COMMON PRE-BOARD EXAMINATION 2022-23

CLASS X

Subject: MATHEMATICS (BASIC) -241

Maximum Marks: 80 Date:

General Instructions: Time: 3 Hours

1. This Question Paper has 5 Sections A - E.
2. Section **A** has 20 Multiple Choice Questions (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 Qs of 5 marks, 2 Qs 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. Take $\pi = \frac{22}{7}$, wherever required if not stated.

Sl. No.	Section A Section A consists of 20 questions of 1 mark each	Marks
1	The HCF and LCM of two numbers are 9 and 360 respectively. If one number is 45, the other number is (a)72 (b) 16 (c) 9 (d) 360	1
2	If 2 and 3 are the zeros of a quadratic polynomial, the polynomial is of the form (a)$x^2 + 6x + 5$ (b) $x^2 + 2x + 3$ (c) $x^2 - 5x + 6$ (d) $x^2 - 6x + 5$	1
3	If the sum of zeroes of the quadratic polynomial $3x^2 – kx + 6$ is 3, then the value of k is (a)-9 (b)8 (c)9 (d)6	1
4	How many solutions does the pair of equations y = 0 and y = -5 have? (a)No solution (b)Unique solution (c)Infinite number of solutions (d) Two solutions	1
5	If A($\frac{m}{3}$, 5) is the mid-point of the line segment joining the points Q(- 6, 7) and R(-2, 3), then the value of m is (a) -12 (b) – 4 (c) 12 (d) – 6	1
6	If $x = ab^2$ and $y = a^3bc$, then the HCF of x and y is (a) ab^2 (b)ab (c) b^2a^3 (d) a^3bc	1

7 What is the value of $\frac{3-sin^2 60^0}{tan30^0\ tan60^0}$ 1

(a) $2\frac{1}{4}$ (b) $3\frac{1}{4}$ (c) $2\frac{3}{4}$ (d) $3\frac{3}{4}$

8 If 3sec θ – 5 = 0 then cot θ is equal to 1

(a) $\frac{5}{3}$ (b) $\frac{4}{5}$ (c) $\frac{3}{4}$ (d) $\frac{3}{5}$

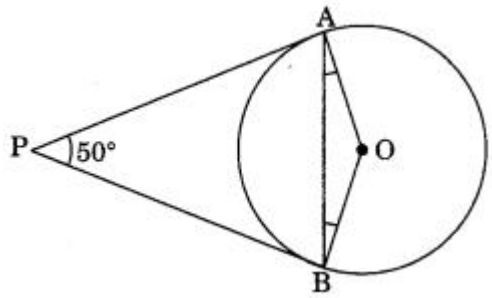
9 In ΔPQR , L and M are points on sides PQ and PR respectively such that LM || QR and PL: LQ = 1: 3. If MR = 6.6 cm, then PM is equal to 1

(a)8.8 cm (b)9.9 cm (c)3.3 cm (d)2.2 cm

10 D and E are the midpoints of side AB and AC of a triangle ABC, respectively and BC = 6 cm. If DE || BC, then the length (in cm) of DE is: 1

(a) 2.5 cm (b) 3 cm (c) 5 cm (d) 6 cm

11 In figure, if PA and PB are tangents to the circle with center 0 such that ∠APB = 50°, then ∠AOB is equal to 1



(a) 25° (b) 130° (c) 100° (d) 50°

12 Perimeter of a sector of a circle whose central angle is 90° and radius 7 cm is 1

(a) 35 cm (b) 25 cm (c) 77 cm (d) 7 cm

13 Two cubes each of volume 8 cm³ are joined end to end, then the surface area of the resulting cuboid is: 1

(a) 80 cm² (b) 64 cm² (c) 40 cm² (d) 8 cm²

14 If the arithmetic mean of x, x + 3, x + 6, x + 9 and x + 12 is 10, then x =? 1

(a) 1 (b) 2 (c) 6 (d) 4

15 The area of the sector of a circle with radius 6 cm and of angle 60° is 1

(a) 9.42 cm² (b) 37.68 cm² (c) 18.84 cm² (d) 19.84 cm²

16 The relationship between mean, median and mode for a moderately skewed distribution is 1

(a) mode = median – 2 mean
(b) mode = 3 median – 2 mean
(c) mode = 2 median – 3 mean
(d) mode = median – mean

17 A card is selected from a deck of 52 cards. The probability of its being a red face card is: 1

(a) $\frac{3}{26}$ (b) $\frac{3}{13}$ (c) $\frac{2}{13}$ (d) $\frac{1}{2}$

18 What is the minimum value of sin A, $0 \leq A \leq 90°$ 1

(a) -1 (b) 0 (c) 1 (d) 12

19 **DIRECTION:** In the question number 19 and 20, a statement of **Assertion (A)** is followed by a statement of **Reason (R)**. 1

Choose the correct option

Statement A (Assertion): 2 is an example of a rational number.

***Statement R (Reason)*:** The square roots of all positive integers are irrational numbers.

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A)

(b) Both assertion (A) and reason (R) are true and reason (R) is not the 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 (0, 4) lies on y-axis. 1

Statement R (Reason): The x co-ordinate of the point on y-axis is zero.

