

Total No. of Printed Pages—16

**X/25/M (NC)**

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**MATHEMATICS**

**( New Course )**

**( FOR REGULAR CANDIDATES )**

*Full Marks : 80*

*Pass Marks : 24*

*Time : 3 hours*

*The figures in the margin indicate full marks for the questions*

*General Instructions :*

- (i) Please check that this Question Paper contains **55** questions.
- (ii) 15 minutes time is given for the candidates to read the Question Paper. The Question Paper will be distributed 15 minutes before the scheduled time of the examination. In these 15 minutes, the candidates should only read the instructions and questions carefully and should not write answers on the Answer Sheet.
- (iii) The Question Paper contains 4 Sections, **Sections A, B, C and D**.
- (iv) **Section—A** contains Multiple Choice Questions (MCQ). Choose the most appropriate answer from the given options. The answers to this Section must be provided in the boxes provided in the Answer Sheet. Answers given anywhere else will not be counted for marking.

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- (v) **Section—B** contains Very Short Answer-type Questions. Answer the questions briefly, in minimum 3 steps.
- (vi) **Section—C** contains Short Answer-type Questions. Answer the questions in minimum 5 steps.
- (vii) **Section—D** contains Long Answer-type Questions. Answer the questions in minimum 8 steps.
- (viii) Use of calculators/mobile phone/any electronic device is NOT ALLOWED.

**SECTION—A**

Multiple Choice Questions (Attempt **all** questions) : 1×30=30

1. For any two positive integers  $p$  and  $q$ ,  
HCF( $p, q$ ) × LCM( $p, q$ ) is equal to  
(A)  $p + q$  (B)  $p - q$   
(C)  $p \times q$  (D)  $\frac{p}{q}$  1
2. If a pair of linear equations has infinitely many solutions, then the lines representing them will be  
(A) parallel  
(B) intersecting or coincident  
(C) always intersecting  
(D) always coincident 1

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3. The product of prime factors of 156 is

(A)  $2 \times 3 \times 13$

(B)  $2^2 \times 3 \times 13$

(C)  $2 \times 3^2 \times 13$

(D)  $2^2 \times 3^2 \times 13$

1

4. A quadratic polynomial can have at most

(A) 1 zero

(B) 2 zeroes

(C) 3 zeroes

(D) 4 zeroes

1

5. A square and a rhombus are always

(A) similar

(B) congruent

(C) similar but not congruent

(D) neither similar nor congruent

1

6. For any polynomial  $p(x)$ , if  $p(a) = 0$ , then  $a$  is called

(A) constant of the polynomial

(B) zero of the polynomial

(C) degree of the polynomial

(D) coefficient of the polynomial

1

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7. The pair of equations  $x = 0$  and  $y = 0$  has

(A) no solution

(B) one solution

(C) two solutions

(D) infinitely many solutions

1

8. If the roots of the equation  $ax^2 + bx + c = 0$  are equal, then  $c$  equals to

(A)  $\frac{b}{2a}$

(B)  $-\frac{b}{2a}$

(C)  $\frac{b^2}{4a}$

(D)  $-\frac{b^2}{4a}$

1

9. The solution of  $(x - 4)(x + 2) = 0$  is

(A) 4, -2

(B) -4, 2

(C) 2, -2

(D) 4, 2

1

10. Which of the following is an AP? 1

(A) 2, 4, 8, 16, ...

(B) 0, -4, -8, -12, ...

(C) 1, 3, 9, 27, ...

(D) 0.2, 0.22, 0.222, 0.2222, ...

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11. If  $5n + 3$  is the  $n$ th term of an AP, then the common difference is

(A) 15

(B) 12

(C) 5

(D) 1

1

12. If the bisector of an angle of a triangle bisects the opposite side, then the triangle is

(A) scalene

(B) isosceles

(C) equilateral

(D) right angled

1

13. The distance of any point  $P(x, y)$  from the origin is

(A)  $\sqrt{x^3 + y^3}$

(B)  $\sqrt{y^2 - x^2}$

(C)  $\sqrt{x^2 - y^2}$

(D)  $\sqrt{x^2 + y^2}$

1

14. The area of an equilateral triangle of side  $a$  is

(A)  $3a^2$

(B)  $\frac{2\sqrt{3}}{a}$

(C)  $\frac{\sqrt{3}a}{4}$

(D)  $\frac{\sqrt{3}a^2}{4}$

1

15. If  $\cos(\alpha + \beta) = 0$ , then the value of  $\cos\left\{\frac{(\alpha + \beta)}{2}\right\}$  is equal to
- (A)  $\frac{1}{\sqrt{2}}$  (B)  $\frac{1}{2}$   
(C) 0 (D)  $\sqrt{2}$  1
16. If  $\theta = 30^\circ$ , then the value of  $\cos^2 \theta - \sin^2 \theta$  is
- (A) 1 (B)  $-\frac{1}{2}$   
(C)  $\frac{1}{2}$  (D) -1 1
17. If the point  $P\left(\frac{a}{3}, 4\right)$  is the midpoint of the line segment joining the points  $A(-6, 5)$  and  $B(-2, 3)$ , then  $a$  equals to
- (A) -6 (B) -4  
(C) -12 (D) 12 1
18. The distance between two parallel tangents of a circle of radius 8 cm is
- (A) 8 cm (B) 12 cm  
(C) 14 cm (D) 16 cm 1
19. A part of the circle whose end points are the end points of a diameter is called
- (A) circumference (B) segment  
(C) semicircle (D) perimeter 1

