

## Sample Question Paper Standard (Code 041)

Time Allowed: 3 hours

Maximum Marks: 80

### General Instructions:

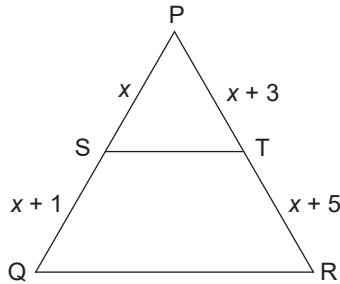
1. This Question Paper has 5 Sections A–E.
2. Section A has 20 MCQs carrying 1 mark each.
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of assessment (04 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Questions of 5 marks, 2 Questions of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.
8. Draw neat figures wherever required. Taken  $\pi = \frac{22}{7}$  wherever required if not stated.

### Section - A

Section A consists of 20 questions of 1 mark each.

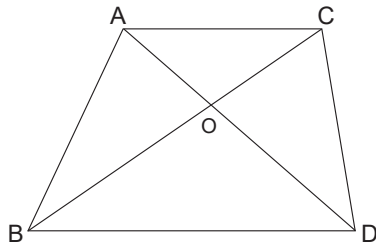
1. If  $a$  and  $b$  are two odd prime numbers, then  $a^2 - b^2$  is a  
(a) odd number. (b) even number.  
(c) composite number. (d) neither composite nor odd.
2. For what values of  $k$ ,  $x^2 + 3kx + k + 7$  has equal roots?  
(a) 2,  $-\frac{14}{9}$  (b) 1,  $\frac{6}{5}$  (c) -2,  $\frac{14}{9}$  (d) 2,  $\frac{3}{9}$
3. If  $\alpha$  and  $\beta$  are roots of polynomial  $2x^2 - 5x + 2$ , then  $\alpha\beta$  is  
(a) 0 (b) 4 (c) 1 (d) 2
4. If the system of equations  $3x - y - 5 = 0$ ,  $6x - 2y + k = 0$  has infinite solutions, then  $k$  is  
(a) 10 (b) -10 (c) 5 (d) 2
5. If points A( $x$ , 2), B(-3, -4) and C(7, -5) are collinear, then  $x$  is  
(a) 63 (b) 23 (c) 60 (d) -63
6.  $\Delta ABC \sim \Delta DEF$ . If  $AB = 4DE$ ,  $\text{ar}(\Delta ABC) = 128 \text{ cm}^2$  then  $\text{ar}(\Delta DEF)$  is  
(a)  $8 \text{ cm}^2$  (b)  $4 \text{ cm}^2$  (c)  $16 \text{ cm}^2$  (d)  $10 \text{ cm}^2$

7. If  $2 \sin^2 \theta - \cos^2 \theta = 2$ , then  $\theta$  is equal to  
 (a)  $45^\circ$  (b)  $90^\circ$  (c)  $60^\circ$  (d)  $0^\circ$
8. If  $\tan \theta + \cot \theta = 5$ , then  $\tan^2 \theta + \cot^2 \theta$  is  
 (a) 24 (b) 25 (c) 10 (d) 23
9. In the given figure,  $ST \parallel QR$ , then  $x$  is



- (a) 4 (b) 3 (c) 2 (d) 1

10.  $ABDC$  is a trapezium with  $\frac{\text{ar}(\triangle ABC)}{\text{ar}(\triangle DBC)} = \frac{4}{9}$ ,  $AO = 4$  cm then  $DO$  is



- (a) 2 cm (b) 3 cm (c) 9 cm (d) 8 cm

11. The area of a triangle whose vertices are  $(5, 0)$ ,  $(8, 0)$  and  $(8, 4)$  in sq units is  
 (a) 20 (b) 12 (c) 6 (d) 16
12. The area of a circle that can be inscribed in a square of 4 cm is  
 (a)  $4\pi \text{ cm}^2$  (b)  $2\pi \text{ cm}^2$  (c)  $16\pi \text{ cm}^2$  (d)  $8\pi \text{ cm}^2$
13. What is the smallest positive integer which should be multiplied with  $6^n$ , (where  $n$  is a natural number) so that it ends with the digit 0?  
 (a) No possible digit (b) 3  
 (c) 5 (d) 25
14. If median is three times mean, mean is 4, then mode is equal to  
 (a) 28 (b) 13 (c) 20 (d) 4
15. If origin is the centroid of a triangle whose vertices are  $A(a, b)$ ,  $B(b, c)$  and  $C(c, a)$ , then the value of  $a + b + c$  is  
 (a) 1 (b) 2 (c) 0 (d) 3

16. In a continuous frequency distribution, median of data is 21. If each observation is increased by 5, then new median is  
 (a) 5 (b) 21 (c) 26 (d) 30
17. Two coins are tossed simultaneously. What is the probability of getting exactly two heads?  
 (a)  $\frac{1}{4}$  (b)  $\frac{1}{2}$  (c)  $\frac{1}{6}$  (d)  $\frac{1}{8}$
18. If  $5 \sin \theta = 4$ , then  $\frac{1}{\cos \theta} + \frac{1}{\cot \theta}$  is  
 (a)  $\frac{1}{3}$  (b) 3 (c) 2 (d) 6

