

CLASS X (2019-20)
MATHEMATICS BASIC(241)
SAMPLE PAPER-6

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. Two coins are tossed simultaneously. The probability of getting at most one head is [1]
(a) $\frac{1}{4}$ (b) $\frac{1}{2}$
(c) $\frac{3}{4}$ (d) 1
- Q2. If the perimeter of one face of a cube is 20 cm, then its surface area is [1]
(a) 120 cm^2 (b) 150 cm^2
(c) 125 cm^2 (d) 400 cm^2
- Q3. Which of the following will have a terminating decimal expansion? [1]
(a) $\frac{77}{210}$ (b) $\frac{23}{30}$
(c) $\frac{125}{441}$ (d) $\frac{23}{8}$
- Q4. If $x \sin^3 \theta + y \cos^3 \theta = \sin \theta \cos \theta$ and $x \sin \theta = y \cos \theta$, then $x^2 + y^2$ is equal to [1]
(a) 0 (b) $1/2$
(c) 1 (d) $3/2$
- Q5. One of the two students, while solving a quadratic equation in x , copied the constant term incorrectly and got the roots 3 and 2. The other copied the constant term and coefficient of x^2 correctly as -6 and 1 respectively. The correct roots are [1]
(a) 3, -2 (b) $-3, 2$
(c) $-6, -1$ (d) 6, -1
- Q6. A motor boat takes 2 hours to travel a distance 9 km. down the current and it takes 6 hours to travel the same distance against the current. The speed of the boat in still water and that of the current (in km/hour) respectively are [1]
(a) 3, 1.5 (b) 3, 2
(c) 3.5, 2.5 (d) 3, 1
- Q7. Five distinct positive integers are in an arithmetic progression with a positive common difference. If their sum is 10020, then the smallest possible value of the last term is [1]
(a) 2002 (b) 2004
(c) 2006 (d) 2007

- Q8. The value of the polynomial $x^8 - x^5 + x^2 - x + 1$ is [1]
 (a) positive for all the real numbers (b) negative for all the real numbers
 (c) 0 (d) depends on value of x

- Q9. If the area of a semi-circular field is 15400 sq m, then perimeter of the field is: [1]
 (a) $160\sqrt{2}$ m (b) $260\sqrt{2}$ m
 (c) $360\sqrt{2}$ m (d) $460\sqrt{2}$ m

- Q10. The median of a set of 9 distinct observations is 20.5. If each of the largest 4 observation of the set is increased by 2, then the median of the new set [1]
 (a) Is increased by 2
 (b) Is decreased by 2
 (c) Is two times the original median
 (d) Remains the same as that of the original set

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

- Q11. The total surface area of a solid hemisphere having radius r is [1]

- Q12. The fourth vertex D of a parallelogram $ABCD$ whose three vertices are $A(-2, 5)$, $B(6, 9)$ and $C(8, 5)$ is [1]

OR

$(5, -2)$, $(6, 4)$ and $(7, -2)$ are the vertices of an triangle.

- Q13. The region enclosed by an arc and a chord is called the of the circle. [1]

- Q14. In ΔPQR , right-angled at Q , $PR + QR = 25$ cm and $PQ = 5$ cm. The value of $\tan P$ is [1]

- Q15. An algorithm which is used to find HCF of two positive numbers is [1]

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

- Q16. A pole casts a shadow of length $2\sqrt{3}$ m on the ground, when the Sun's elevation is 60° . Find the height of the pole. [1]

OR

An observer 1.5 m tall is 28.5 m away from a tower 30 m high. Find the angle of elevation of the top of the tower from his eye.

- Q17. If ratio of corresponding sides of two similar triangles is 5 : 6, then find ratio of their areas. [1]

- Q18. Two concentric circles are of radii 5 cm and 3 cm. Find the length of the chord of larger circle (in cm) which touches the smaller circle. [1]

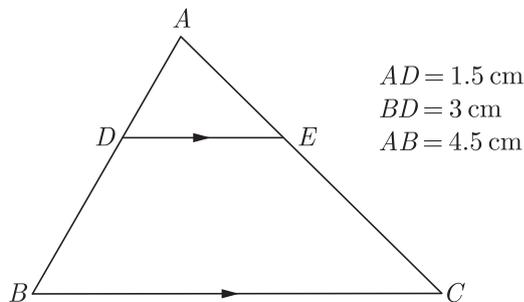
- Q19. A line Segment AB is divided at point P such that $\frac{PB}{AB} = \frac{3}{7}$, then find the ratio $AP : PB$. [1]

- Q20. If the radius of the base of a right circular cylinder is halved, keeping the height same, find the ratio of the volume of the reduced cylinder to that of original cylinder. [1]

SECTION B

- Q21. For what value of ' k ', the system of equations $kx + 3y = 1$, $12x + ky = 2$ has no solution. [2]

- Q22. In the given figure, $DE \parallel BC$. If $AD = 1.5$ cm $BD = 2AD$, then find $\frac{ar(\Delta ADE)}{ar(\text{trapezium } BCED)}$ [2]



OR

In an equilateral triangle of side 24 cm, find the length of the altitude.

- Q23. Prove that the point $(3, 0)$, $(6, 4)$ and $(-1, 3)$ are the vertices of a right angled isosceles triangle. [2]
- Q24. A cubical block of side 7 cm is surmounted by a hemisphere. What is the greatest diameter the hemisphere can have? Find the surface area of the solid. [2]

OR

A metallic solid sphere of radius 4.2 cm is melted and recast into the shape of a solid cylinder of radius 6 cm. Find the height of the cylinder.

