Class- X Session- 2020-21

Subject- Mathematics -Standard

Sample Question Paper -4

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. The decimal expansion of the rational number $\frac{43}{2^4 5^3}$ will terminate in 4 decimal places. What is the sum of exponents in denominator?

OR

If the HCF of 408 and 1032 is expressible in the form 1032 × 2 + 408 × p, then find the value of p

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2. Find the LCM of 96 and 360 by using fundamental theorem of arithmetic

3. If α and β are the zeroes of a polynomial such that α + β = -6 and αβ = 5, then find the polynomial.

4. Find out whether the lines 5x – 4y + 8 = 0, 7x + 6y – 9 = 0 representing the

linear equations intersect at a point, are parallel or coincident.

5. Check whether $(x + 2)^3 = 2x(x^2 - 1)$ is quadratic equations, justify the answer.

OR

Using factorization, find the roots of the quadratic equation: $(x-2)^2 - 25 = 0$.

6.Find the common difference of the AP $\frac{1}{p}, \frac{1-p}{p}, \frac{1-2p}{p}, \ldots$.

7.What is the common difference of an A.P. in which $a_{21} - a_7 = 84$?

OR

Find the 2nd term from the end (towards the first term) of the A.P. 5,9,13, ..., 185.

8.Find the distance of the point (-3, 4) from the x-axis.

9.In which quadrant the point P that divides the line segment joining the points A(2, -5) and B(5,2) in the ratio 2 : 3 lies?

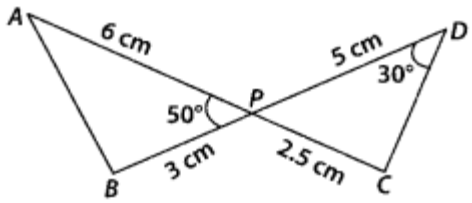
OR

ABCD is a rectangle whose three vertices are B(2, 0), C(2, 3) and D(0, 3). Calculate the length of one of its diagonals.

10. The lengths of the diagonals of a rhombus are 16 cm and 12 cm. Then, find the length of the side of the rhombus.

OR

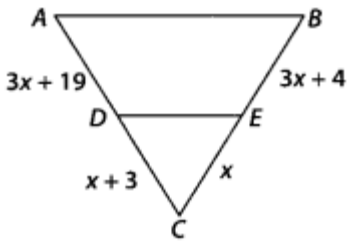
In the figure, two line segments AC and BD intersect each other at the point P such that PA =6 cm, PB = 3 cm, PC = 2.5 cm, PD = 5 cm, ∠APB = 50° and ∠CDP = 30°. Find ∠PBA.



11. It is given that $\Delta ABC \sim \Delta PQR$ with $\frac{BC}{QR} = \frac{1}{3}$ then find $\frac{ar(\Delta PRQ)}{ar(\Delta BCA)}$.

12.A chord of a circle of radius 10 cm subtends a right angle at its centre. Calculate the length of the chord (in cm).

13. Find the value of x for which DE || AB is given figure.



14. If sec 2A = cosec (A – 27°) where 2A is an acute angle, find the measure of ∠A

15. If sin θ – cos θ = 0, find the value of $\sin^4 \theta + \cos^4 \theta$.

16. If $\sqrt{3}$. sin θ = cos θ, find the value of $\frac{3\cos^2 \theta + 2\cos\theta}{3\cos\theta + 2}$.

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 TAXI SERVICE LINEAR EQUATION: Aakash, you are taking a taxi service in metro city. You know that the taxi service charges Rs 10 to pick your family up from your hotel and another 7 per km for the trip. Without knowing how many kms it will be to each destination; you can set up a linear equation that can be used to find the cost of any taxi trip you take on your trip. By using "x" to represent the number of km to your destination and "y" to represent the cost of that taxi ride, the linear equation would be: y = 7x + 10.

Another taxi service charges 16 Rs for pickup and Rs 3 per km for the trip. Total amount with x km will be y = 3x + 16.

a) For how many km both the taxi service charges the same amount.