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**20.** The number of tangents that can be drawn to a circle from a point inside it is

- (A) one (B) two  
(C) infinite (D) none 1

**21.** If the area and circumference of a circle are numerically equal, then its diameter is

- (A) 6 units (B) 4 units  
(C) 3 units (D) 2 units 1

**22.** The total surface area of a hemispherical object of radius  $r$  units is

- (A)  $\pi r^2$  sq. units (B)  $2\pi r^2$  sq. units  
(C)  $3\pi r^2$  sq. units (D)  $4\pi r^2$  sq. units 1

**23.** When the degree measure of the angle at the centre is  $360^\circ$ , then the area of the sector is

- (A)  $\frac{\theta}{360^\circ} \times \pi r^2$  (B)  $\frac{\pi r^2}{360^\circ}$   
(C)  $\pi r^2$  (D)  $\frac{\pi r \theta}{180^\circ}$  1



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28. If an event cannot occur, then its probability is

- (A) 1 (B)  $\frac{3}{4}$   
(C)  $\frac{1}{2}$  (D) 0 1

29. A die is thrown once, then the probability of getting a number less than 3 is

- (A)  $\frac{1}{2}$  (B)  $\frac{1}{3}$   
(C)  $\frac{1}{4}$  (D)  $\frac{1}{6}$  1

30. A jar contains 25 marbles with 10 green marbles and the rest are blue marbles. If a marble is drawn at random from the jar, then the probability that the drawn marble is blue is

- (A)  $\frac{1}{5}$  (B)  $\frac{2}{5}$   
(C)  $\frac{3}{5}$  (D)  $\frac{4}{5}$  1

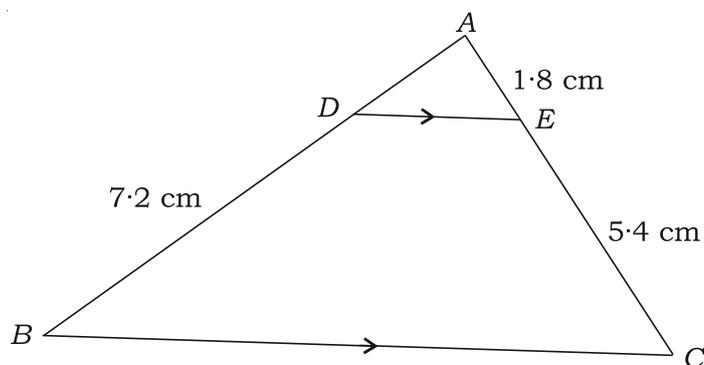
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**SECTION—B**

Very Short Answer-type Questions (Answer **any six**) :  $2 \times 6 = 12$

- 31.** Find the least number which is exactly divisible by 15, 24 and 30. 2
- 32.** Given that  $\text{HCF}(306, 657) = 9$ , find the  $\text{LCM}(306, 657)$ . 2
- 33.** Form a pair of linear equations for the problem given below : 2
- The coach of a cricket team buys 7 bats and 6 balls for ₹ 3,800. Later, she buys 3 bats and 5 balls for ₹ 1,750.
- 34.** Find the value of  $k$  for which the quadratic equation  $kx(x - 2) + 6 = 0$  has two equal real roots. 2

**35.**



In the figure given above, in  $\triangle ABC$ ,  $DE \parallel BC$ . Find  $AD$  where  $BD = 7.2$  cm,  $AE = 1.8$  cm and  $EC = 5.4$  cm. 2

**[ For Visually Handicapped (Blind) Students only, instead of Question No. 35 given above ]**

- 35.** When are two triangles said to be similar? 2

36. Find the value of

$$\frac{5 \cos^2 60^\circ + 4 \sec^2 30^\circ - \tan^2 45^\circ}{\sin^2 30^\circ + \cos^2 30^\circ} \quad 2$$

37. Express  $\frac{1 + \tan^2 A}{1 + \cot^2 A}$  in terms of  $\tan A$ . 2

38. A box contains balls numbered 3 to 50. A ball is drawn at random from the box. Find the probability that the drawn ball has a number which is a perfect square. 2

39. Prove that  $7\sqrt{5}$  is irrational. 2

**SECTION—C**

Short Answer-type Questions (Answer **any six**) : 3×6=18

40. Find the zeroes of the quadratic polynomial  $x^2 - 2x - 8$  and verify the relationship between the zeroes and the coefficients. 3