- Q25. There are two covers A and B each containing paper slips with natural numbers from 1 to 7 written on them. One slip is drawn from each cover. Using them, a two digit number is formed with a number from A in the units place and the number from B in the tens place. How many such two digit numbers can be formed? What is the probability that a two digit number so formed is even? [2]
- Q26. Read the following passage and the question that follows:
 The radius and height of a wax made cylinder are 6 cm and 12 cm respectively. A cone of same base radius and height has been made from this cylinder by cutting out. [2]
 (a) Find the volume of cone
 (b) How many candles with 1 cm radius and 12 cm height can be made using the remaining wax.

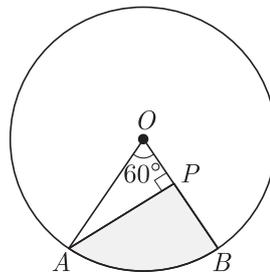
SECTION C

- Q27. Determine an A.P. whose third term is 9 and when fifth term is subtracted from 8^{th} term, we get 6. [3]
- Q28. If the sum and product of the zeroes of the polynomial $ax^2 - 5x + c$ are equal to 10 each, find the value of 'a' and 'c'. [3]
- OR**
- If α and β are the zeroes of a quadratic polynomial such that $\alpha + \beta = 0$ and $\alpha - \beta = 8$. Find the quadratic polynomial having α and β as its zeroes.
- Q29. ABC is a triangle. A circle touches sides AB and AC produced and side BC at X, Y and Z respectively. Show that $AX = \frac{1}{2}$ perimeter of ΔABC . [3]
- Q30. Find the co-ordinate of a point P on the line segment joining $A(1, 2)$ and $B(6, 7)$ such that $AP = \frac{2}{5}AB$ [3]

OR

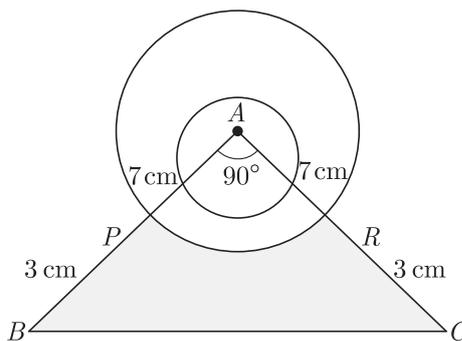
Find the ratio in which the line segment joining the points $A(3, -3)$ and $B(-2, 7)$ is divided by x-axis. Also find the co-ordinates of point of division.

- Q31. In the given figure, AOB is a sector of angle 60° of a circle with centre O and radius 17 cm. If $AP \perp OB$ and $AP = 15$ cm, find the area of the shaded region. [3]



OR

A memento is made as shown in the figure. Its base $PBCR$ is silver plate from the Front side. Find the area which is silver plated. Use $\pi = \frac{22}{7}$.



Q32. A 7m long flagstaff is fixed on the top of a tower standing on the horizontal plane. From point on the ground, the angles of elevation of the top and bottom of the flagstaff are 60° and 45° respectively. Find the height of the tower correct to one place of decimal. (Use $\sqrt{3} = 1.73$) [3]

Q33. Read the following passage and the question that follows:
 One sees the top of a tree on the bank of a river at an elevation of 70° from the other bank. Stepping 20 metres back, he sees the top of the tree at an elevation of 55° . Height of the person is 1.4 metres.
 (a) Draw a rough figure and mark the measurements.
 (b) Find the height of the tree.
 (c) Find the width of the river. [$\tan 70^\circ = 2.75$; $\tan 55^\circ = 1.43$] [3]

Q34. Find the area of the rhombus of vertices $(3,0), (4,5), (-1,4)$ and $(-2,-1)$ taken in order. [3]

SECTION D

Q35. Find the HCF of 256 and 36 using Euclid's Division Algorithm. Also, find their LCM and verify that $\text{HCF} \times \text{LCM} = \text{Product of the two numbers}$. [4]

Q36. Solve for x and y : [4]

$$\begin{aligned} 2x - y + 3 &= 0 \\ 3x - 5y + 1 &= 0 \end{aligned}$$

OR

A two digit number is obtained by either multiplying the sum of digits by 8 and then subtracting 5 or by multiplying the difference of digits by 16 and adding 3. Find the number.

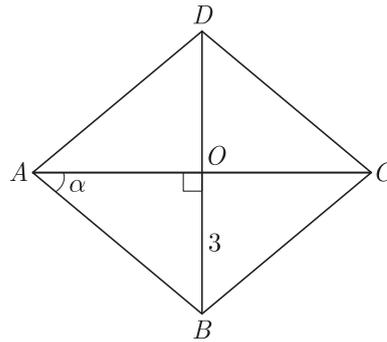
Q37. In an acute angled triangle ABC , if $\sin(A + B - C) = \frac{1}{2}$ and $\cos(B + C - A) = \frac{1}{\sqrt{2}}$, find $\angle A, \angle B$ and $\angle C$. [4]

Q38. The denominator of a fraction is two more than its numerator. If the sum of the fraction and its reciprocal is $\frac{34}{15}$, find the fraction. [4]

OR

A motor boat whose speed is 24 km/h in still water takes 1 hour more to go 32 km upstream than to return downstream to the same spot. Find the speed of the stream.

- Q39. $ABCD$ is a rhombus whose diagonal AC makes an angle α with AB . If $\cos \alpha = \frac{2}{3}$ and $OB = 3$ cm, find the length of its diagonals AC and BD . [4]



OR

Vertical angles of two isosceles triangles are equal. If their areas are in the ratio $16 : 25$, then find the ratio of their altitudes drawn from vertex to the opposite side.

- Q40. Find the median of the following data :

Class Interval	0- 20	20-40	40-60	60-80	80-100	100-120	120-140
Frequency	6	8	10	12	6	5	3

How can we find the median graphically ?

[4]

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