

**CLASS X (2019-20)**  
**MATHEMATICS BASIC(241)**  
**SAMPLE PAPER-17**

Time : 3 Hours

Maximum Marks : 80

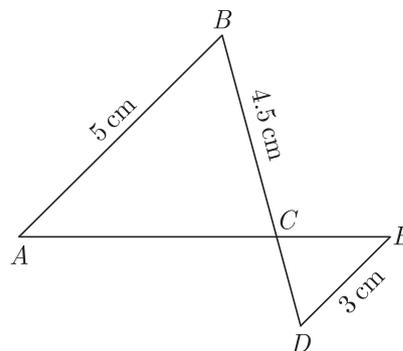
**General Instructions :**

- (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. The least number that is divisible by all natural numbers from 1 to 10 (both inclusive) is [1]  
 (a) 10 (b) 100  
 (c) 504 (d) 2520
- Q2. The decimal expansion of the rational number  $\frac{33}{2^2 \times 5}$  will terminate after [1]  
 (a) one decimal place (b) two decimal places  
 (c) three decimal places (d) four decimal places
- Q3. If the equation  $3x^2 - kx + 2k = 0$  has equal roots, then the value(s) of  $k$  is (are) [1]  
 (a) 6 (b) 0 only  
 (c) 24 only (d) 0 or 24
- Q4. If a ladder 10 m long reaches a window 8 m above the ground, then the distance of the foot of the ladder from the base of the wall is [1]  
 (a) 18 m (b) 8 m  
 (c) 6 m (d) 4 m
- Q5. In given figure,  $AB \parallel DE$ . The length of  $CD$  is [1]



- (a) 2.5 cm (b) 2.7 cm  
 (c)  $\frac{10}{3}$  cm (d) 3.5 cm
- Q6. If  $\sin \theta = \frac{a}{b}$ , the  $\cos \theta$  is equal to [1]  
 (a)  $\frac{b}{\sqrt{b^2 - a^2}}$  (b)  $\frac{b}{a}$   
 (c)  $\frac{\sqrt{b^2 - a^2}}{b}$  (d)  $\frac{a}{\sqrt{b^2 - a^2}}$

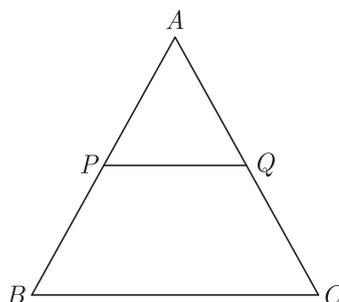
- Q7. If a pole 6 m high casts shadow  $2\sqrt{3}$  m long on the ground, then the sun's elevation is [1]  
 (a)  $60^\circ$  (b)  $45^\circ$   
 (c)  $30^\circ$  (d)  $90^\circ$
- Q8. If a kite is flying at a height of  $40\sqrt{3}$  metres from the level ground, attached to a string inclined at  $60^\circ$  to the horizontal, then the length of the string is [1]  
 (a) 80 m (b)  $60\sqrt{3}$   
 (c)  $80\sqrt{3}$  m (d) 120 m
- Q9. Area of the largest triangle that can be inscribed in a semicircle of radius  $r$  units is [1]  
 (a)  $r^2$  sq. units (b)  $\frac{1}{2}r^2$  sq. units  
 (c)  $2r^2$  sq. units (d)  $\sqrt{2}r^2$  sq. units
- Q10. A mason constructs a wall of dimensions  $300\text{ cm} \times 270\text{ cm} \times 350\text{ cm}$  with the bricks of size  $22.5\text{ cm} \times 11.25\text{ cm} \times 8.75\text{ cm}$  and it is assumed that  $\frac{1}{8}$  space is covered by mortar. Then the number of bricks used to construct the wall is [1]  
 (a) 11100 (b) 11200  
 (c) 11000 (d) 11300

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

- Q11. All decimal numbers (terminating, non-terminating repeating or non-terminating non-repeating) are ..... numbers. [1]
- Q12. In two similar triangles, if the ratio of their corresponding medians is  $3 : 5$ , then the ratio of their corresponding sides is ..... [1]

**OR**

In the given figure,  $P$  and  $Q$  are mid-points of sides  $AB$  and  $AC$  respectively. If  $PQ = 2.3$  cm, then the length of  $BC$  is .....



- Q13. The lengths of tangents drawn from an external point to a circle are ..... [1]
- Q14. If the difference between circumference and radius of a circle is 37 cm, then the circumference of that circle is ..... [1]
- Q15. The value of  $\sin^2 30^\circ \cdot \tan 60^\circ + \cos^2 30^\circ \cdot \tan 60^\circ$  is ..... [1]

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

- Q16. If the sum of zeroes of the quadratic polynomial  $3x^2 - kx + 6$  is 3, then find the value of  $k$ . [1]

**OR**

If 1 is a root of both the equations  $ay^2 + ay + 3 = 0$  and  $y^2 + y + b = 0$ , then find the value of  $ab$ .

