Roll No. | | | | | | | |

Candidates must write the Code on the title page of the answer book.

- **Please check that this question paper contains 12 printed pages.**
- **Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.**
- **Please check that this question paper contains 38 questions.**
- **Please write down the Serial Number of the question before attempting it.**
- **15 minute time has been allotted to read this question paper. The students will read the question paper only and will not write any answer on the answer-book during this period.**

I-PRE BOARD EXAMINATION

MATHEMATICS

Time Allowed : 3 hours ***Maximum Marks : 80***

General Instructions :

Read the following instructions carefully and follow them.

i) This question paper contains 38 questions. All questions are compulsory.

ii) This question paper is divided into 5 Sections A, B, C, D and E.

iii) In Section – A, Questions no. 1 -18 are multiple choice questions (MCQ) and questions no. 19 and 20 are Assertion-Reason based questions of 1 mark each.

iv) In Section – B, Questions no. 21-25 are very short answer (VSA) type questions, carrying 02 marks each.

This paper consists of 12 printed pages.

v) *In **Section – C**, Questions no. 26-31 are short answer (SA) type questions, carrying 03 marks each.*

vi) *In **Section – D**, Questions no. 32-35 are long answer (LA) type questions, carrying 05 marks each.*

vii) *In **Section – E**, Questions no. 36-38 are case study based questions carrying 04 marks each with subparts of the values of 1, 1 and 2 marks each respectively.*

viii) *There is no overall choice. However, an internal choice in 2 Questions of Section B, 2 Questions of Section C and 2 Questions of Section D has been provided. An internal choice has been provided in all the 2 marks questions of Section E.*

ix) *Draw neat and clean figures wherever required.*

x) *Take π = 22/7, wherever required if not stated.*

xi) *Use of calculators is not allowed.*

SECTION – A

Section A consists of 20 questions of 1 mark each.

1. The ratio of HCF to LCM of the smallest composite number and the smallest prime number is : [1]

(a) 1 : 2 (b) 2 : 1

(c) 1 : 1 (d) 1 : 3

2. If α are β the zeroes of the polynomial $6x^2 - 5x - 4$ then $\frac{1}{\alpha}+\frac{1}{\beta}$ is equal to : [1]

(a) $\frac{5}{4}$ (b) $\frac{-5}{4}$

(c) $\frac{4}{5}$ (d) $\frac{5}{24}$

3. Value of k for which the system of equations kx-y=2 and 6x-2y=3 has a unique solution : [1]

(a) $k = 2$ (b) $k = 3$

(c) $k \neq 3$ (d) $k \neq 2$

4. The equation $x^2 - 8x + k = 0$ has real and equal roots if : [1]

(a) $k = 16$ (b) $k > 16$

(c) $k = 8$ (d) $k < 8$

5. Roots if quadratic equation $x^2 - 7x = 0$ are : [1]

(a) only 7 (b) only 0

(c) only - 7 (d) both 0 and 7

6. The common difference of the AP whose n^{th} term is given by $a_n = 3n + 7$ is : [1]

(a) 7 (b) 3

(c) 3n (d) 1

7. Mid point of the line segment joining points A(-1, 0) and B(5, 0) is : [1]

(a) (2, 0) (b) (0, 2)

(c) (3, 0) (d) (2, 2)

8. If $\sin A = \frac{3}{5}$, then the value of $\frac{4\sin A + 3\cos A}{4\sin A - 3\cos A}$ is : [1]

(a) $\frac{7}{\sqrt{3}}$ (b) $\frac{1}{\sqrt{13}}$

(c) 3 (d) does not exist

[1]

9. $\frac{3}{4}\tan^2 30° - \sec^2 45° + \sin^2 60°$ is equal to :

(a) -1 (b) $\frac{5}{6}$

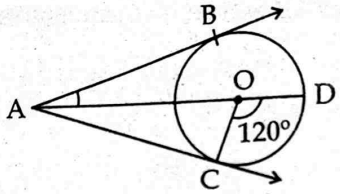
(c) $\frac{-3}{2}$ (d) $\frac{1}{6}$

10. A chord of a circle of radius 10 cm subtends 60° angle at its centre. The length of the chord (in cm) is : [1]

(a) $5\sqrt{2}$ (b) 10

(c) $\frac{5}{\sqrt{2}}$ (d) 5

11. AC and AB are tangents to a circle centered at 0. If $\angle COD = 120°$, then $\angle BAO$ is equal to : [1]



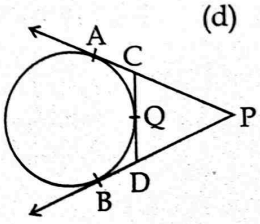
(a) 30° (b) 60°

(c) 45° (d) 90°

12. PA and PB are tangents to the circle from an external point P. CD is another tangent touching the circle at Q. If PA = 12 cm, QC = QD = 3 cm then PC + PD is : [1]

