Class- X Session- 2020-21

Subject- Mathematics -Standard

Sample Question Paper -1

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

General Instructions:

1. This question paper contains two parts A and B.

2. Both Part A and Part B have internal choices.

Part – A:

1. It consists two sections- I and II.

2. Section I has 16 questions of 1 mark each. Internal choice is provided in 5 questions.

3. Section II has 4 questions on case study. Each case study has 5 case-based sub-parts. An examinee is to attempt any 4 out of 5 sub-parts.

Part – B:

1. Question No 21 to 26 are Very short answer Type questions of 2 mark each,

2. Question No 27 to 33 are Short Answer Type questions of 3 marks each

3. Question No 34 to 36 are Long Answer Type questions of 5 marks each.

4. Internal choice is provided in 2 questions of 2 marks, 2 questions of 3 marks and 1 question of 5 marks.

Part - A

Section I has 16 questions of 1 mark each. Internal choice is provided in 5 questions

1.Write the smallest number which is divisible by both 306 and 657.

OR

LCM of the given number 'x' and 'y' where y is a multiple of 'x' is given by _____

2.Find the sum sf exponents of prime factor in the prime factorization of 200.

3.Find zeroes of the polynomial x^2 -3x -a(a+3).

4.If the system of equations 6x - 2y = 3 and kx - y = 2 has unique solution, then find value of k.

5.A bi-quadratic equation has degree _____

OR

Find value of k for equation $2x^2 + kx + 3 = 0$ which has two equal roots.

6.Find the common difference if nth term of an A.P. is given by $a_n = 3 + 4n$.

7.Find nth term of an A.P. 5, 2, -1, -4, -7 …

OR

Find the sum of first n odd natural numbers.

8.Find distance between the point P(1, 4) and Q(4, 0)

9.Find co-ordinates of the point which is reflection of point (3, 4) in the y-axis

OR

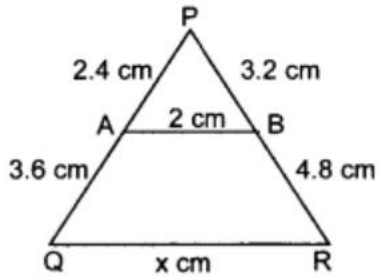
The distance of the point P(2, 3) from the x-axis is_____

10. The line segment joining the points (3, -1) and (-6, 5) is trisected. Find coordinates of point of trisection.

11.ABC and BDE are two equilateral triangles such that D is mid-point of BC. Ratio of the areas of triangles ABC and BDE is _____.

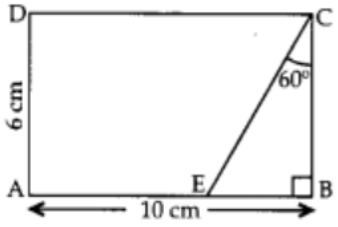
12. The tangents drawn at the extremities of the diameter of a circle are_____

