CLASS X (2019-20)
MATHEMATICS BASIC(241)
SAMPLE PAPER-1

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

General Instructions :

(i)   All questions are compulsory.
(ii)   The questions paper consists of 40 questions divided into four sections A, B, C and D.
(iii)   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.
(iv)   There is no overall choice. However, an internal choices have 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.
(v)   Use of calculators is not permitted.

SECTION A

Q.1-Q.10 are multiple choice questions. Select the most appropriate answer from the given options.

Q1.   The points $(7, 2)$ and $(-1, 0)$ lie on a line   [1]

(a) $7y = 3x - 7$ (b) $4y = x + 1$
(c) $y = 7x + 7$ (d) $x = 4y + 1$

Q2.   If $\frac{1}{2}$ is a root of the equation $x^2 + kx - \frac{5}{4} = 0$, then the value of k is   [1]

(a) 2   (b) -2
(c) $\frac{1}{4}$ (d) $\frac{1}{2}$

Q3.   To divide a line segment AB in the ratio $3 : 4$, we draw a ray AX, so that $\angle BAX$ is an acute angle and then mark the points on ray AX at equal distances such that the minimum number of these points is   [1]

(a) 3   (b) 4
(c) 7   (d) 10

Q4.   If p_1 and p_2 are two odd prime numbers such that $p_1 > p_2$, then $p_1^2 - p_2^2$ is   [1]

(a) an even number   (b) an odd number
(c) an odd prime number   (d) a prime number

Q5.   If the nth term of an A.P. is given by $a_n = 5n - 3$, then the sum of first 10 terms if   [1]

(a) 225   (b) 245
(c) 255   (d) 270

Q6.   Two chords AB and CD of a circle intersect at E such that $AE = 2.4\,\text{cm}$, $BE = 3.2\,\text{cm}$ and $CE = 1.6\,\text{cm}$. The length of DE is   [1]

(a) 1.6 cm   (b) 3.2 cm
(c) 4.8 cm   (d) 6.4 cm

Q7.   If the radius of the sphere is increased by 100%, the volume of the corresponding sphere is increased by   [1]

(a) 200%   (b) 500%
(c) 700%   (d) 800%

Q8.   It is given that $\Delta ABC \sim \Delta PQR$ with $\frac{BC}{QR} = \frac{1}{3}$. Then $\frac{\text{ar}(\Delta PRQ)}{\text{ar}(\Delta BCA)}$ is equal to   [1]

(a) 9   (b) 3

(c) $\dfrac{1}{3}$ (d) $\dfrac{1}{9}$

Q9.   Ratio in which the line $3x + 4y = 7$ divides the line segment joining the points $(1, 2)$ and $(-2, 1)$ is   [1]

(a) $3 : 5$ (b) $4 : 6$

(c) $4 : 9$ (d) None of these

Q10. $(\cos^4 A - \sin^4 A)$ is equal to   [1]

(a) $1 - 2\cos^2 A$ (b) $2\sin^2 A - 1$

(c) $\sin^2 A - \cos^2 A$ (d) $2\cos^2 A - 1$

(Q.11-Q.15) Fill in the blanks.

Q11.   H.C.F. of 6, 72 and 120 is ....   [1]

Q12.   If α and β are the zeroes of the quadratic polynomial $ax^2 + bx + c$, then $\alpha + \beta = -\, b/$.......... and $\alpha\beta = c/$...........   [1]

OR

Degree of remainder is always .... than degree of divisor.

Q13.   Length of arc of a sector angle $45°$ of circle of radius 14cm is ....   [1]

Q14.   The length of the diagonal of a cube that can be inscribed in a sphere of radius 7.5 cm is ....   [1]

Q15.   A dice is thrown once, the probability of getting a prime number is ....   [1]

(Q.16-Q.20) Answer the following

Q16.   A rectangular sheet paper 40 cm $\times$ 22 cm is rolled to form a hollow cylinder of height 40 cm. Find the radius of the cylinder.   [1]

OR

A cylinder, a cone and a hemisphere have same base and same height. Find the ratio of their volumes.

