section B consists of 20 questions of 1 mark each. Any 16 questions are to be attempted.***
4. ***Section C consists of 10 questions based on two Case Studies. Attempt any 8 questions.***
5. ***There is no negative marking.***

SECTION-A

(Section A consists of 20 questions of 1 mark each. Any 16 questions are to be attempted.The first attempted 16 questions would be evaluated.)

Q1. The largest number which divides 70 and 125, leaving remainders 5 and 8, respectively, is

(A) 13 (B) 65 (C) 875 (D)1750

Q2. The pair of equations x = a and y = b graphically represents lines which are

(A) Parallel (B) intersecting at (a,b)

(C) Coincident (D) intersecting at (b,a)

Q3. If $\Delta ABC \sim \Delta EDF$ and ΔABC is not similar to Δ D E F, then which of the following is not true?

(A) BC.EF =AC.FD (B) AB.EF =AC.DE

(C) BC.DE =AB.EF (D) BC.DE =AB.FD

Q4. If ΔABC~ΔPQR , perimeter of $\Delta PQR = 48cm$ and perimeter of $\Delta ABC = 32cm$. If PR=6cm, then what is the length of AC

(A) 9cm (B)4cm (C) 8cm (D)18cm

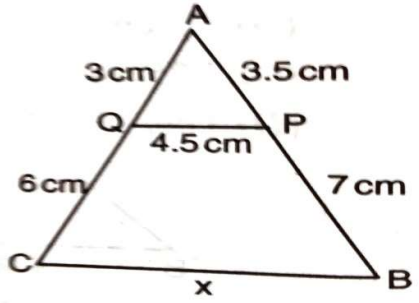
Q5. Two dice are thrown simultaneously. What is the probability of getting a doublet?

(A) $\frac{1}{6}$ (B) $\frac{1}{3}$ (C) $\frac{1}{4}$ (D) $\frac{1}{9}$

Q6. The areas of two similar triangles are 121 cm^2 and 64 cm^2 respectively. If the median of the first triangle is 12.1cm, then the corresponding median of the other triangle is

(A) **11cm** (B) 8.8cm (C) 11.1 cm (D) 8.1 cm

Q7. In triangle ABC ,$QP \parallel CB$, so find the value of x.



(A) 9cm (B) 10.5cm (C) 13.5cm (D) 12cm

Q8. If $\Delta ABC \sim \Delta PQR$ and $\angle A = 32^0, \angle R = 65^0$, then the value of $\angle B$ is

(A) 83^0 (B) 32^0 (C) 65^0 (D) 97^0

Q9. Given that $sin\theta = \frac{a}{b}$, then $cos\theta =$

(A) $\frac{b}{\sqrt{b^2-a^2}}$ (B) $\frac{b}{a}$ (C) $\frac{\sqrt{b^2-a^2}}{b}$ (D) $\frac{a}{\sqrt{b^2-a^2}}$

Q10. If $sinA + cosecA = 2$, then $\sin^2 A + cosec^2 A =$

(A) 4 (B) 2 (C) 0 (D) 1

Q11. If $cos3\theta = \frac{\sqrt{3}}{2}$, $0 < \theta < 20^0$, then the value of θ is

(A) 15^0 (B) 10^0 (C) 0^0 (D) 30^0

Q12. The value of $2\tan^2 45^0 + \cos^2 30^0 - \sin^2 60^0$ is

(A) 2 (B) $\frac{1}{2}$ (C) $\frac{7}{2}$ (D) 0

Q13. If LCM(x, 24) =24 and HCF(x, 24) =3, then x is

(A) 2 (B) 3 (C) 4 (D) 6

Q14. Prime factors of the denominator of a rational number with the decimal expansion 23.1278 are

(A) 2,3 (B) 2,3 (C) 2,5 (D) 3,5

Q15. The decimal expansion of a rational number $\frac{14587}{2500}$ will terminate after:

(A) One decimal place (B) Two decimal places
(C) Three decimal places (D) Four decimal places

Q16. The value of k for which the pair of linear equations $4x + 6y - 1 = 0$ and $2x + ky - 7 = 0$ represent parallel lines is :

(A) 3 (B) 2 (C)4 (D) -2

Q17. If $2x + 3y = 11$ and $2x - 4y = -24$, $y = px + 3$, then the value of p is

(A) 2 (B)1 (C) -1 (D)4

Q18. The probability that a leap year selected at random will contain 53 Sundays is