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

(b) Both assertion (A) and reason (R) are true and reason (R) is not the 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

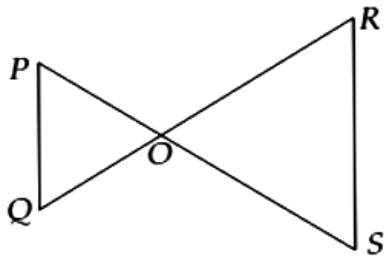
Section B consists of 5 questions of 2 marks each

21 Solve the following pair of linear equations for x and y: 2

x + y = 10

x - 2y = 4

22 In Figure , if PQ || RS, prove that Δ POQ ~ Δ SOR. 2



23 Prove that lengths of the tangents drawn from an external point to a circle are equal. 2

24 In a circle of radius 21 cm, an arc subtends an angle of 60° at the centre. Find: 2

(i) the length of the arc

(ii) area of the sector formed by the arc. [Use π = 22/7]

OR

The length of the minute hand of a clock is 14 cm. Find the area swept by the minute hand in 5 minutes.

25 If $\cos(A + B) = 0$ and $\sin(A - B) = \frac{1}{2}$, then find the value of A and B where A and B are acute angles. 2

OR

Evaluate: $4\cot^2 45^0 - \sec^2 60^0 + \sin^2 60^0 + \cos^2 90^0$

Section C

Section C consists of 6 questions of 3 marks each.

26 Prove that $\sqrt{2}$ is irrational. 3

27 Find the zeroes of $p(x) = 2x^2 - x - 6$ and verify the relationship of zeroes with these co-efficient. 3

28 Find the values of k for the quadratic equation $2x^2 + kx + 3 = 0$, so that they have two equal roots. 3

OR

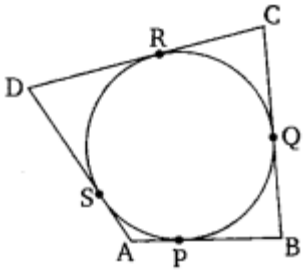
Find the roots of the equation $\frac{1}{x} - \frac{1}{x-2} = 3$, $x \neq 0$, 2.

29 Prove that $\frac{\sin\theta}{1+\cos\theta} + \frac{1+\cos\theta}{\sin\theta} = 2\,\text{cosec}\,\theta$ 3

30 Prove that the angle between the two tangents drawn from an external point to a circle is supplementary to the angle subtended by the line-segment joining the points of contact at the Centre. 3

OR

A quadrilateral ABCD is drawn to circumscribe a circle. Prove that AB + CD = AD + BC



31 Two coins are tossed simultaneously. What is the probability of getting 3

(i) At least one head?

(ii) At most one tail?

(iii) A head and a tail?

Section D

Section D consists of 4 questions of 5 marks each

32 The sum of the areas of two squares is 468 m^2. If the difference of their perimeters is 24 m, find the sides of the two squares. 5

OR

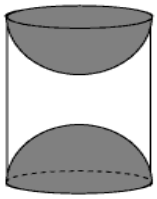
A train travels 360 km at a uniform speed. If the speed had been 5 km/h more, it would have taken 1 hour less for the same journey. Find the speed of the train.

33 State and prove Basic Proportionality Theorem (Thales Theorem). 5

34 A tent is in the shape of a cylinder surmounted by a conical top. If the height and diameter of the cylindrical part are 2.1 m and 4 m respectively, and the slant height of the top is 2.8 m, find the area of the canvas used for making the tent. Also, find the cost of the canvas of the tent at the rate of Rs 500 per m^2. (Note that the base of the tent will not be covered with canvas.) 5

OR

A wooden article was made by scooping out a hemisphere from each end of a solid cylinder, as shown in figure. If the height of the cylinder is 10 cm, and its base is of radius 3.5 cm, find the total surface area of the article.



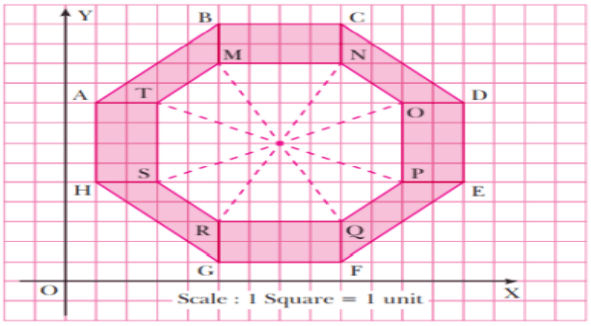
35 If the mean of the following distribution is 50, find the value of p: 5

Class	Frequency
0 – 20	17
20 – 40	P
40 – 60	32
60 – 80	24
80 – 100	19

Section E

Section E consists of 3 case study questions of 4 marks each

36 The top of a table is shown in the figure given below: 4



(i) Find the coordinates of the points H and G.

(ii) Find the coordinates of the mid-point of line segment joining points M and Q.

(iii) Find the distance between the points A and B.

OR

If G is taken as the origin, and x, y axis is put along GF and GB, then find the point denoted by coordinate (4, 2)

37 India is competitive manufacturing location due to the low cost of manpower and strong technical and engineering capabilities contributing to higher quality production runs. The production of TV sets in a factory increases uniformly by 2200 every year. It produced 5000 TV sets in the 1st year. 4

Based on the above information, answer the following questions:
(i) Find the production during second year.

(ii) Find the production during 8th year.

(iii) Find the production during first 3 years.

OR

In which year, the production is Rs 29,200.

38 A group of students of class X visited India Gate on an education 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, 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 Raj path (formerly called the Kingsway), is about 138 feet (42 meters) in height. 4

(i) What is the angle of elevation if they are standing at a distance of 42m away from the monument?

(ii) They want to see the tower at an angle of 60^{o}. So, they want to know the distance where they should stand and hence find the distance.

(iii) If the altitude of the Sun is at 60^{o}, then find the height of the vertical tower that will cast a shadow of length 20 m.

OR

The ratio of the length of a rod and its shadow is 1:1. Find the angle of elevation of the Sun.