13. The In the given figure, value of x (in cm) is ____



14. The value of cos 0°. cos 1°. cos 2°. cos 3°… cos 89° cos 90° is ____

15. In given figure, the value of CE is _____



16. If $\sin\theta - \cos\theta = 0$, then the value of $(\sin^4\theta + \cos^4\theta)$ is

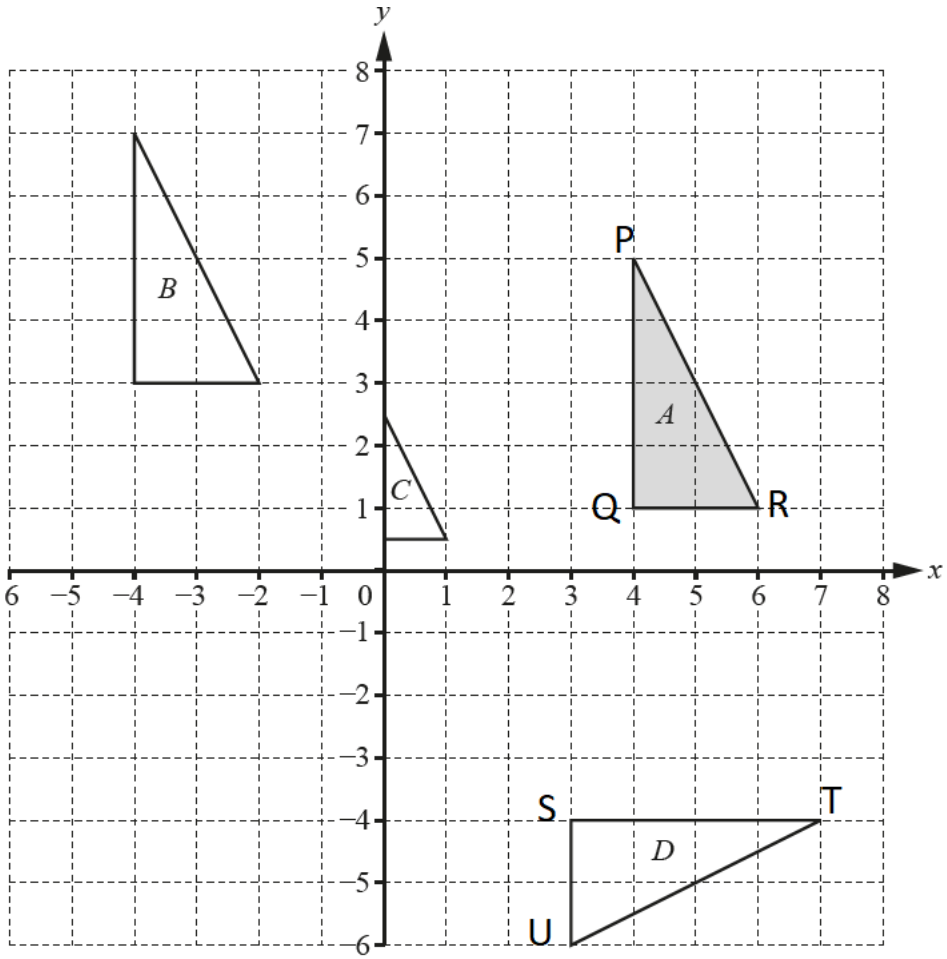
OR

Find value of cosec 0°. cosec 1°. cosec 2°. cosec 3°... cosec 89° cosec 90°

Section-II

Case study-based questions are compulsory. Attempt any four sub parts of each question. Each subpart carries 1 mark

17.Case Study based-1 Triangles



a) Refer to Triangle PQR

Find the mid-point of the segment joining the points P and R.

(i) (3/2,5/2)(ii) (3/2,1/2)(iii)(5,3)(iv) (1/2,3/2)

b) The distance of the point P from the y-axis is
(i) 4 (ii) 15 (iii) 19 (iv) 25

c) The distance between the points U and S is

(i) 4 (ii) 8 (iii)16 (iv)2

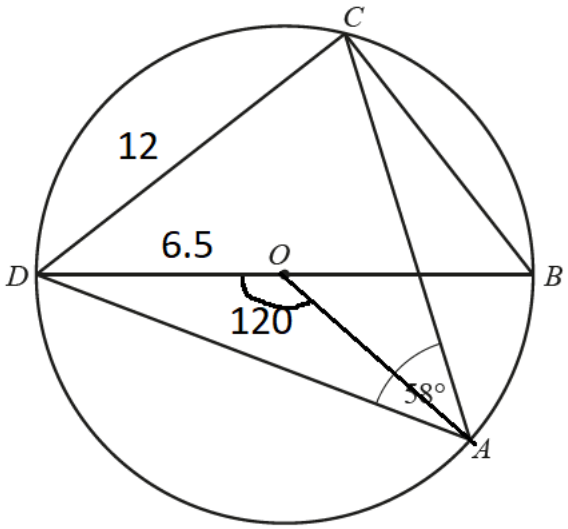
d) Find the co-ordinates of the point which divides the line segment joining the points S and T in the ratio 1:3 internally.

(i) (8,2) (ii) (4,-4) (iii) (3,-7) (iv) (2,8)

e) If a point (x,y) is equidistant from the P and R, then

(i) x+y=13 (ii) x+1=2y (iii) y-13=2x (iv)x-2y=13

18.Case Study Based- 2 Circles



NOT TO SCALE

a)Refer to Circle with radius OD as 6.5 units.

Find the length of BC.

(i) 5 (ii) 7.5 (iii)8.5 (iv) 10

b) The area of triangle BCD is
(i) 4 (ii) 15 (iii) 19 (iv) 30

c) The perimeter of triangle AOD is

(i) 4 (ii) 30 (iii)18 (iv)6.5(2 + √3)

d) The length of minor arc AD is .

(i) 13 π/3 (ii) 14 π/3 (iii) 5 π (iv) 4 π

e) Angle DOC is equal to

(i) 116 (ii) 120 (iii) 200 (iv)60

19.Case Study Based- 3 SCALE FACTOR AND SIMILARITY

a)The figure represents the model of aircraft and actual size in the ratio of 1:7.The wings of the model is 170cm long and overall length of acutal aeroplane is 1600m. Then overall length of the model aeroplane is

(i) 280 (ii) 1500 (iii)1600 (iv) 1600/7

b) In triangles ABC and DEF, ∠B = ∠E, ∠F = ∠C and AB = 3DE. Then, the two triangles are

(i) congruent but not similar (ii) similar but not congruent

(iii) neither congruent nor similar (iv) congruent as well as similar

c) ABC and BDE are two equilateral triangles such that D is mid-point of BC. Ratio of the areas of triangles ABC and BDE is

(i)2:1 (ii) 1:4 (iii)1:2 (iv) 4:1

d)"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." This theorem is known as

(i) Basic Proportionality Theorem (ii) similarity theorem

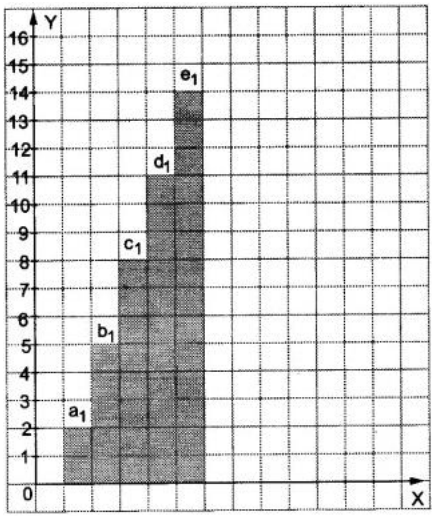
(iii) Corresponding sides theorem (iv) SAS theorem

e)If two similar triangles have a scale factor of p: q. Which statement regarding the two triangles is true?