(A) $\frac{1}{7}$ (B)$\frac{2}{7}$ (C) $\frac{3}{7}$ (D) $\frac{2}{365}$

Q19. The distance of the point P (–6, 8) from the origin is

(A) 8 (B) $2\sqrt{7}$ (C) 10 (D) 6

Q20. Area of the largest triangle that can be inscribed in a semi-circle of radius r units is

(A) $r^2\ sq.units$ (B) $\frac{1}{2}r^2\ sq.units$
(C) $2r^2 sq.units$ (D) $\sqrt{2}r^2 sq.units$

SECTION-B

(Section B consists of 20 questions of 1 mark each. Any 16 questions are to be attempted. The first attempted 16 questions would be evaluated)

Q21. If H.C.F of 65 and 117 is expressible in the form of 65m-117, the value of m is

(A) 4 (B) 2 (C) 1 (D) 3

Q22. $n^2 - 1$ **is divisible by 8, if n is**

(A) an integer (B) a natural number (C) an odd integer (D) an even integer

Q23. If three pieces of timber 63m, 42m, and 49m long have to be divide into planks of same length, then what will be the least possible number of planks?

(A) 9 (B) 22 (C) 7 (D) 16

Q24. If 217x + 131y = 913, 131x + 217y = 827, then x + y is

(A) 5 (B) 6 (C) 7 (D) 8

Q25. The father's age is six times his son's age. Four years hence, the age of father would be four times his son's age. The present ages in years, of the son and the father are respectively

(A) 4 and 24 (B) 5 and 30 (C) 6 and 36 (D) 3 and 24

Q26. Area of the triangle, in square units, formed by the lines y=x , x=6 and y=0 is

(A) 36 (B) 18 (C) 9 (D) 72

Q27. In a family of three children, the probability of having at least one boy is

(A) $\frac{7}{8}$ (B) $\frac{1}{8}$ (C) $\frac{5}{8}$ (D) $\frac{3}{4}$

Q28. Someone is asked to take a number between 1 and 100. The probability that it is a perfect square is

(A) $\frac{4}{49}$ (B) $\frac{2}{25}$ (C) $\frac{8}{99}$ (D) $\frac{1}{11}$

Q29. The value of $(\sin^4\theta - \cos^4\theta)cosec^2\theta$ **is**

(A) 0 (B) 1 (C) 2 (D) 3

Q30. If $sin\theta + cos\theta = \sqrt{3}$**, then the value of** $tan\theta + cot\theta$ **is**

(A) 0 (B) 1 (C) 2 (D) 3

Q31. If $x = 3\sec^2\theta - 1, y = \tan^2\theta - 2, then\ x - 3y =$

(A) 3 (B) 4 (C) 8 (D) 6

Q32. A line intersects the y-axis and x-axis at the points P and Q, respectively. If (2, –5) is the mid-point of PQ, then the coordinates of P and Q are, respectively

(A) (0, – 5) and (2, 0) (B) (0, 4) and (– 10, 0)

(C) (0, 10) and (– 4, 0) (D) (0, – 10) and (4, 0)

Q33. The points (–4, 0), (4, 0), (0, 3) are the vertices of a

(A) right triangle (B) equilateral triangle

(C) isosceles triangle (D) scalene triangle

Q34. A circle is drawn with centre as origin passes through the points (4,3). The point which lies outside the circle is

(A) (5,0) (B) (3,4) (C) (0,6) (D) (4,1)

Q35. It is proposed to build a single circular park equal in area to the sum of areas of two circular parks of diameters 16 m and 12 m in a locality. The radius of the new park would be

(A) 10 m (B) 15 m (C) 20 m (D) 24 m

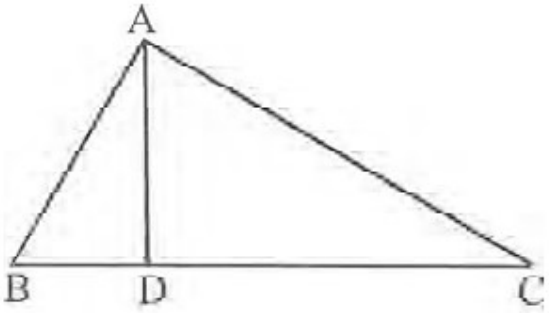
Q36. The wheel of a motor cycle is of radius 35 cm. How many revolutions per minute must the wheel make so as to keep a speed of 66 km/h?