(i) 4 (ii) 3 (iii)2 (iv) 1.5

b) Student draws another line ax +by +c = 0. Condition for intersecting line with y =7x+10 is
(i) 7/a ≠-1/b (ii) 7/a = 1/b (iii) 7/a = 10/c (iv) 7/b = 10/c

c) For finding infinite set of solution which kind of lines are required.

(i) parallel and intersecting (ii) intersecting (iii)parallel (iv) coincident

d) a1x + b1y + c1 =0; a2x + b2y + c1 =0. How many methods are there to solve this equation?

(i) 8 (ii) infinite (iii) 3 (iv) 1

e) What angle y = x +5 makes with the x axis.

(i) 30 (ii)0 (iii) 90 (iv) 45

18.Case Study based-Seating around square table: When a Seating around tables. Think about a restaurant. A square table fits 4 people. When two square tables are put together, now 6 people are seated. Put 3 square tables together and now 8 people are seated. Restaurant owner wants to have the party for 100 people coming Saturday.

Square tables	1	2	3	…..
No of people	4	6	8	…..

a) For inviting 100 people in restaurant how many square tables need to be ordered.

(i) 30 (ii) 50 (iii)49 (iv) 100

b) What is the common difference of the above series.
(i) 1 (ii) 3 (iii) 4 (iv) 2

c) On 100^{th} square table how many people can sit.

(i) 202 (ii) 34 (iii) 80 (iv) 200

d) What will be general term of the sequence?

(i) 3n (ii) 2n (iii)2n-1 (iv)2n+2

e) If constant number is added to each term of the AP then the resultant series is

(i) AP (ii) not an AP (iii)random series (iv) GP

19.Case Study based-BOAT SAIL design: Almost every boat nowadays has a triangular sail. In the early years, the sailing ships had a sail with a square design. By using a triangular sail design, it has become possible to travel against the wind using a technique known as tacking. Tacking allows the boat to travel forward with the wind at right angles to the boat.

Here the base of sail design is 10cm and height Is 15 cm.

a) What will be height of the similar bigger sail design if width is 100m.

(i) 5 km (ii) 200 km (iii) 200 m (iv) 1.5 km

b) The ratio of area of model to the actual sail design is
(i) 1:100 (ii) 1:10 (iii) 10:1 (iv) 100:1

c) Line joining the mid points of the sides of the triangle form 4 triangles. The ratio of area of each triangle to the original triangle is?

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

d) Ref to c. what is the height of the tree?