(a) 22 cm (b) 20 cm

(c) 19 cm (d) 18 cm



13. The length of arc of a circle whose central angle is 90° and radius 7 cm is : [1]

(a) 35 cm

(b) 11 cm

(c) 22 cm

(d) 25 cm

14. If the area of the base of a cone is 51 cm^2 and its volume is 85 cm^3, then the vertical height of the cone is : [1]

(a) $\frac{5}{6}$ cm

(b) $\frac{5}{4}$ cm

(c) $\frac{5}{2}$ cm

(d) 5 cm

15. A spherical metal ball of raius 8 cm is melted to make 8 smaller identical balls. The radius of each new ball is : [1]

(a) 2 cm

(b) 4 cm

(c) 8 cm

(d) 6 cm

16. If the mean and the mode of a data are 24 and 12 respectively, then its median is : [1]

(a) 25

(b) 18

(c) 20

(d) 22

17.

Marks	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
No. of students	3	9	15	30	25	5

: [1]

The modal class of above data is :

(a) 10–20

(b) 20–30

(c) 30–40

(d) 50–60

18. Two dice are thrown together. The probability of getting difference of numbers on their upper faces equal to 3 is : [1]

(a) $\frac{1}{9}$ (b) $\frac{2}{9}$

(c) $\frac{1}{6}$ (d) $\frac{1}{12}$

Direction:- In the question number 19 and 20, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option.

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.

19. **Assertion (A) :** Points (1, 7) and (4, 2) do not lie on y-axis. [1]

Reason (R) : x-coordinate of a point on y-axis is zero.

20. **Assertion (A) :** The probability that a leap year has 53 Sundays is $\frac{2}{7}$ [1]

Reason (R) : The probability that a non-leap year has 53 Sundays is $\frac{5}{7}$

SECTION - B

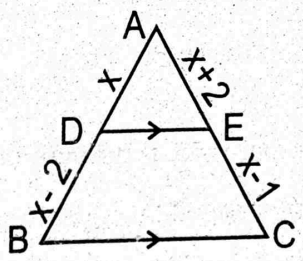
Section B consists of 5 questions of 2 marks each.

21. (A) Show that 4^n can never end with digit 0, where n is a natural number. [2]

OR

(B) Find the HCF opf 612 and 1314 using prime factorisation.

22. ABC is a triangle in which DE||BC. If AD = x, DB = x - 2, AE = x + 2 and EC = x - 1, then find the value of x. [2]



23. Find the point on x-axis which is equidistant from (2, –5) and (–2, 9). [2]

24. If $2\sin(A+B)=\sqrt{3}$ and cos (A–B) = 1, then find the measures of angles A and B, [2]

$0^\circ \le A, B, (A+B) \le 90^\circ$

25. (A) Two different dice are thrown together. Find the probability that the product of the number appeared is less than 18. [2]

OR

(B) A card is drawn at random from a well shuffled pack of 52 playing cards . Find the probability of getting neitehr a red card nor a queen.

P.T.O.

SECTION - C

Section C consists of 6 questions of 3 marks each.

26. Prove that $5+3\sqrt{2}$ is an irrational number, it being given that $\sqrt{2}$ is irrational. [3]

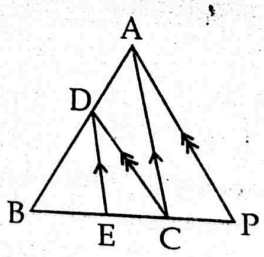
27. Find the zeros of the quadratic polynomial $21y^2-11y-2$ and verify the relationship between the zeros and the coefficients. [3]

28. The sum of two number is 15. If the sum of their reciprocals is $\frac{3}{10}$ find the two numbers. [3]

29. (A) ABCD is a trapezium in which AB || DC. Its diagonals intersect each other at he point O show that : $\frac{AO}{BO}=\frac{CO}{DO}$ [3]

OR

(B) In the given figure DE || AC and DC || AP, prove that $\frac{BE}{EC}=\frac{BC}{CP}$



30. Prove that : $\frac{\cot A+\operatorname{cosec}A-1}{\cot A-\operatorname{cosec}A+1}=\frac{1+\cos A}{\sin A}$ [3]

31. (A) Find area of segment of circle if angle of sector at the centre is 120° and radius of circle is 21 cm . [3]

OR

(B) In the given figure a square OPQR is insecribed in a quadrant OAQB of a circle. If the radius of circle is $6\sqrt{2}$ cm , find the area of the shaded region.

