

**CLASS X (2019-20)**  
**MATHEMATICS STANDARD(041)**  
**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 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.
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**SECTION A**

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

- Q1. Which of the following will have a terminating decimal expansion? [1]
- (a)  $\frac{77}{210}$  (b)  $\frac{23}{30}$   
(c)  $\frac{125}{441}$  (d)  $\frac{23}{8}$
- Q2. 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
- Q3. 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
- Q4. 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,  $-1$
- Q5. 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
- Q6. 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)  $3/2$
- Q7. 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
- Q8. If the perimeter of one face of a cube is 20 cm, then its surface area is [1]
- (a)  $120\text{ cm}^2$  (b)  $150\text{ cm}^2$

(c)  $125 \text{ cm}^2$

(d)  $400 \text{ cm}^2$

- Q9. 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

- Q10. 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

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

- Q11. An algorithm which is used to find HCF of two positive numbers 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. In  $\Delta PQR$ , right-angled at  $Q$ ,  $PR + QR = 25 \text{ cm}$  and  $PQ = 5 \text{ cm}$ . The value of  $\tan P$  is ..... [1]

- Q14. The region enclosed by an arc and a chord is called the ..... of the circle. [1]

- Q15. The total surface area of a solid hemisphere having radius  $r$  is ..... [1]

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

- Q16. If ratio of corresponding sides of two similar triangles is  $5 : 6$ , then find ratio of their areas. [1]

- Q17. Two concentric circles are of radii  $5 \text{ cm}$  and  $3 \text{ cm}$ . Find the length of the chord of larger circle (in  $\text{cm}$ ) which touches the smaller circle. [1]

- Q18. A pole casts a shadow of length  $2\sqrt{3} \text{ m}$  on the ground, when the Sun's elevation is  $60^\circ$ . Find the height of the pole. [1]

**OR**

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

- 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]

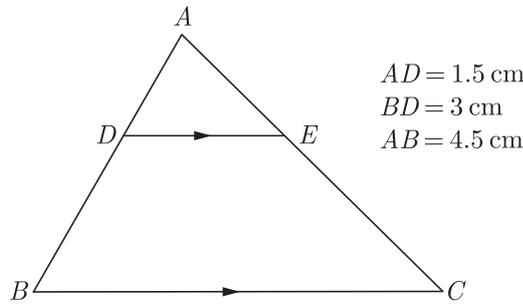
- Q20. If the radius of the base of a right circular cylinder is halved, keeping the height same, find the ratio of the volume of the reduced cylinder to that of original cylinder. [1]

**SECTION B**

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

- Q22. Prove that the point  $(3, 0)$ ,  $(6, 4)$  and  $(-1, 3)$  are the vertices of a right angled isosceles triangle. [2]

- Q23. In the given figure,  $DE \parallel BC$ . If  $AD = 1.5 \text{ cm}$   $BD = 2AD$ , then find  $\frac{\text{ar}(\Delta ADE)}{\text{ar}(\text{trapezium } BCED)}$  [2]



**OR**

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

- Q24. 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.

- Q25. 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.

- Q26. 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]

### SECTION C

- Q27. 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  $\alpha$  and  $\beta$  are the zeroes of a quadratic polynomial such that  $\alpha + \beta = 0$  and  $\alpha - \beta = 8$ . Find the quadratic polynomial having  $\alpha$  and  $\beta$  as its zeroes.

- Q28. Determine an A.P. whose third term is 9 and when fifth term is subtracted from 8<sup>th</sup> term, we get 6. [3]

- Q29. 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.

- Q30. *ABC* is a triangle. A circle touches sides *AB* and *AC* produced and side *BC* at *X*, *X*, *Y* and *Z* respectively. Show that  $AX = \frac{1}{2}$  perimeter of  $\Delta ABC$ . [3]

- Q31. One sees the top of a tree on the bank of a river at an elevation of  $70^\circ$  from the other bank. Stepping 20 metres back, he sees the top of the tree at an elevation of  $55^\circ$ . Height of the person is 1.4 metres. [3]

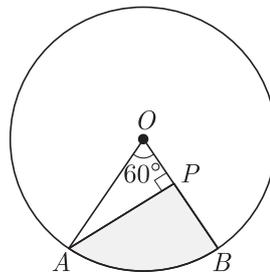
(a) Draw a rough figure and mark the measurements.

(b) Find the height of the tree.

(c) Find the width of the river.

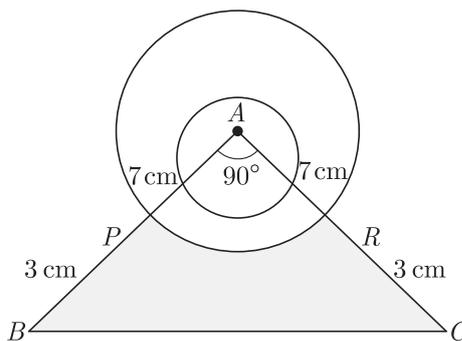
$$[\tan 70^\circ = 2.75; \tan 55^\circ = 1.43]$$

- Q32. In the given figure, *AOB* is a sector of angle  $60^\circ$  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  $\pi = \frac{22}{7}$ .



- Q33. 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  $60^\circ$  and  $45^\circ$  respectively. Find the height of the tower correct to one place of decimal. (Use  $\sqrt{3} = 1.73$ ) [3]
- Q34. From the top of a tower of height 50 cm, the angles of depression of the top and bottom of a pole are  $30^\circ$  and  $45^\circ$  respectively find: [3]  
 (i) How far the pole is from the bottom of a tower?  
 (ii) The height of the pole (Use  $\sqrt{3} = 1.732$ )

**SECTION D**

- Q35. Solve for  $x$  and  $y$  : [4]  
 $2x - y + 3 = 0$   
 $3x - 5y + 1 = 0$

**OR**

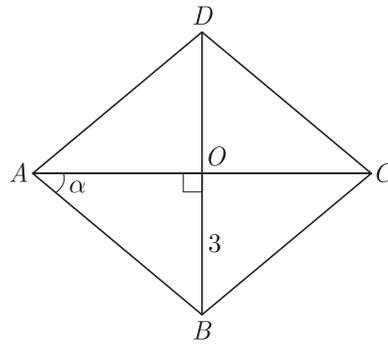
A two digit number is obtained by either multiplying the sum of digits by 8 and then subtracting 5 or by multiplying the difference of digits by 16 and adding 3. Find the number.

- Q36. 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]
- Q37. 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.

- Q38.  $ABCD$  is a rhombus whose diagonal  $AC$  makes an angle  $\alpha$  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.

Q39. 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]

Q40. Find the median of the following data :

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

How can we find the median graphically ?

[4]

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