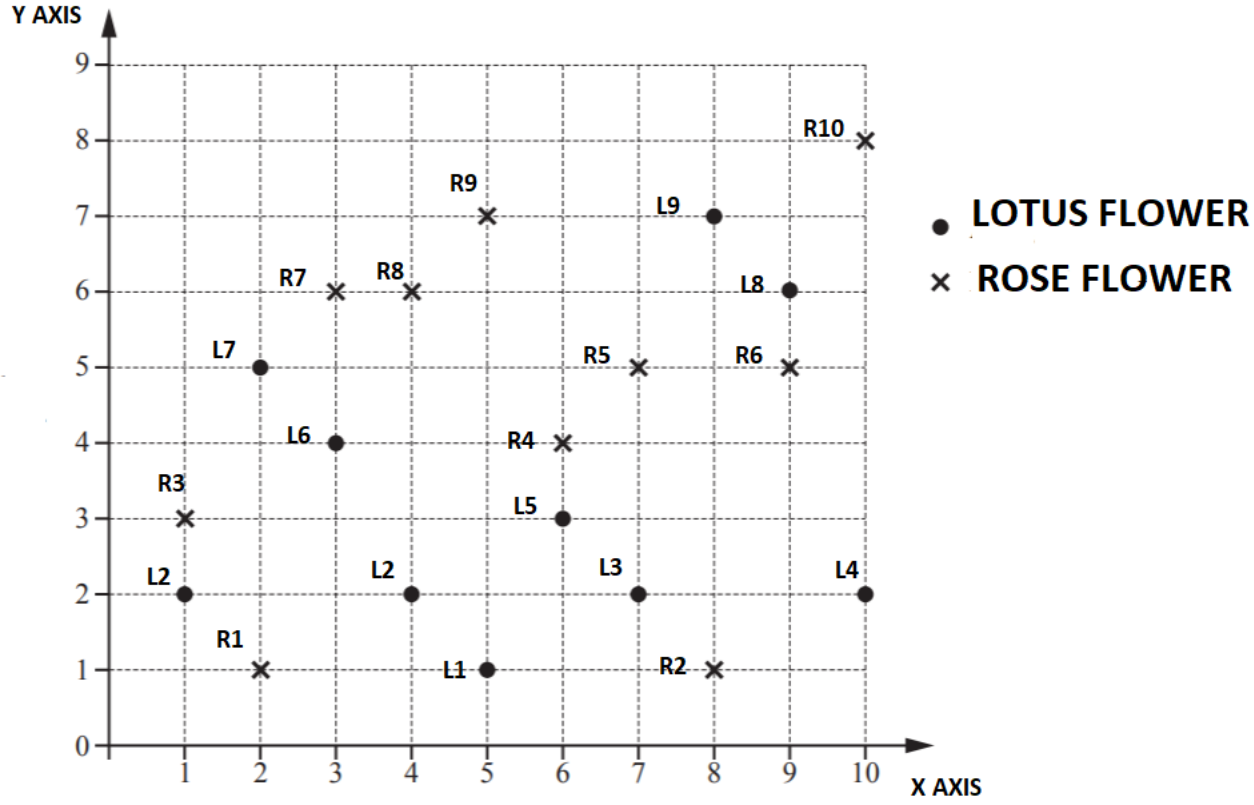
(i) $8\sqrt{3}$ (ii) $16\sqrt{3}$ (iii)$24\sqrt{3}$ (iv)$8/\sqrt{3}$

e) In a right-angled triangle if the opposite to adjacent ratio changes from 1 to $\sqrt{3}$ then the change in the angle of elevation will be

(i) 45 (ii) 60 (iii)30 (iv)15

20.Case Study based-4 Garden Coordinate Geometry: he diagram shows the number of lotus flowers and rose flowers seen in garden one day.

After arranging the flowers in the 2-dimensional geometry and marking each rose flower and lotus flower differently with the coordinates. It appears in the manner which can be traced easily.



a)What is the coordinate of L4?

(i) (10,2) (ii) (2,10) (iii)(3,10) (iv) (4,10)

b)What is the shortest distance between R2 and L9?

(i) 6 (ii) 9 (iii) 5 (iv) 10

c)The midpoint of R1 and R10 is

(i) (3,6) (ii) (6,4,5) (iii)(9,10) (iv)(3,2.5)

d) In what ratio point L2 divides the line R1 and L5?

(i) 3:2 (ii) 2:1 (iii)4:2 (iv)1:1

e) The coordinates of the point P(x, y) which divides the line segment joining the points A(x1, y1) and B(x2, y2) externally in the ratio, m1 : m2 i.e., $\frac{PA}{PB}=\frac{m1}{m2}$ are

(i) $\left(\frac{m_1x_2-m_2x_1}{m_1-m_2},\frac{m_1y_2-m_2y_1}{m_1-m_2}\right)$ (ii) $\left(\frac{m_1x_2+m_2x_1}{m_1+m_2},\frac{m_1y_2+m_2y_1}{m_1+m_2}\right)$ (iii) can't be determined (iv) 1:1