**Direction: In the question numbers 19 and 20, a statement of assertion (A) is followed by a statement of Reason(R).**

**Choose the correct option**

19. **Statement A (Assertion):** For any two positive integers  $p$  and  $q$ ,  
 $\text{HCF}(p, q) \times \text{LCM}(p, q) = p \times q$ .  
**Statement R (Reason):** If HCF of two numbers is 5 and their product is 150, then their LCM is 40.  
 (a) Both Assertion (A) and Reason (R) are true and Reason (R) is correct explanation of Assertion (A).  
 (b) Both Assertion (A) and Reason (R) are true and Reason (R) is not correct explanation of Assertion (A).  
 (c) Assertion (A) is true but Reason (R) is false.  
 (d) Assertion (A) is false but Reason (R) is true.
20. **Statement A (Assertion):** The point  $(-1, 6)$  divides the line segment joining the points  $(-3, 10)$  and  $(6, -8)$  in the ratio  $2 : 7$  internally.  
**Statement R (Reason):** Given three points A, B and C form an equilateral triangle, then  $AB = BC = AC$ .  
 (a) Both Assertion (A) and Reason (R) are true and Reason (R) is correct explanation of Assertion (A).  
 (b) Both Assertion (A) and Reason (R) are true and Reason (R) is not correct explanation of Assertion (A).  
 (c) Assertion (A) is true but Reason (R) is false.  
 (d) Assertion (A) is false but Reason (R) is true.

### Section - B

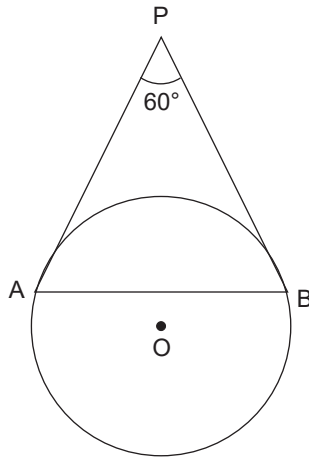
Section B consists of 5 questions of 2 marks each.

21. Solve the pair of linear equations to find  $x$  and  $y$ .

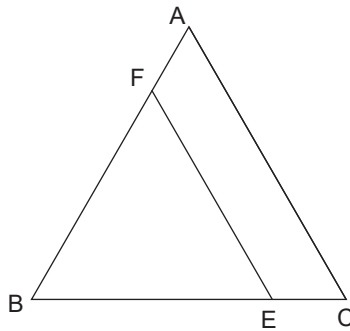
$$\frac{3x}{2} - \frac{5y}{3} = -2$$

and  $\frac{x}{3} + \frac{y}{2} = \frac{13}{6}$

22. 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 length of chord AB.



23. In the given figure,  $EF \parallel AC$ ,  $BC = 10$  cm,  $AB = 13$  cm and  $EC = 2$  cm. Find AF.



24. Find the area of triangle whose vertices are  $A(2, 3)$ ,  $B(-2, 1)$  and  $C(3, -2)$ .

or

Find the lengths of the medians of the triangle whose vertices are  $(3, -1)$ ,  $(5, 3)$  and  $(7, -3)$ .

25. If  $x = a \cos \theta - b \sin \theta$  and  $y = a \sin \theta + b \cos \theta$ , then prove that  $a^2 + b^2 = x^2 + y^2$

or

If  $\tan \theta = \frac{a}{b}$ , then prove that  $\frac{a \sin \theta - b \cos \theta}{a \sin \theta + b \cos \theta} = \frac{a^2 - b^2}{a^2 + b^2}$ .

### Section - C

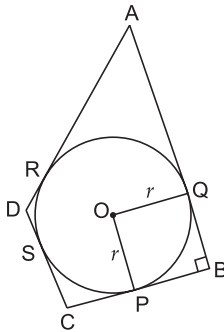
Section C consists of 6 questions of 3 marks each.

26. Given that  $\sqrt{5}$  is irrational, prove that  $6 + 7\sqrt{5}$  is irrational.
27. If  $\alpha$  and  $\beta$  are zeroes of the polynomial  $6y^2 - 7y + 2$ , find quadratic polynomial whose zeroes are  $\frac{1}{\alpha}$  and  $\frac{1}{\beta}$ .
28. The age of the father is twice the sum of ages of his two children. After 20 years, his age will be equal to the sum of ages of his children. Find age of the father.

or

The owner of taxi company decides to run all the taxis on CNG fuel instead of petrol. The taxi charges in city comprises of fixed charges together with the charge for the distance covered. For a journey of 13 km, the charge paid is ₹ 129 and for a journey of 22 km, charge paid is ₹ 210. What will a person pay for travelling 32 km?