Q17.   Find the positive root of $\sqrt{3x^2 + 6} = 9$.   [1]

Q18.   The diameter of a wheel is 1.26 m. What the distance covered in 500 revolutions.   [1]

Q19.   If the median of a series exceeds the mean by 3, find by what number the mode exceeds its mean?   [1]

Q20.   20 tickets, on which numbers 1 to 20 are written, are mixed thoroughly and then a ticket is drawn at random out of them. Find the probability that the number on the drawn ticket is a multiple of 3 or 7.   [1]

SECTION B

Q21.   Solve the following pair of linear equations by cross multiplication method: [2]
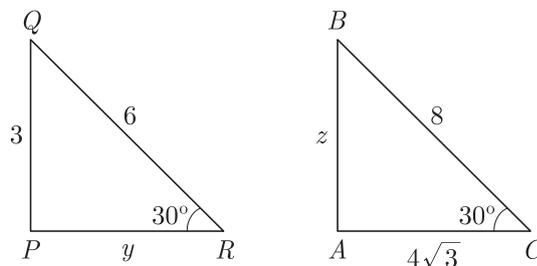
$$x + 2y = 2$$
$$x - 3y = 7$$

Q22.   If the point $P(x, y)$ is equidistant from the points $Q(a + b, b - a)$ and $R(a - b, a + b)$, then prove that $bx = ay$.   [2]

OR

Show that the points $A(0,1)$, $B(2,3)$ and $C(3,4)$ are collinear.

Q23.   In the given figure, $\Delta\, ABC \sim \Delta\, PQR$. Find the value of $y + z$.   [2]

Q24. Find the mean of the data using an empirical formula when it is given that mode is 50.5 and median in 45.5. [2]

OR

A bag contains 6 red and 5 blue balls. Find the probability that the ball drawn is not red.

Q25. Two circular pieces of equal radii and maximum areas, touching each other are cut out from a rectangular cardboard of dimensions 14 cm $\times$ 7 cm. find the area of the remaining cardboard. $\left(Use\ \pi = \frac{22}{7}\right)$ [2]

Q26. Read the following passage and answer the questions that follows:

As a part of a campaign, a huge balloon with message of "AWARENESS OF CANCER" was displayed from the terrace of a tall building. It was held by string of length 8 m each, which inclined at an angle of $60°$ at the point, where it was tied as shown in the figure.
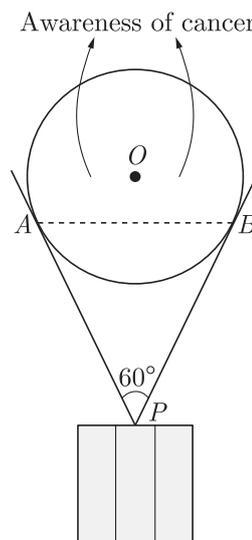
i. What is the length of AB?
ii. If the perpendicular distance from the centre of the circle to the chord AB is 3 cm, then find the radius of the circle. [2]

SECTION C

Q27. Solve using cross multiplication method: [3]

$$5x + 4y - 4 = 0$$
$$x - 12y - 20 = 0$$

Q28. Quadratic polynomial $2x^2 - 3x + 1$ has zeroes as α and β. Now form a quadratic polynomial whose zeroes are 3α and 3β .[3]

OR

If α and β are the zeroes of a quadratic polynomial such that $\alpha + \beta = 24$ and $\alpha - \beta = 8$. Find the quadratic polynomial having α and β as its zeroes.

Q29. In a trapezium $ABCD$, diagonals AC and BD intersect at O and $AB = 3DC$, then find ratio of areas of triangles COD and AOB. [3]

Q30. Find the 20th term of an A.P. whose 3rd term is 7 and the seventh term exceeds three times the 3rd term by 2. Also find its

n^{th} term (a_n). [3]

OR

In an A.P. the sum of first n terms is $\frac{3n^2}{2} + \frac{13n}{2}$. Find the 25th term.

Q31. ABC is a triangle. A circle touches sides AB and AC produced and side BC at BC at X, X, Y and Z respectively. Show that $AX = \frac{1}{2}$ perimeter of $\Delta\,ABC$. [3]

OR

In $\Delta\,ABD$, $AB = AC$. If the interior circle of $\Delta\,ABC$ touches the sides AB, BC and CA at D, E and F respectively. Prove that E bisects BC.