41. Find a relation between  $x$  and  $y$  such that the point  $(x, y)$  is equidistant from the points  $(7, 1)$  and  $(3, 5)$ . 3

42. The age of a man is twice the square of the age of his son. Eight years hence, the age of the man will be 4 years more than three times the age of his son. Find their present ages. 3

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43. Find the coordinates of a point  $A$ , where  $AB$  is the diameter of a circle whose centre is  $(2, -3)$  and  $B$  is  $(1, 4)$ . 3

44. From a point  $Q$ , the length of a tangent to a circle is 24 cm and the distance of  $Q$  from the centre is 25 cm. Find the diameter of the circle. 3

[ For Visually Handicapped (Blind) Students only,  
instead of Question No. 44 given above ]

44. (a) Define tangent to a circle. 1

(b) How many tangents can be drawn from an external point to a circle? 1

(c) How many tangents are there at a point of the circle? 1

45. Prove that a parallelogram circumscribing a circle is a rhombus. 3

[ For Visually Handicapped (Blind) Students only,  
instead of Question No. 45 given above ]

45. (a) The tangent at any point of a circle is \_\_\_\_\_ to the radius through the point of contact. (Fill in the blank) 1

(b) Define a secant of a circle. 1

(c) The common point of a tangent to a circle and the circle is called the point of contact. (State whether True or False) 1

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46. The length of the minute hand of a clock is 14 cm. Find the area swept by the minute hand between 9 a.m. to 9:05 a.m. (take  $\pi = \frac{22}{7}$ ).

3

47. The following frequency distribution gives the monthly consumption of electricity of 68 consumers of a locality :

Monthly consumption (in units)	Number of consumers
65–85	4
85–105	5
105–125	13
125–145	20
145–165	14
165–185	8
185–205	4

Based on the above information, answer the following questions :

- (a) Find the median class of the data.  
(b) Find the class mark of the median class.

3

48. A student noted the number of cars passing through a spot on a road for 100 periods each of 3 minutes and summarized it in the table below :

Number of cars	0–10	10–20	20–30	30–40	40–50	50–60	60–70	70–80
Frequency	7	14	13	12	20	11	15	8

Find the mode of the data.

3

**SECTION—D**

Long Answer-type Questions (Answer **any four**) : 5×4=20

- 49.** The first term of an AP is 5, the last term is 45 and the sum is 400. Find the number of terms and the common difference. Write the first three terms of the AP. 5
- 50.** Prove that if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio. 5

**[ For Visually Handicapped (Blind) Students only,  
instead of Question No. 50 given above ]**

- 50.** (a) Define similar figures. 2
- (b) Two polygons of same number of sides are similar, if (i) their corresponding angles are \_\_\_\_\_ and (ii) their corresponding sides are \_\_\_\_\_. (Fill in the blanks) 2
- (c) If a line divides any two sides of a triangle in the same ratio, then the line is parallel to the third side. (State whether True or False) 1
- 51.** The diagonals of a quadrilateral  $ABCD$  intersect each other at point  $O$  such that  $\frac{AO}{BO} = \frac{CO}{DO}$ . Show that  $ABCD$  is a trapezium. 5

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**[ For Visually Handicapped (Blind) Students only,  
instead of Question No. 51 given on Page No. 14 ]**

51. (a) Define scalene triangle. 2
- (b) Define trapezium. 2
- (c) The distance between two parallel lines is same everywhere. (State whether True or False) 1
52. From a point on the ground, the angles of elevation of the bottom and the top of a transmission tower fixed at the top of a 20 m high building are  $45^\circ$  and  $60^\circ$  respectively. Find the height of the tower (use  $\sqrt{3} = 1.732$ ). 5

**[ For Visually Handicapped (Blind) Students only,  
instead of Question No. 52 given above ]**

52. (a) If  $\sin \theta = \frac{1}{2}$ , then find the value of  $\theta$ . 2
- (b) Define angle of elevation. 2
- (c) The greatest side of a right-angled triangle is called \_\_\_\_\_. (Fill in the blank) 1
53. From a solid cylinder whose height is 2.4 cm and diameter 1.4 cm, a conical cavity of the same height and same diameter is hollowed out. Find the total surface area of the remaining solid to the nearest  $\text{cm}^2$  (use  $\pi = \frac{22}{7}$ ). 5

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54. Find the value of  $k$  such that the quadratic polynomial  $x^2 - (k + 6)x + 2(2k + 1)$  has sum of the zeroes as half of their product. 5

55. Consider the following distribution of daily wages of 50 workers of a factory :

Daily wages (in ₹)	500–520	520–540	540–560	560–580	580–600
Number of workers	12	14	8	6	10

- Find the mean daily wages of the workers of the factory by using an appropriate method. 5

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