(A) 500 (B) 250 (C) 1000 (D) 550

Q37. Area of a sector of a circle of radius 36 cm is 54 $\pi\ m^2$. Find the length of the corresponding arc of the sector

(A) $2\pi\ cm$ (B) $3\pi\ cm$ (C) $6\pi\ cm$ (D) $9\pi\ cm$

Q38. In figure given below $\angle BAC = 90^0$ and $AD \perp BC$, then



(A) $BD.CD = BC^2$ (B) $BD.CD = AD^2$

(C) $AB.AC = BC^2$ (D) $AB.AC = AD^2$

Q39. ABC and BDE are two equilateral triangle such that D is the mid point of BC . Ratio of the area of triangle ABC and BDE is

(A) 2:1 (B) 1:2 (C) 4:1 (D) 1:4

Q40. If the zeroes of the quadratic polynomial $x^2 + (a+1)x + b$ are 2 and –3, then

(A) a = –7, b = –1 (B) a = 5, b = –1 (C) a = 2, b = – 6 (D) a = 0, b = – 6

SECTION-C

Case study based questions

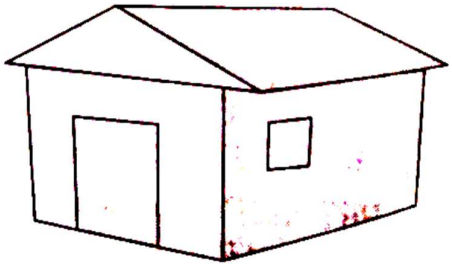
(Section C consists of 10 questions of 1 mark each. Any 8 questions are to be attempted. The first attempted 4 questions each would be evaluated in Case Study 1 & 2)

Q41-Q45 are based on Case Study -1

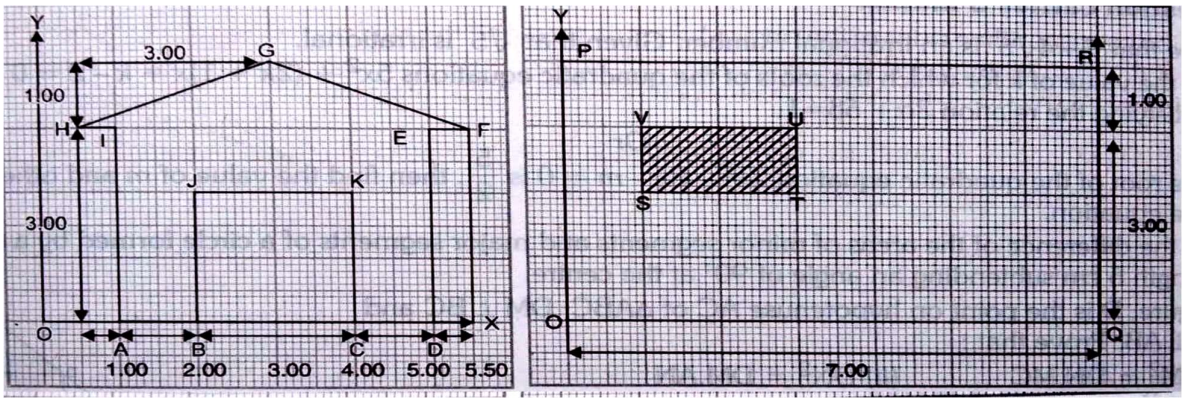
CASE STUDY-1

Case study based-1: Garage

A garage manufacturer's "basic" range includes models with just one window and one door. George chooses the following model from the "basic" plans. The position of the window and the door are shown here.



The two plans show the dimensions, in metres of the garage George choose.



Front ViewSide View

Q41. Refer to front view
Find the mid-point of the line segment joining the points A(1,0) and G(3,4).

(A) (4,4) (B) (0,4) (C) (1,3) (D) (2,2)

Q42. Refer to front view
What is the distance of point F from the y-axis ?

(A) 25 (B) 5 (C) 5.5 (D) 6

Q43. Refer to side view
Find the distance between P and Q.