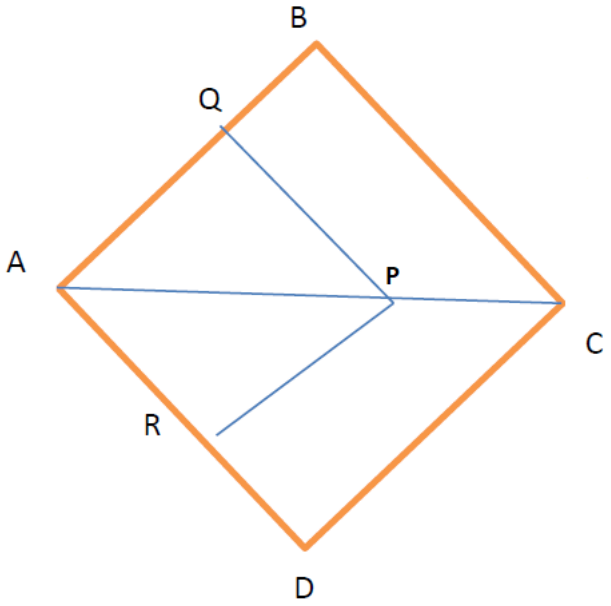
Part – B

Q. Nos 21 to 26 carry 2 marks each.

21. Find the two consecutive odd integers, the sum of whose squares is 202.

22. In the given figure If PQ II BC and PR II CD

Prove that AR/AD = AQ / AB·



OR

Through the midpoint M of the side CD of a parallelogram ABCD,

the line BM is drawn intersecting AC in L and AD produced in E.
Prove that EL = 2 BL.

23. If A and B are acute angles such that tan A = 1/ 2 and tan B =1/3 and

$$\text{Tan (A+B)} = \frac{\tan A + \tan B}{1 - \tan A \tan B}, \text{ find A+B}$$

.

OR

If $\sin\theta + \cos\theta = \sqrt{2}\sin(90 - \theta)$, determine $\cos\theta$.

24. Is -150 a term of the AP 17,12,7, 2...?

25. The probability of getting a bad egg in lot of 400 is 0.035. Find the number of bad eggs.

26. Calculate the mean 20 students in the mathematics test:

marks	10-20	20-30	30-40	40-50	50-60
students	2	4	7	6	1

Q. Nos 27 to 33 carry 3 marks each.

27. Solve the following pair of equations:

$$x + y = 3.3, \quad \frac{0.6}{3x - 2y} = -1$$

OR

Solve for x

$$\frac{x}{3} + \frac{y}{4} = 4, \frac{5x}{6} - \frac{y}{8} = 4$$

28. Which term of the progression $19, 18\frac{1}{5}, 17\frac{1}{5}$,....is the first negative term?

OR

If the pth term of an AP is 1/q and qth term is 1/p, show that the sum of pq term is $\frac{1}{2}(pq+1)$.

29. Solve for x $\frac{x-1}{2x+1} + \frac{2x+1}{x-1} = \frac{2}{1}$.

30. Point P divides the line segment joining the points A (2, 1) and B (5,-8) such

that AP: AB=1:3 If P lies on the line 2x-y+k=0, then find the value of k.

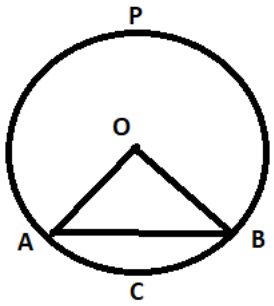
31.ABC is a right triangle right angled at B. Let D and E be any points on AB and BC respectively. Prove that $AE^2 + CD^2 = AC^2 + DE^2$.

32. In rhombus ABCD, each side is equal to x units. Prove that $AC2+BD2=4x^2$.

33. Prove the following identity:
(cosec A – sin A)(sec A– cos A)(tanA +cot A) = 1.

Q. Nos 34 to 36 carry 5 marks each.

34. Find the area of the major segment APB, in figure of a circle of radius 35 cm and ∟AOB = 90˚ (π = 22/7)



35. The following frequency distribution gives the monthly consumption of electricity of 68 consumers of a locality. Find the median, mean and mode of the data and compare them..

Income	65-85	85-105	105-125	125-145	145-165	165-185	185-205
No. of families	4	5	13	20	14	8	4

36. Metallic spheres of radii 6 cm, 8 cm and 10 cm, respectively, are melted to form a single solid sphere. Find the radius of the resulting sphere?

OR

A 20 m deep well with diameter 7 m is dug and the earth from digging is evenly spread out to form a platform 22 m by 14 m. Find the height of the platform?