- Q17. Consider the following distribution, find the frequency of class  $30 - 40$ . [1]

Marks obtained	No. of students
0 or more	63

Marks obtained	No. of students
10 or more	58
20 or more	55
30 or more	51
40 or more	48
50 or more	42

Q18. Cards marked with number 3, 4, 5, ....., 50 are placed in a box and mixed thoroughly. A card is drawn at random from the box. Find the probability that the selected card bears a perfect square number. [1]

Q19. In which quadrant, the point  $P$  that divides the line segment joining the points  $A(2, -5)$  and  $B(5, 2)$  in the ratio  $2 : 3$  lies? [1]

Q20. If  $\sec 2A = \operatorname{cosec}(A - 27^\circ)$ , where  $2A$  is an acute angle, find the measure of  $\angle A$ . [1]

### SECTION B

Q21. Find whether the following pair of linear equations is consistent or inconsistent: [2]

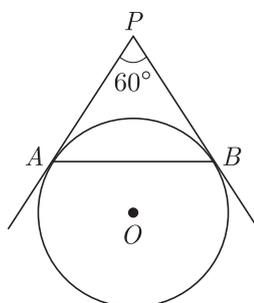
$$2x - 3y = 8; 4x - 6y = 9$$

Q22. The  $x$ -coordinate of a point  $P$  is twice its  $y$ -coordinate. If  $P$  is equidistant from  $Q(2, -5)$  and  $R(-3, 6)$ , find the coordinates of  $P$ . [2]

OR

If the point  $(m, 3)$  lies on the line segment joining the points  $(-\frac{2}{5}, 6)$  and  $(2, 8)$ , find the value of  $m$ .

Q23. In the given figure,  $AP$  and  $BP$  are tangents to a circle with centre  $O$ , such that  $AP = 5$  cm and  $\angle APB = 60^\circ$ , find the length of chord  $AB$  [2]



Q24. How many terms of the AP 18, 16, 14, ..... be taken so that their sum is zero? [2]

OR

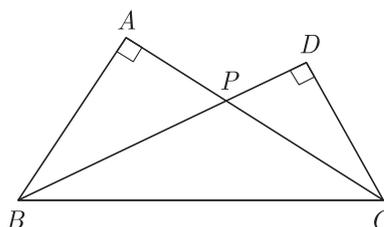
The sum of 5<sup>th</sup> and 7<sup>th</sup> terms of an AP is 52 and the 10<sup>th</sup> term is 46. Find the AP.

Q25. Show that the mode of the sequences obtained by combining the two sequences  $S_1$  and  $S_2$  taken separately: [2]

$$S_1 : 3, 5, 8, 8, 9, 12, 13, 9, 9$$

$$S_2 : 7, 4, 7, 8, 7, 8, 13$$

Q26. In the adjoining figure,  $ABC$  and  $DBC$  are two right triangles. Prove that  $AP \times PC = BP \times PD$ . [2]



## SECTION C

- Q27. Sum of the digits of a two digit number is 8 and the difference between the number and that formed by reversing the digits is 18. Find the number. [3]
- Q28. Divide 56 in four parts in  $AP$  such that the ratio of the product of their extremes ( $1^{\text{st}}$  and  $4^{\text{th}}$ ) to the product of means ( $2^{\text{nd}}$  and  $3^{\text{rd}}$ ) is 5 : 6. [3]
- Q29.  $D$  and  $E$  are points on the sides  $AB$  and  $AC$  respectively of  $\Delta ABC$  such that  $DE$  is parallel to  $BC$ , and  $AD : DB = 4 : 5$ .  $CD$  and  $BE$  intersect each other at  $F$ . Find the ratio of the areas of  $\Delta DEF$  and  $\Delta CBF$ . [3]
- Q30. Find the area of  $\Delta PQR$  with  $Q(3, 2)$  and the mid-points of the sides through  $Q$  being  $(2, -1)$  and  $(1, 2)$ . [3]

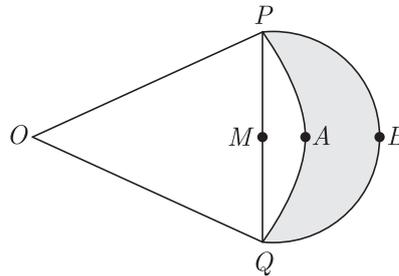
**OR**

The two opposite vertices of a square are  $(-1, 2)$  and  $(3, 2)$ . Find the coordinates of the other two vertices.

