

CLASS X (2019-20)
MATHEMATICS STANDARD(041)
SAMPLE PAPER-7

Time : 3 Hours

Maximum Marks : 80

General Instructions :

- (i) All questions are compulsory.
- (ii) The questions paper consists of 40 questions divided into 4 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 value of $(12)^{3x} + (18)^{3x}$, $x \in N$, end with the digit. [1]
 (a) 2 (b) 8
 (c) 0 (d) Cannot be determined
- Q2. On dividing $x^3 - 3x^2 + x + 2$ by a polynomial $g(x)$, the quotient and remainder were $x - 2$ and $-2x + 4$ respectively, then $g(x)$ is equal to [1]
 (a) $x^2 + x + 1$ (b) $x^2 + 1$
 (c) $x^2 - x + 1$ (d) $x^2 - 1$
- Q3. At present ages of a father and his son are in the ratio 7 : 3, and they will be in the ratio 2 : 1 after 10 years. Then the present age of father (in years) is [1]
 (a) 42 (b) 56
 (c) 70 (d) 77
- Q4. Each root of $x^2 - bx + c = 0$ is decreased by 2. The resulting equation is $x^2 - 2x + 1 = 0$, then [1]
 (a) $b = 6, c = 9$ (b) $b = 3, c = 5$
 (c) $b = 2, c = -1$ (d) $b = -4, c = 3$
- Q5. What is the common difference of four terms in A.P. such that the ratio of the product of the first fourth term to that of the second and third term is 2 : 3 and the sum of all four terms is 20? [1]
 (a) 3 (b) 1
 (c) 4 (d) 2
- Q6. The ratio in which the point $(2, y)$ divides the join of $(-4, 3)$ and $(6, 3)$. The value of y is [1]
 (a) 2 : 3, $y = 3$ (b) 3 : 2, $y = 4$
 (c) 3 : 2, $y = 3$ (d) 3 : 2, $y = 2$
- Q7. If the angle of depression of an object from a 75 m high tower is 30° , then the distance of the object from the tower is [1]
 (a) $25\sqrt{3}$ m (b) $50\sqrt{3}$ m
 (c) $75\sqrt{3}$ m (d) 150 m
- Q8. Ratio of volumes of two cones with same radii is [1]
 (a) $h_1 : h_2$ (b) $s_1 : s_2$
 (c) $r_1 : r_2$ (d) None of these
- Q9. In a frequency distribution, the mid value of a class is 10 and the width of the class is 6. The lower limit of the class is [1]
 (a) 6 (b) 7

(c) 8

(d) 12

- Q10. The probability of getting a number greater than 2 in throwing a dice is [1]
 (a) $\frac{2}{3}$ (b) $\frac{1}{3}$
 (c) $\frac{4}{3}$ (d) $\frac{1}{4}$

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

- Q11. The ratio of the areas of two similar triangles is equal to the square of the ratio of their [1]
 Q12. Point $(-4, 6)$ divide the line segment joining the points $A(-6, 10)$ and $B(3, -8)$ in the ratio [1]

OR

All the points equidistant from two given points A and B lie on the of the line segment AB .

- Q13. If $\tan A = \frac{4}{3}$ then $\sin A$ [1]
 Q14. A line that intersects a circle in one point only is called [1]
 Q15. Two points on a line segment are marked such that the three parts they make are equal then we say that the two points the line segment. [1]

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

- Q16. If the length of the ladder placed against a wall is twice the distance between the foot of the ladder and the wall. Find the angle made by the ladder with the horizontal. [1]
 Q17. What is the perimeter of the sector with radius 10.5 cm and sector angle 60° . [1]
 Q18. Two cubes each of volume 8 cm^3 are joined end to end, then what is the surface area of resulting cuboid. [1]

OR

A solid metallic object is shaped like a double cone as shown in figure. Radius of base of both cones is same but their heights are different. If this cone is immersed in water, find the quantity of water it will displace.