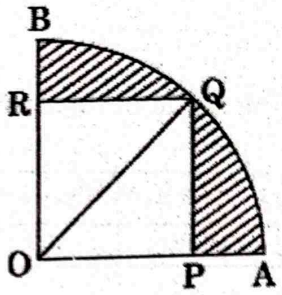


Figure-9

SECTION - D

Section D consists of 4 questions of 5 marks each.

32. Given a line segment AB joining the points A(–4, 6) and B(8, –3). Find : [5]

(i) the ratio in which AB is divided by the y-axis.

(ii) the coordinates of the point of intersection.

(iii) the length of AB.

33. Show that if a line is drawn parallel to one side of a triangle to intersect the other two sides at distinct points, the other two sides are divided in the same ratio. [5]

34. (A) Solve the system of equations $3x-2y-1 = 0$ and $2x-3y+6=0$. Shade the region bounded by the lines ant x-axis. [5]

OR

(B) The sum of digits of a two digit number is 14. The number obtained by interchanging the digits exceeds the given number by 18. Find the number.

P.T.O.

35. (A) For what value of x, the median of given frequency distribution is 34.5 : [5]

Class	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70
frequency	3	5	11	10	x	3	2

OR

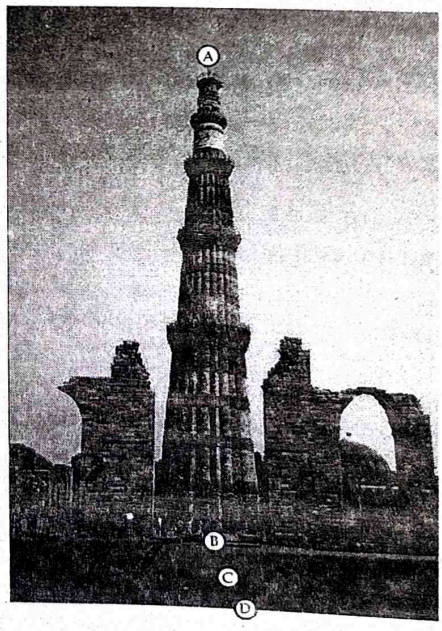
(B) Find the mode of the distribution.

Height (in cm)	Above 30	Above 40	Above 50	Above 60	Above 70	Above 80
No. of plants	34	30	27	19	8	2

SECTION – E

Section–E consists 3 case study based questins of 4 marks each.

36. Qutub Minar, located in South Delhi, India was built in the year 1193. It is 72 m high tower. Working on a school project, Charu and Daljeet visited the monument. They used trigonometry to find their distance from the tower. Observe the picture given below. Points C and D represent their positions on the ground in line with the base of tower, the angles of elevation of top of the tower (point A) are 60° and 45° from points C and D respectively.



(i) Based on information, draw a well-labelled diagram. [1]

(ii) Find the distance BD [1]

(iii) (A) Find CD. [2]

OR

(iii) (B) Find AC.

Question 37

India is a competitive manufacturing location due to the low cost of man power and strong technical capabilities. A washing machine factory was set up. The production of washing machine in factory increases uniformly by a fixed number every year. It produced 16000 sets in 6^{th} year and 22600 in 9^{th} year.

Based on the above informations, answer the following questions:

(i) Find the production during 8^{th} year. [1]

(ii) Find the difference of the production during 7^{th} year and 4^{th} year. [1]

(iii) (A) Find the production during first 3 year. [2]

OR

(B) In which year, the prodution was 29200 ?

P.T.O.

38. A circus is a company of performers who put on shows of acrobats, clowns etc to entertain people. Started around 250 years back in open fields, now generally performed in tents. One such circus tent is shown in figure. The tent is in the shape of a cylinder surmounted by a conical top. The height and diameter of cylindrical part are 9m and 30 m respectively and height of conical part is 8m with same diameter as that of the cylindricaL part.

Based on the above information, answer the following questions :

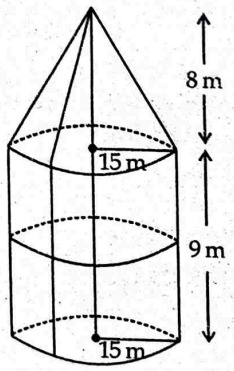
(i) Find the slant height of cone. [1]

(ii) Find the cost of the canvas bought for the tent at the rate of ₹ 200 per square metre. If 30 sq m. canvas was required extra for stitching margin. [1]

(iii) (A) Find the area of canvas used in making the tent. [2]

OR

(B) Find the volume of air inside the tent.



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