

CLASS X (2019-20)
MATHEMATICS STANDARD(041)
SAMPLE PAPER-10

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 least number which is a perfect square and is divisible by each of 16, 20 and 24 is [1]
 (a) 240 (b) 1600
 (c) 2400 (d) 3600
- Q2. If the sum of the zeroes of the polynomial $f(x) = 2x^3 - 3kx^2 + 4x - 5$ is 6, then the value of k is [1]
 (a) 2 (b) -2
 (c) 4 (d) -4
- Q3. x and y are 2 different digits. If the sum of the two digit numbers formed by using both the digits is a perfect square, then value of $x + y$ is [1]
 (a) 10 (b) 11
 (c) 12 (d) 13
- Q4. The real roots of the equation $x^{2/3} + x^{1/3} - 2 = 0$ are [1]
 (a) 1, 8 (b) -1, -8
 (c) -1, 8 (d) 1, -8
- Q5. In an AP, if $a = 3.5$, $d = 0$ and $n = 101$, then a_n will be [1]
 (a) 0 (b) 3.5
 (c) 103.5 (d) 104.5
- Q6. If the area of the triangle formed by the points $(x, 2x)$, $(-2, 6)$ and $(3, 1)$ is 5 sq units, then x equals [1]
 (a) $2/3$ (b) $3/5$
 (c) 3 (d) 5
- Q7. The ratio of the length of a rod and its shadow is $1 : \sqrt{3}$ then the angle of elevation of the sun is [1]
 (a) 90° (b) 45°
 (c) 30° (d) 75°
- Q8. A sphere is melted and half of the melted liquid is used to form 11 identical cubes, whereas the remaining half is used to form 7 identical smaller spheres. The ratio of the side of the cube to the radius of the new small sphere is [1]
 (a) $\left(\frac{4}{3}\right)^{1/3}$ (b) $\left(\frac{8}{3}\right)^{1/3}$
 (c) $(3)^{1/3}$ (d) 2
- Q9. If the mean of the observation $x, x + 3, x + 5, x + 7$ and $x + 10$ is 9, the mean of the last three observation is [1]

- (a) $10\frac{1}{3}$
- (b) $10\frac{2}{3}$
- (c) $11\frac{1}{3}$
- (d) $11\frac{2}{3}$

- Q10. If in a lottery, there are 5 prizes and 20 blanks, then the probability of getting a prize is [1]
- (a) $\frac{2}{5}$
 - (b) $\frac{4}{5}$
 - (c) $\frac{1}{5}$
 - (d) 1

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

- Q11. Two figures having the same shape and size are said to be [1]
- Q12. Points (3, 2), (-2, -3) and (2, 3) form a triangle. [1]

OR

The distance of the point (x_1, y_1) from the origin is

- Q13. $\sin^2\theta + \sin^2(90^\circ - \theta) = \dots\dots\dots$ [1]
- Q14. The tangent to a circle is to the radius through the point of contact. [1]
- Q15. A curve made by moving one point at a fixed distance from another is called [1]

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

- Q16. If the angles of elevation of the top of a tower from two points distant a and $b(a > b)$ from its foot and in the same straight line from it are respectively 30° and 60° , then find the height of the tower. [1]
- Q17. The diameter of a wheel is 1.26 m. What the distance covered in 500 revolutions. [1]
- Q18. The slant height of a bucket is 26 cm. The diameter of upper and lower circular ends are 36 cm and 16 cm. Find the height of the bucket. [1]

OR

A cylinder and a cone have base radii 5 cm and 3 cm respectively and their respective heights are 4 cm and 8 cm. Find the ratio of their volumes.

- Q19. Consider the following distribution : [1]

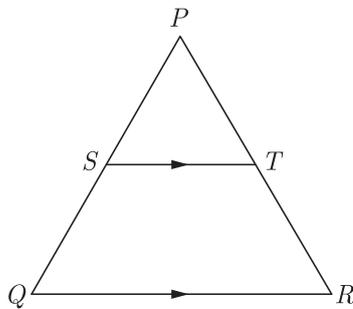
Marks Obtained	0 or more	10 or more	20 or more	30 or more	40 or more	50 or more
Number of students	63	58	55	51	48	42

- (i) Calculate the frequency of the class 30 - 40.
- (ii) Calculate the class mark of the class 10 - 25.

- Q20. A bag contains cards numbered from 1 to 25. A card is drawn at random from the bag. Find the probability that number is divisible by both 2 and 3. [1]

SECTION B

- Q21. Given that $HCF(306, 1314) = 18$. Find $LCM(306, 1314)$ [2]
- Q22. If one root of the quadratic equation $6x^2 - x - k = 0$ is $\frac{2}{3}$, then find the value of k . [2]
- Q23. In the given figure, in a triangle $PQR, ST \parallel QR$ and $\frac{PS}{SQ} = \frac{3}{5}$ and $PR = 28$ cm, find PT . [2]



OR

$ABCD$ is a trapezium in which $AB \parallel CD$ and its diagonals intersect each other at the point O . Show that $\frac{AO}{BO} = \frac{CO}{DO}$.

- Q24. There are 60 students in a class among which 30 are boys. In another class there are 50 students among which 25 of them are boys. If one from each class is selected, [2]
 (a) What is the probability of both being girls ?
 (b) What is the probability of having atleast one girl?

