CLASS X (2019-20)
MATHEMATICS BASIC(241)
SAMPLE PAPER-11

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.   In the adjoining figure, $\angle BAC = 90°$ and $AD \perp BC$, then   [1]

(a) $BC \cdot CD = BC^2$ (b) $AB \cdot AC = BC^2$
(c) $BD \cdot CD = AD^2$ (d) $AB \cdot AC = AD^2$

Q2.   In $\Delta ABC \sim \Delta EDF$ and ΔABC is not similar to ΔDEF, then which of the following is not true?   [1]
(a) $BC \cdot EF = AC \cdot DE$ (b) $AB \cdot AC = BC^2$
(c) $BC \cdot DE = AB \cdot EF$ (d) $BC \cdot DE = AB \cdot FD$

Q3.   The value of $3\tan^2 26° - 3\csc^2 64°$ is   [1]
(a) 0   (b) 3
(c) -3 (d) -1

Q4.   If $\cos A = \frac{3}{5}$, then the value of $\tan A$ is   [1]

(a) $\frac{3}{4}$ (b) $\frac{4}{5}$

(c) $\frac{4}{3}$ (d) $\frac{5}{4}$

Q5.   If the ratio of the circumferences of two circles is 4 : 9, then the ratio of their areas is   [1]
(a) 9 : 4   (b) 4 : 9
(c) 2 : 3   (d) 16 : 81

Q6.   If the sector of a circle of diameter 10 cm subtends an angle of $144°$ at the centre, then the length of the arc of the sector is   [1]
(a) 2π cm   (b) 4π cm
(c) 5π cm   (d) 6π cm

Q7.   If the classes of a frequency distribution are $1 - 10, 11 - 20, 21 - 30, ..., 61 - 70$, then the upper limit of the class $11 - 20$ is   [1]

       (a) 20   (b) 21
       (c) 19.5   (d) 20.5

Q8.   If the probability of an event is p, then the probability of its complementary event will be   [1]

       (a) $p - 1$ (b) p
       (c) $1 - p$ (d) $1 - \dfrac{1}{p}$

Q9.   For some integer q, every odd integer is of the form   [1]

       (a) q (b) $q + 1$
       (c) $2q$ (d) $2q + 1$

Q10.   If the base area of a cone is 51 cm² and its volume is 85 cm³, then its vertical height is   [1]

       (a) 3.5 cm   (b) 4 cm
       (c) 4.5 cm   (d) 5 cm

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

Q11.   If the ratio of the corresponding sides of two similar triangles is 7 : 11, then the ratio of their corresponding altitudes is ....   [1]

Q12.   The perimeter of a semicircular protactor of diameter 14 cm is ....   [1]

                                              OR

       If the area of a circle is 616 cm², then its circumference is ....

Q13.   Ogive is a curve which represents continuous .... frequency distribution graphically.   [1]

Q14.   The value of $\dfrac{\sec 23°}{\operatorname{cosec} 67°}$ is ....   [1]

Q15.   A line intersecting a circle in two points is called a ....   [1]

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

Q16.   Given that LCM (91, 26) = 182, find HCF (91, 26).   [1]

                                              OR

       Does the rational number $\dfrac{441}{2^2 \cdot 5^7 \cdot 7^2}$ has a terminating or a non-terminating decimal representation?

Q17.   If 1 is a zero of the polynomial $p(x) = ax^2 - 3(a - 1)x - 1$, then find the value of a.   [1]

Q18.   The nth term of an AP is $7 - 4n$. Find its common difference.   [1]

Q19.   In the given figure, $DE \parallel BC$ and $AD = 1\,\text{cm}$, $BD = 2\,\text{cm}$. What is the ratio of the area of $\triangle ABC$ to the area of $\triangle ADE$?   [1]
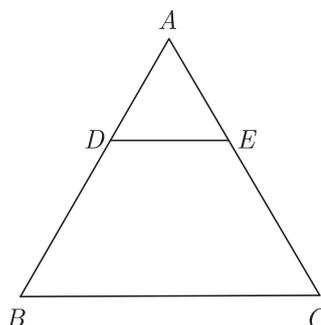
Q20.   In the given figure, PA and PB are tangents to the circle drawn from an external point P. CD is a third tangent touching the circle at Q. If $PB = 10$ cm and $CQ = 2$ cm, what is the length of PC?   [1]
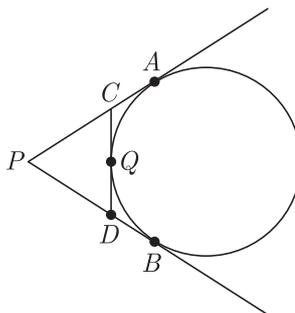
SECTION B

Q21.   Determine the values of m and n, so that the following system of linear equations has infinite number of solutions: [2]
$(2m - 1)x + 3y - 5; \; 3x + (n - 1)y - 2 = 0$

Q22.   Find the roots of the quadratic equations: [2]

$4\sqrt{3}\,x^2 + 5x - 2\sqrt{3} \; = 0$

OR

Solve for x: $\sqrt{6x + 7} - (2x - 7) = 0$

Q23.   A bag contains 5 red, 8 green and 7 white balls. One ball is drawn at random from the bag. Find the probability of getting: [2]

(i)   a white ball or a green ball.
(ii) neither a green ball nor a red ball.