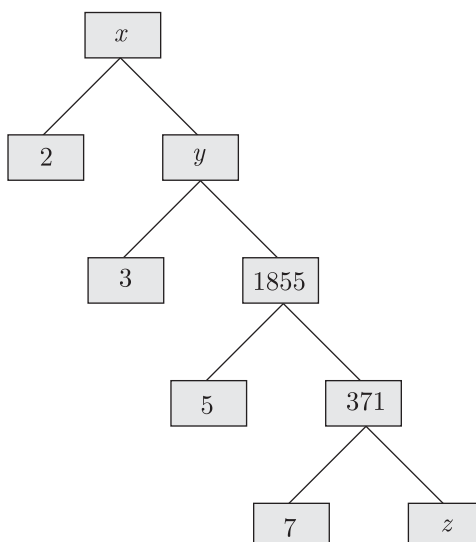
- Q19. Find the following frequency distribution, find the median class : [1]

Cost of living index	1400-1500	1550-1700	1700-1850	1850-2000
Number of weeks	8	15	21	8

- Q20. Out of 200 bulbs in a box, 12 bulbs are defective. One bulb is taken out at random from the box. What is the probability that the drawn bulb is not defective? [1]

SECTION B

- Q21. Complete the following factor tree and find the composite number x [2]

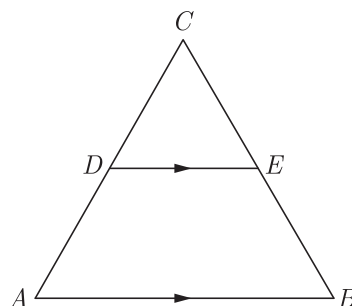


Q22. If $x = -\frac{1}{2}$, is a solution of the quadratic equation $3x^2 + 2kx - 3 = 0$, find the value of k . [2]

Q23. The sides AB and AC and the perimeter P_1 of ΔABC are respectively three times the corresponding sides DE and DF and the parameter P_2 of ΔDEF . Are the two triangles similar? If yes, find $\frac{ar(\Delta ABC)}{ar(\Delta DEF)}$ [2]

OR

In the given figure, $\angle A = \angle B$ and $AD = BE$. Show that $DE \parallel AB$.



Q24. Two slips of paper marked 5 and 10 are put in a box and three slips marked 1, 3, 5 are in another. One slip from each box is drawn. [2]

- (a) What is the probability that both show odd number?
- (b) What is the probability of getting one odd number and one even number?

Q25. The data regarding marks obtained by 48 students of a class in a class test is given below. Calculate the modal marks of students. [2]

Marks obtained	0-5	5- 10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50
Number of students	1	0	2	0	0	10	25	7	2	1

OR

The following table gives the life time in days of 100 bulbs :

Life time in days	Less than 50	Less than 100	Less than 150	Less than 200	Less than 250	Less than 300
Number of Bulbs	8	23	55	81	93	100

Change the above distribution as frequency distribution.

Q26. The angle of elevation of the top of a chimney from the foot of a tower is 60° and the angle of depression of the foot of the chimney from the top of the tower is 30° . If the height of tower is 40 m, find the height of smoke emitting chimney. According to pollution control norms, the minimum height of a smoke emitting chimney should be 100 m. What value is discussed in this problem? [2]

SECTION C

Q27. Find the HCF of 180, 252 and 324 by Euclid’s Division algorithm. [3]

OR

144 cartons of Coke cans and 90 cartons of Pepsi cans are to be stacked in a canteen. If each stack is of the same height and if it equal contain cartons of the same drink, what would be the greatest number of cartons each stack would have?

Q28. Solve for x : [3]

$$\frac{x+1}{x-1} + \frac{x-2}{x+2} = 4 - \frac{2x+3}{x-2}; x \neq 1, -2, 2$$

Q29. The ninth term of an A.P. is equal to seven times the second term and twelfth term exceeds five times the third term by 2. Find the first term and the common difference. [3]

OR

Find the 20^{th} term of an A.P. whose 3^{rd} term is 7 and the seventh term exceeds three times the 3^{rd} term by 2. Also find its n^{th} term (a_n).