- Q25. Find the mean of the following distribution : [2]

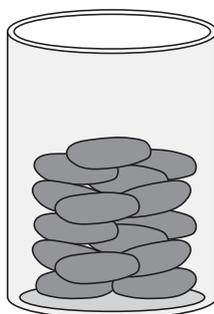
Class interval	0-6	6-12	12-18	18-24	24-30
Frequency	5	4	1	6	4

OR

Find the mode of the following distribution :

Classes	25-30	30-35	35-40	40-45	45-50	50-55
Frequency	25	34	50	42	38	14

- Q26. A gulab jamun, contains sugar syrup upto about 30% of its volume. Find approximately how much syrup would be found in 45 gulab jamuns, each shaped like a cylinder with two hemispherical ends with length 5 cm and diameter 2.8 cm. [2]



SECTION C

- Q27. Find the HCF and LCM of 510 and 92 and verify that $HCF \times LCM = \text{Product of two given numbers}$. [3]

OR

Show that any positive odd integer is of the form $6q + 1, 6q + 3$ or $6q + 5$, where q is some integer.

- Q28. Solve for $x : \sqrt{3}x^2 - 2\sqrt{2}x - 2\sqrt{3} = 0$ [3]

- Q29. The sum of n terms of an A.P. is $3n^2 + 5n$. Find the A.P. Hence find its 15th term. [3]

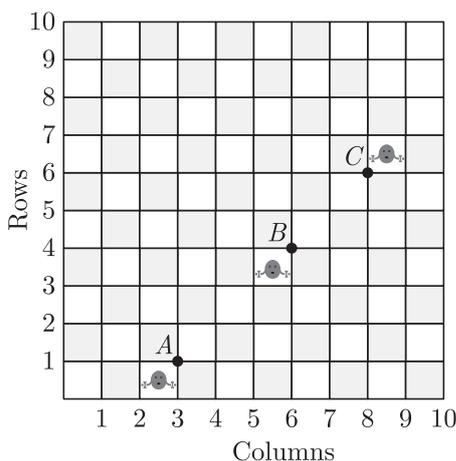
OR

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).

- Q30. A circle is inscribed in a ΔABC , with sides AC, AB and BC as 8 cm, 10 cm and 12 cm respectively. Find the length of AD, BE and CF . [3]

- Q31. 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. [3]

- (i) Do you think they are seated in a line? Give reasons for your answer.
- (ii) Which mathematical concept is used in the above problem?



- Q32. The angle of elevation of the top of a building from the foot of the tower is 30° and the angle of elevation of the top of the tower from the foot of the building is 45° . If the tower is 30 m high, find the height of the building. [3]

OR

A man standing on the deck of a ship, which is 10 m above water level, observes the angle of elevation of the top of a hill as 60° and the angle of depression of the base of hill as 30° . Find the distance of the hill from the ship and the height of the hill.

- Q33. A hemispherical bowl of internal diameter 36 cm contains liquid is filled into 72 cylindrical bottles of diameter 6 cm. Find the height of the each bottle, if 10% liquid is wasted in this transfer. [3]
- Q34. A boy, 1.4 metre tall standing at the edge of a river bank sees the top of a tree on the edge of the other bank at an elevation of 55° . Standing back by 3 metre, he sees it at elevation of 45° . [3]
- (a) Draw a rough figure showing these facts.
 - (b) How wide is the river and how tall is the tree ? [$\sin 55^\circ = 0.8192$, $\cos 55^\circ = 0.5736$, $\tan 55^\circ = 1.4281$]

SECTION D

- Q35. Obtain all other zeroes of the polynomial $x^4 + 6x^3 + x^2 - 24x - 20$, if two of its zeroes are $+2$ and -5 . [4]

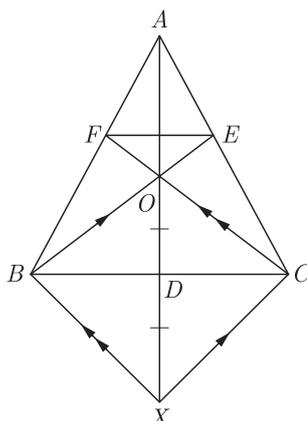
OR

Obtain all other zeroes of the polynomial $4x^4 + x^3 - 72x^2 - 18x$, if two of its zeroes are $3\sqrt{2}$ and $-3\sqrt{2}$.

- Q36. A and B are two points 150 km apart on a highway. Two cars start A and B at the same time. If they move in the same direction they meet in 15 hours. But if they move in the opposite direction, they meet in 1 hours. Find their speeds. [4]
- Q37. In $\triangle ABC$, AD is a median and O is any point on AD . BO and CO on producing meet AC and AB at E and F respectively. Now AD is produced to X such that $OD = DX$ as shown in figure. [4]

Prove that :

- (1) $EF \parallel BC$
- (2) $AO : AX = AF : AB$



OR

Let ABC be a triangle D and E be two points on side AB such that $AD = BE$. If $DP \parallel BC$ and $EQ \parallel AC$, then prove that $PQ \parallel AB$.

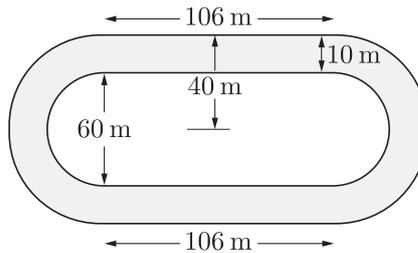
- Q38. When is an equation called 'an identity'. Prove the trigonometric identity $1 + \tan^2 A = \sec^2 A$. [4]

OR

Given that $\tan(A + B) = \frac{\tan A + \tan B}{1 - \tan A \tan B}$, find the values of $\tan 75^\circ$ and $\tan 90^\circ$ by taking suitable values of A and B .

- Q39. Find the values of k for which the points $A(k + 1, 2k)$, $B(3k, 2k + 3)$ and $C(5k - 1, 5k)$ are collinear. [4]

- Q40. Figure depicts a racing track whose left and right ends are semi-circular. The distance between the two inner parallel line segments is 60 m and they are each 106 m long. If the track is 10 m wide everywhere, find the area of the track. [4]



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