(i)The ratio of their perimeters is 2p : q (ii)Their altitudes have a ratio 3p:q

(iii)Their medians have a ratio 3p : 5q (iv)Their areas have a ratio $p^2 : q^2$

20. Case Study Based- 4 Applications of AP Graph below shows the Scale x axis = 1 unit y axis = 1 unit. Jogger is initially at a1 and jumping to b1 and so on…



a)Refer to graph.

Find the difference in height from e1 to d1.

(i) 5 (ii) 2 (iii)8.5 (iv) 10

b) At what height it will reach if it does nth jump
(i) 3n-1 (ii) 2n+1 (iii) 3n+1 (iv) 2n+3

c) The total heights jumped by jogger till 8th jump is

(i) 150 (ii) 70 (iii)50 (iv)100

d) If the numbers a, b, c, d, e form an A.P., then the value of a – 4b + 6c – 4d + e is

(i) 0 (ii) 1 (iii) -1 (iv) 2

e) The list of numbers -10, -6, -2, 2, … is

(i) an AP with d = -16 (ii) an AP with d = 4 (iii) an AP with d = -4 (iv) not an AP

Part – B

All questions are compulsory. In case of internal choices, attempt any one.

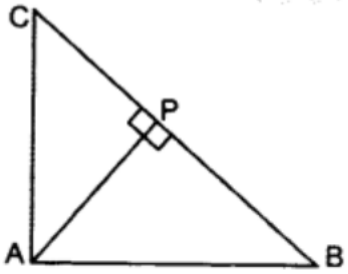
Q. Nos 21 to 26 carry 2 marks each.

21. Find the zeroes of the $x^2 - 8 - 2x$ verify the relationship between the zeroes and the coefficients.

22. The sides AB and AC and the perimeter P, of ΔABC are respectively three times the corresponding sides DE and DF and the perimeter P, of ΔDEF. Are the two triangles similar? If yes, find ratios of their areas.

OR

In ΔABC, if AP ⊥ BC and $AC^2 = BC^2 - AB^2$, then prove that $PA^2 = PB \times CP$.



23. In a right triangle ABC, right-angled at B, if tan A = 1, then verify that 2 sin A cos A = 1

OR

Prove that sec A (1 – sin A)(sec A + tan A) = 1.

24. If the total surface area of a solid hemisphere is 462 cm^2, find its volume. [Take π = 22/7].

25. Three coins are tossed simultaneously. Find the probability of getting exactly two heads.

26. Find the median of the data using an empirical formula, when it is given that mode = 35.3 and mean = 30.5.

Q. Nos 27 to 32 carry 3 marks each.

27. Solve the following pair of equations for x and y

$$\frac{x}{2}+\frac{2y}{3}=-1 \text{ and } x-\frac{y}{3}=3$$

OR

Solve for x

$$x-\frac{1}{x}=3, x\neq 0$$

28. Find the value of the middle term of the following A.P.: -6, -2, 2, ..., 58.

OR

Solve the equation 1+4+7+⋯+x=925

29. For what value of k, the roots of the quadratic equation $kx(x - 2\sqrt{5}) + 10 = 0$, are equal?

30. If A(4, 3), B(-1, y) and C(3, 4) are the vertices of a right triangle ABC, right-angled at A, then find the value of y

31.A girl of height 90 cm is walking away from the base of a lamp-post at a speed of 1.2 m/s. If the lamp is 3.6 m above the ground, find the length of her shadow after 4 seconds.

32. The incircle of an isosceles triangle ABC, in which AB = AC, touches the sides BC, CA and AB at D, E and F respectively. Prove that BD = DC

Q. Nos 33 to 36 carry 5 marks each.

33. Prove the identity: (sec A – cos A). (cot A + tan A) = tan A . sec A.

34. Prove that $3 + 2\sqrt{5}$ is irrational

35. The owner of a taxi company decides to run all the taxis on CNG fuel instead of petrol/diesel. The taxi charges in city comprises of fixed charges together with the charge for the distance covered. For a journey of 13 km, the charge paid is ₹129 and for a journey of 22 km, the charge paid is ₹210.What will a person have to pay for travelling a distance of 32 km?

36. Draw a line segment of length 7.6 cm and divide it in the ratio 5 : 8. Measure the two parts..

OR

Draw a pair of tangents to a circle of radius 3 cm, which are inclined to each other at an angle of 60°.