- Q31. Prove the following identity: [3]

$$\frac{\sin \theta - 2 \sin^3 \theta}{2 \cos^3 \theta - \cos \theta} = \tan \theta$$

- Q32. Three alarm clocks ring at intervals of 4, 12 and 20 minutes respectively. If they start ringing together, after how much time will they next ring together? [3]
- Q33. The given figure shows two arcs  $PAQ$  and  $PBQ$ . Arc  $PAQ$  is a part of a circle with centre  $O$  and radius  $OP$  while arc  $PBQ$  is a semicircle drawn on  $PQ$  as diameter. If  $OP = PQ = 10$  cm, show that the area of the shaded region is  $25\left(\sqrt{3} - \frac{\pi}{6}\right) \text{cm}^2$ . [3]



**OR**

Sides of a triangular field are 15 m, 16 m, 17 m. With the three corners of the field a cow, a buffalo and a horse are tied separately with ropes of length 7 m each to graze in the field. Find the area of the field which cannot be grazed by the three animals.

- Q34. Two different dice are tossed together. Find the probability that the product of the two numbers on the top of dice is (i) 6 (ii) a perfect square number. [3]

**OR**

A carton consists of 100 shirts of which 88 are good, 8 have minor defects and 4 have major defects. Ramesh, a trader, will only accept the shirts which are good, but Kewal, another trader, will only reject the shirts have major defects. One shirt is drawn at random from the carton. What is the probability that:

- (i) it is acceptable to Ramesh?  
 (ii) it is acceptable to Kewal?

## SECTION D

- Q35. If  $\alpha$  and  $\beta$  are the zeroes of the polynomial  $p(x) = 3x^2 + 2x + 1$ , find the polynomial whose zeroes are  $\frac{1-\alpha}{1+\alpha}$  and  $\frac{1-\beta}{1+\beta}$ . [4]
- Q36. If  $\sec \theta - \tan \theta = x$ , show that  $\sec \theta + \tan \theta = \frac{1}{x}$  and hence, find the values of  $\cos \theta$  and  $\sin \theta$ . [4]

**OR**

If  $\tan(A + B) = \sqrt{3}$ ,  $\tan(A - B) = \frac{1}{\sqrt{3}}$ ,  $0^\circ < A + B < 90^\circ$ ,  $A > B$ , find  $A$  and  $B$ .

Also calculate  $\tan A \sin(A + B) + \cos A \tan(A - B)$ .

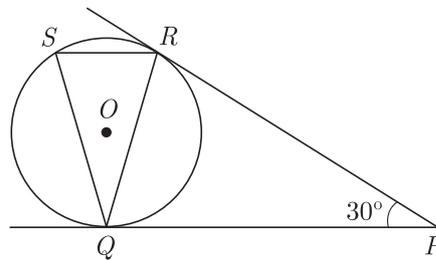
Q37. Sushant has a vessel of the form of an inverted cone, open at the top, of height 11 cm and radius of top as 2.5 cm and is full of water. Metallic spherical balls each of diameter 0.5 cm are put in the vessel due to which  $\frac{2}{5}$ th of the water in the vessel flows out. Find how many balls were put in the vessel. [4]

Q38. A peacock is sitting on the top of a pillar, which is 9 m high. From a point 27 m away from the bottom of a pillar, a snake is coming to its hole at the base of a pillar, seeing the snake, the peacock pounces on it. If their speeds are equal, at what distance from the hole is the snake caught? [4]

**OR**

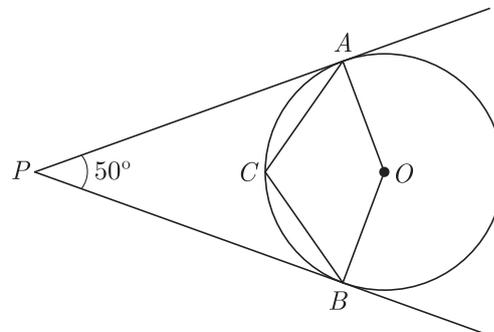
Find the value(s) of  $p$  for which the quadratic equation  $(2p + 1)x^2 - (7p + 2)x + (7p - 3) = 0$  has equal roots. Also find these roots.

Q39. In the given figure, tangents  $PQ$  and  $PR$  are drawn from an external point  $P$  to a circle with centre  $O$ , such that  $\angle RPQ = 30^\circ$ . A chord  $RS$  is drawn parallel to the tangent  $PQ$ . Find  $\angle RQS$ . [4]



**OR**

In the given figure,  $O$  is the centre of the circle. Determine  $\angle ACB$ , if  $PA$  and  $PB$  are tangents and  $\angle APB = 50^\circ$ .



Q40. The following table gives the daily income of 50 workers of a factory. Draw both types (less than type and greater than type) gives. Hence, obtain the median income. [4]

Daily income (in ₹)	No. of workers
100 – 120	12
120 – 140	14
140 – 160	8
160 – 180	6
180 – 200	10

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