Q32. Construct a $\Delta\,ABC$ in which $AB = 4$ cm, $BC = 5$cm and $AC = 6$cm. Then construct another triangle whose sides are $\frac{2}{3}$ times the corresponding sides of $\Delta\,ABC$. [3]

Q33. Read the following passage and answer the questions that follows:

Given figure shows the arrangement of desks in a classroom. Ashima, Bharti and Camella are seated at $A(3, 1)$, $B(6, 4)$ and $C(8, 6)$ respectively.

1. Do you think are seated in a line? Give reasons for your answer.
2. Which mathematical concept is used in the above problem? [3]
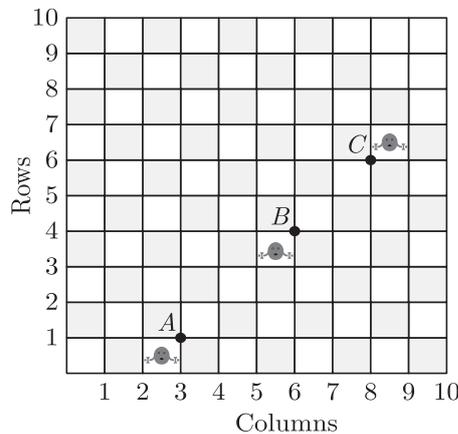
Q34. Half the perimeter of a rectangular garden, whose length is 4 m more then its width, is 36 m. Find the dimensions of garden. [3]
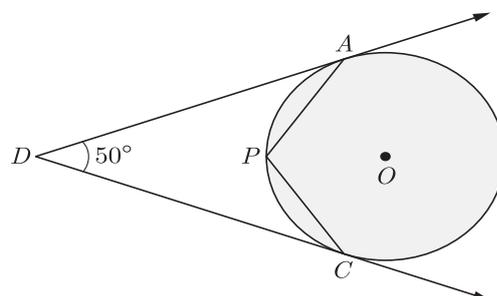
SECTION D

Q35. Solve for x : $\left(\frac{2x}{x-5}\right)^2 + \left(\frac{2x}{x-5}\right) - 24 = 0, x \neq 5$ [4]

Q36. For any positive integer n, prove that $n^3 - n$ is divisible by 6. [4]

OR

Prove that $\sqrt{3}$ is an irrational number. Hence, show that $7 + 2\sqrt{3}$ is also an irrational number.

Q37. In the given figure, O is the centre of the circle. Determine $\angle APC$, if DA and DC are tangents and $\angle ADC = 50°$. [4]

Q38.   The base BC of an equilateral triangle ABC lies on y-axis. The co-ordinates of point C are $(0,3)$. The origin is the mid-point of the base. Find the co-ordinates of the point A and B. Also find the co-ordinates of another point D such that $BACD$ is a rhombus. [4]

OR

In ΔABC, if $\angle ADE = \angle B$, then prove that $\Delta ADE \sim \Delta ABC$. Also, if $AD = 7.6$ cm, $AE = 7.2$ cm, $BE = 4.2$ cm and $BC = 8.4$ cm, then find DE.
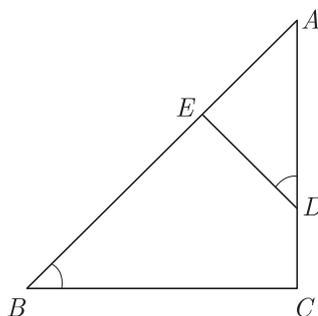
Q39.   From the top of tower, 100 m high, a man observes two cars on the opposite sides of the tower with the angles of depression $30°$ & $45°$ respectively. Find the distance between the cars. (Use $\sqrt{3} = 1.73$) [4]

OR

From the top of a 7 m high building, the angle of elevation of the top of a tower is $60°$ and the angle of depression of its foot is $45°$. Find the height of the tower. (Use $\sqrt{3} = 1.732$)

Q40.   The following distribution gives the weights of 60 students of a class. Find the mean and mode weights of the students. [4]

Weight (in kg)	40-44	44-48	48-52	52-56	56-60	60-64	64-68	68-72
Number of students	4	6	10	14	10	8	6	2