Q24.   Without using trigonometric tables, find the value of: [2]
$\dfrac{\cos 70^\circ}{\sin 20^\circ} + \cos 57^\circ \cdot \operatorname{cosec} 33^\circ - 2\cos 60^\circ$

Q25.   In the adjoining figure, E is a point on the side CB produced of an isosceles triangle ABC with $AB = AC$. If $AD \perp BC$ and $EF \perp AC$, prove that: [2]
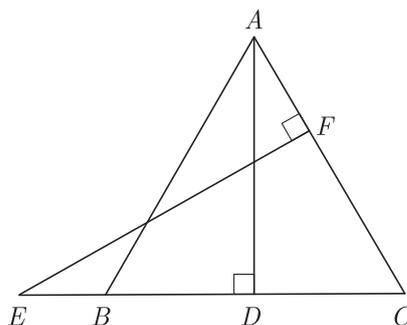
$AB \times EF = AD \times EC$

Q26.   Two circles touch externally. The sum of their areas is 58π cm^2 and the distance between their centres is 10 cm. Find the radii of the two circles.   [2]

OR

A student takes a rectangular piece of paper 30 cm long and 21 cm wide. Find the area of the biggest circle that can be cut from the paper. Also find the area of the paper left after cutting out the circle.

SECTION C

Q27.   Prove that: [3]

$$\sqrt{\frac{\sec A - 1}{\sec A + 1}} + \sqrt{\frac{\sec A + 1}{\sec A - 1}} = 2\operatorname{cosec} A$$

Q28.   Solve the following pair of linear equations: [3]

$$\frac{a^2}{x} - \frac{b^2}{y} = 0; \ \frac{a^2 b}{x} + \frac{b^2 a}{y} = a + b, \ x \neq 0, \ y \neq 0$$

OR

The sum of the numerator and denominator of a fraction is 4 more than twice the numerator. If the numerator and denominator both increased by 3, they are in the ratio 2 : 3. Determine the fraction.

Q29.   Show that $\frac{1}{2}$ and $\frac{-3}{2}$ are the zeroes of the polynomial $4x^2 + 4x - 3$ and verify the relationship between zeroes and coefficients of the polynomial.   [3]

OR

Quadratic polynomial $2x^2 - 3x + 1$ has zeroes as α and β. Form a quadratic polynomial whose zeroes 3α and 3β.

Q30.   Construct a $\triangle ABC$ in which $CA = 6 \text{ cm}$, $AB = 5 \text{ cm}$ and $\angle BAC = 45°$, then construct a triangle similar to the given triangle whose sides are $\frac{6}{5}$ of the corresponding sides of the $\triangle ABC$.   [3]

Q31.   Find the values of k if the points $A(k+1, 2k)$, $B(3k, 2k+3)$ and $C(5k-1, 5k)$ are collinear.   [3]

OR

If $P(9a - 2, -b)$ divides the line segment joining $A(3a+1, -3)$ and $B(8a, 5)$ in the ratio 3 : 1, find the values of a and b.

Q32.   Prove that the points $A(-3, 0)$, $B(1, -3)$ and $C(4, 1)$ are the vertices of an isosceles right triangle.   [3]

Q33.   Cards marked with all 2-digit numbers are placed in a box and are mixed thoroughly. One card is drawn at random. Find the probability that the number on the card is   [3]

(i)   divisible by 10
(ii) a perfect square number
(iii) a prime number less than 25

Q34.   The following frequency distribution shows the number of runs scored by some batsman of India in one-day cricket matches: [3]

Run scored	Number of batsman
2000 − 4000	9
4000 − 6000	8
6000 − 8000	10
8000 − 10000	2
10000 − 12000	1

Find the mode for the above data.

SECTION D

Q35.   Prove that $n^3 - n$ is divisible by 6 for every positive integer n.   [4]

Q36.   A sum of ₹ 1600 is to be used to give 10 cash prizes to students of a school for their overall academic performance. If each prize is ₹ 20 less than its preceding prize, find the value of each of the prizes.   [4]

Q37.   A motor boat whose speed is 20 km/h in still water takes 1 hour more to go 48 km upstream than to return downstream to the same spot. Find the speed of the stream.   [4]

OR

A shopkeeper buys some books for ₹ 80. If he had bought 4 more books for the same amount, each book would have cost ₹ 1 less. Find the number of books he bought.

Q38.   In the given figure, XY and $X'Y'$ are two parallel tangents to a circle with centre O and another tangent AB with point of contact C intersects XY at A and $X'Y'$ at B. Prove that $\angle AOB = 90°$.   [4]
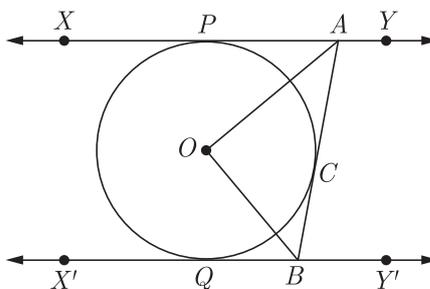
OR

The radii of two concentric circles are 13 cm and 8 cm. AB is a diameter of the bigger circle. BD is a tangent to the smaller circle touching it at D. Find the length AD.

Q39.   The angles of elevation of the top of a tower from two points P and Q at distances of a and b respectively from the base and in the same straight line with it are complementary. Prove that the height of the tower is $\sqrt{ab}$.   [4]

OR

The angle of elevation of the top of a vertical tower from a point on the ground is $60°$. From another point 10 m vertically above the first, its angle of elevation is $45°$. Find the height of the tower.

Q40.   A building is in the form of cylinder surmounted by a hemispherical dome (shown in the adjoining figure). The base diameter of the dome is equal to $\frac{2}{3}$ of the total height of the building. Find the height of the building if it contains $67\frac{1}{21}\, m^3$ of air.   [4]
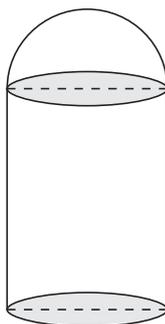
WWW.CBSE.ONLINE

Download Solved version of this paper from
www.cbse.online