29. If  $\sec \theta - \tan \theta = x$ , show that  $\sec \theta + \tan \theta = \frac{1}{x}$  and hence find values of  $\cos \theta$  and  $\sin \theta$ .
30. A bag contains 15 white and some black balls. If the probability of drawing black ball is thrice that of drawing a white ball, find the number of black balls in the bag.
31. In the given figure, a circle inscribed in a quadrilateral ABCD in which  $\angle B = 90^\circ$ . If  $AD = 23$  cm,  $AB = 29$  cm and  $DS = 5$  cm, find radius ( $r$ ) of the circle.



or

Prove that a parallelogram circumscribing a circle is a rhombus.

### Section - D

Section D consists of 4 questions of 5 marks each.

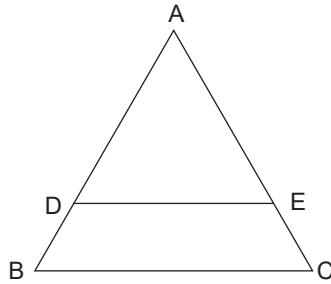
32. If in a rectangle, the length is increased and breadth reduced each by 2 units, the area is reduced by 28 sq units. If, however the length is reduced by 1 unit and breadth increased by 2 units, the area increases by 33 sq units. Find area of the rectangle.

or

The sum of two numbers is 1000 and the difference between their squares is 144000. Find the numbers.

33. Prove that if a line is drawn parallel to one side of a triangle, to intersect the other two sides in distinct points, then the other two sides are divided in the same ratio.

Using above theorem, find AD if  $DE \parallel BC$ ,  $AE = 8$  cm,  $EC = 2$  cm and  $BD = 6$  cm.



34. In a hospital, used water is collected in a cylindrical tank of diameter 2 m and height 5 m. After recycling, this water is used to irrigate a park of hospital whose length is 25 m and breadth is 20 m. If tank is filled completely then what will be the height of standing water used for irrigating the park?

or

A military tent of height 8.25 m is in the form of a right circular cylinder of base diameter 30 m and height 5.5 m surmounted by a right circular cone of same base radius. Find the length of the canvas used in making the tent, if the breadth of canvas is 1.5 m.

35. Find values of  $x$  and  $y$  if median for the following data is 31.

Total frequency is 40.

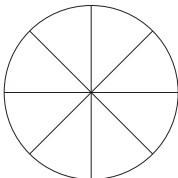
Class interval	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
Frequency	5	$x$	6	$y$	6	5

### Section - E

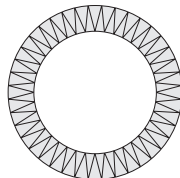
Case study based questions are compulsory.

36. A brooch is a small piece of jewellery which has a pin at the back so it can be fastened on a dress, blouse or coat.

Designs of some brooch are shown below. Observe them carefully.



A



B



**Design A:** Brooch A which is made of silver wire is in the form of a circle with diameter 28 mm. The wire used for making four diameters divide the circle into 8 equal parts.

**Design B:** Brooch B is made of two metals – gold and silver. Outer part is made of gold. The circumference of silver part is 44 mm and the gold part is 3 mm wide everywhere.

- (a) What is the total length of silver wire required? 1 mark
- (b) What is the area of each sector of the brooch A? 1 mark
- (c) A girl is playing with the brooch A. She makes revolution with it along its edge. How many complete revolutions must it take to cover a distance of  $112\pi$  mm? 2 marks

or

A boy is playing with brooch B. He makes revolution with it along its edge. How many complete revolutions must it take to cover a distance of  $80\pi$  mm? 2 marks

37. Veer wants to participate in a 200 m race. He can currently run that distance in 51 seconds and with each day of practice it takes him 2 seconds less. He wants to do in 31 seconds.



- (a) Is the given situation in AP? If yes, give reasons. 1 mark
- (b) If  $n$ th term of an AP is given by  $a_n = 2n + 3$ , then what is the common difference of the AP? 1 mark
- (c) What is the minimum number of days he needs to practice to reach his goal? 2 marks

or

If Veer wants to achieve his goal in 9 days, how much time he should reduce each day so that he completes his race in 31 seconds? 2 marks

38. A group of students of class X visited India Gate on an educational trip. The teacher and students had interest in history as well. The teacher narrated that **India Gate**, official name **Delhi Memorial**, originally called **All-India War Memorial**, monumental sandstone arch in New Delhi, was dedicated to the troops of British India who died in wars fought between 1914 and 1919. The teacher also said that India Gate, which is located at the eastern end of the Kartavya Path (formerly called Rajpath – the Kingsway), is about 138 feet (42 metres) in height.



- (a) What is the angle formed by the line of sight with the horizontal called when the object being viewed lies below the horizontal level? 1 mark
- (b) They want to see the gate at an angle of  $60^\circ$ . So, they want to know the distance where they should stand. Find the distance. 1 mark
- (c) If the altitude of the Sun is at  $60^\circ$ , then find the height of the vertical tower that will cast a shadow of length 20 m. 2 marks

or

What is the angle of elevation if the students are standing at a distance of 42 m away from the monument? 2 marks