Q30. Prove that the tangents drawn at the ends of a diameter of a circle are parallel. [3]

Q31. Read the following, understand the mathematical idea expressed in it answer the questions that follow:
 1,4,9,16, are the square of the counting numbers. The remainders got by dividing the square numbers with natural numbers have a cyclic property. For example, the remainders on dividing these numbers by 4 are tabulated here. [3]

Number	1	4	9	16	25	-	-	-
Remainder	1	0	1	0	1	-	-	-

On dividing by 4 perfect squares leave only 0 and 1 as remainders. From this we can conclude that an arithmetic sequence whose terms leaves remainder 2 on dividing by 4 do not have a perfect square.

- (a) Which are the possible remainders on dividing any number with 4?
- (b) Which are the numbers we would not get on dividing a perfect square by 4?
- (c) What is the remainder that leaves on dividing the terms of the arithmetic sequence 2,5,8,11, by 4?

Q32. The angles of depression of the top and bottom of a 50 m high building from the top of a tower are 45° and 60° respectively. Find the height of the tower and the horizontal distance between the tower and the building. (Use $\sqrt{3} = 1.73$) [3]

OR

An electric pole is 10 m high. A steel wire tied to top of the pole is affixed at a point on the ground to keep the pole up right. If the wire makes an angle of 45° with the horizontal through the foot of the pole, find the length of the wire. [Use $\sqrt{2} = 1.414$]

Q33. The sum of the radius of base and height of a solid right circular cylinder is 37 cm. If the total surface area of the solid cylinder is 1628 sq. cm, find the volume of the cylinder. $\pi = \frac{22}{7}$ [3]

Q34. From a solid wooden sphere with 13 centimetres radius, a cone with 18 centimetres height and maximum base is made. [3]

- (a) Taking the base radius of the cone as r . draw a rough figure.
- (b) Calculate the radius of the cone.
- (c) What is the volume of the cone?

SECTION D

Q35. If the polynomial $x^4 - 6x^3 + 16x^2 - 25x + 10$ is divided by $(x^2 - 2x + k)$, the remainder comes out to be $x + a$, find k and a . [4]

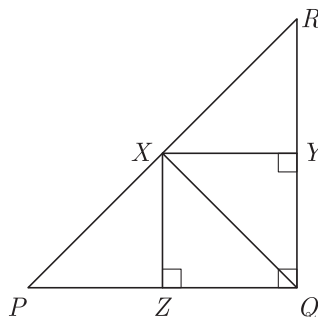
OR

Obtain all other zeroes of the polynomial $9x^4 - 6x^3 - 35x^2 + 24x - 4$, if two of its zeroes are 2 and -2 .

Q36. Solve the following pair of equations : [4]

$$\frac{2}{\sqrt{x}} + \frac{3}{\sqrt{y}} = 2 \text{ and } \frac{4}{\sqrt{x}} - \frac{9}{\sqrt{y}} = -1$$

Q37. ΔPQR is right angled at Q , $QX \perp PR$, $XY \perp RQ$ and $XZ \perp PQ$ are drawn. Prove that $XZ^2 = PZ \times ZQ$. [4]



OR

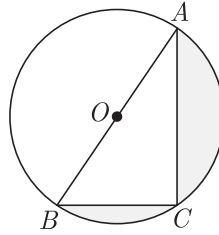
If the area of two similar triangles are equal, prove that they are congruent.

Q38. Evaluate : [4]
 $\tan^2 30^\circ \sin 30^\circ + \cos 60^\circ \sin^2 90^\circ \tan^2 60^\circ - 2 \tan 45^\circ \cos^2 20^\circ \sin 90^\circ$

OR

If $\sqrt{3} \cot^2 \theta - 4 \cot \theta + \sqrt{3} = 0$, then find the value of $\cot^2 \theta + \tan^2 \theta$.

- Q39. Find the coordinates of the point which divide the line segment joining $A(2, -3)$ and $B(-4, -6)$ into three equal parts. [4]
- Q40. In the figure, O is the centre of circle such that diameter $AB = 13$ cm and $AC = 12$ cm. BC is joined. Find the area of the shaded region. ($\pi = 3.14$) [4]



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