(A) $\sqrt{7}$ (B) $\sqrt{65}$ (C) $\sqrt{33}$ (D) 2

Q44. Refer to the front view
Find the coordinates of the point which divides the line segment joining the points J(2, 2) and F($\frac{11}{2}$, 3) in the ratio 1:3 internally.

(A) (23, 9) (B) ($\frac{23}{8}$, $\frac{9}{4}$) (C) (2, 1) (D) ($\frac{11}{2}$, $\frac{9}{4}$)

Q45. Refer to the side view
Find the area of the window STUV.

(A) 2 sq. units (B) 9 sq. units (C) 4 sq. Units (D) 7 sq. units

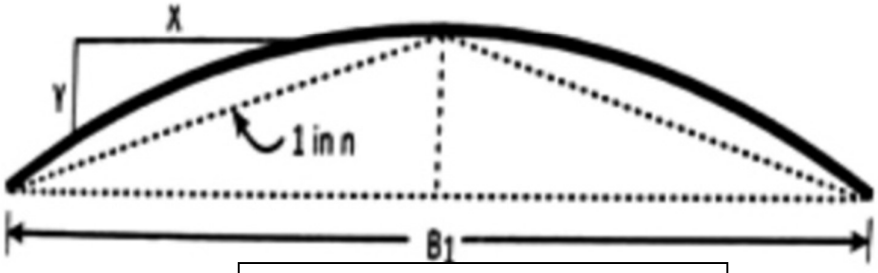
Q46-Q50 are based on Case Study -2

CASE STUDY-2

Application of Parabola – Highway Overpass/Underpasses

A highway underpass is parabolic in shape

➢ Shape Of Cross Slope:



A parabolic Camber $y = 2x^2$

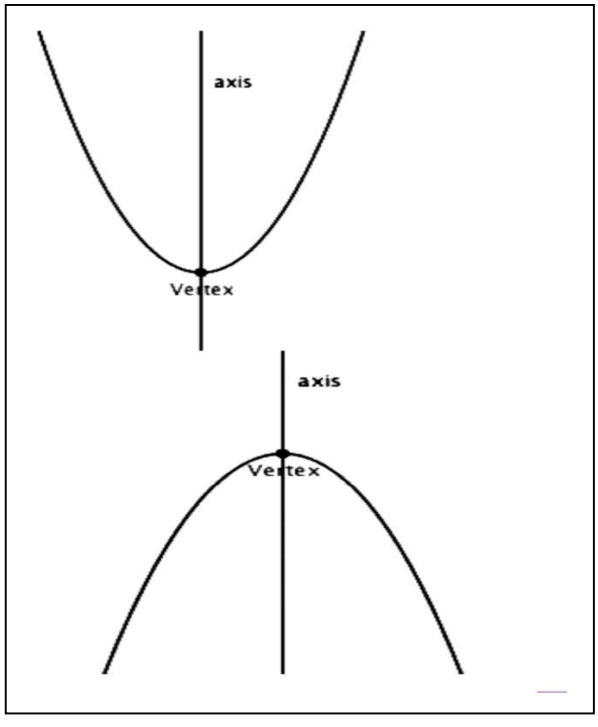
A parabola is the graph that results from $P(x) = ax^2 + bx + c$. Parabolas are symmetric about a vertical line known as the axis of symmetry. The axis of symmetry runs through the maximum or minimum point of the parabola which is called the vertex.

Q46. If the highway overpass is represented by $x^2 - 2x + 8$. Then its zeroes are

(A) (2,-4) (B) (4,-2)
(C) (-2,-2) (D) (-4,-4)

Q47. The highway overpass is represented graphically. Zeroes of a polynomial can be expressed graphically. Number of zeroes of polynomial is equal to number of points where graph of polynomial:

(A) Intersects x-axis
(B) Intersects y-axis
(C) Intersects y-axis or x-axis
(D) None of the above



Q48. The graph of a quadratic polynomial is a

(A) Straight line (B) Circle (C) Parabola (D)Ellipse

Q49. The representation of Highway underpass whose one zero is 6 and sum of the zeroes is 0 , is:

(A) $x^2 + 6x + 2$ (B) $x^2 - 36$ (C) $x^2 - 6$ (D) $x^2 - 3$

Q50. The number of zeroes of the polynomial $f(x) = (x-2)^2 + 4$ can have:

(A) 1 (B) 2 (C) 0 (D) 3

ALL THE BEST