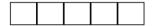
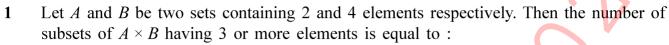


INSTRUCTIONS

- 1. IMMEDIATELY AFTER THE COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS TEST BOOKLET DOES **NOT** HAVE ANY UNPRINTED OR TORN OR MISSING PAGES OR ITEMS, ETC. IF SO, GET IT REPLACED BY A COMPLETE TEST BOOKLET.
- 2. Please note that it is the candidate's responsibility to encode and darken the ROLL NUMBER, TEST BOOKLET SERIES Code A, B, C or D and Question Booklet Number carefully and without any omission or discrepancy at the appropriate places in the OMR Answer Sheet. Any omission/discrepancy will render the OMR Answer Sheet liable for rejection.
- 3. You have to enter your Roll Number on the Test Booklet in the Box provided below. **DO NOT** write **anything else** on the Test Booklet.



- **4.** This Test Booklet contains 100 items (questions). Each item shall have five options (A, B, C, D, and E). If a candidate is attempting a question, he has to darken most appropriate circle from A, B, C or D. However if you are not attempting a question then you have to darken the circle 'E'. If none of the five circle is darkened, one-fourth (0.25) marks shall be deducted.
- 5. Any candidate not darkening any of the five circles in more than 10% question shall be disqualified.
- 6. All questions are compulsory. Each question carry one mark. For each wrong Answer, one fourth (0.25) mark shall be deducted.
- 7. You have to mark all your responses *ONLY* on the separate OMR Answer Sheet provided. See directions in the OMR Answer Sheet. Use only **BLUE/BLACK Ball Point Pen** to answer in OMR Answer Sheet.
- 8. Before you proceed to mark in the OMR Answer Sheet the response to various items in the Test Booklet, you have to fill in some particulars in the OMR Answer Sheet as per instructions mentioned on the OMR Answer Sheet.
- **9.** At the end of the examination you should handover to the invigilator the original copy and office copy of the OMR Sheet. You are permitted to take away with you the Question Booklet along with candidate's copy of the OMR Sheet.
- 10. Sheets for rough work are appended in the Test Booklet at the end.



(A) 219

(B) 210

(C) 200

- (D) 248
- (E) Question not attempted

2 If
$$f(x+2y, x-2y) = xy$$
, then $f(x,y)$ is equal to:

 $(A) \quad \frac{x^2 + y^2}{4}$

(B) $\frac{x^2 - y^2}{4}$

(C) $\frac{x^2 - y^2}{8}$

- (D) $\frac{x^2 + y^2}{8}$
- (E) Question not attempted

3 If
$$g(x) = x^2 - 6x + 38$$
, and $(gof)(x) = 4x^2 - 10x + 5$, then $f(4)$ is equal to :

(A) 2

(B) 3

(C) 4

- (D) 5
- (E) Question not attempted

4 Consider the statement:
$$P(n) = n^2 - n + 41$$
 is prime. Then which one of the following is TRUE?

- (A) (5) is false but P(3) is true
- (B) (3) is false but P(5) is true
- (C) Both P(5) and P(3) are true
- (D) Both P(5) and P(3) are false
- (E) Question not attempted

5 The coefficient of
$$x^7$$
 in $(1+x)^{10} + x(1+x)^9 + x^2(1+x)^8 + ... + x^{10}$ is:

(A) 110

(B) 220

(C) 330

- (D) 440
- (E) Question not attempted

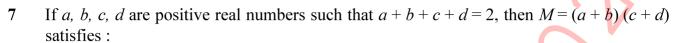
6 If
$$\frac{Z-\alpha}{Z+\alpha}$$
 is a purely imaginary number with $\alpha \in \mathbb{R}$ and $|z|=4$, then the value of α is:

(A) 1

(B) 2

(C) 3

- (D) 4
- (E) Question not attempted



(A) $0 \le M \le 1$

(B) $1 \le M \le 2$

(C) $2 \le M \le 3$

- (D) $-1 \le M \le 0$
- (E) Question not attempted

8 If binomial coefficient of three consecutive terms of $(1+x)^n$ are in H.P., then the maximum possible value of n is:

(A) 10

(B) 20

(C) 30

- (D) None of these
- (E) Question not attempted

The harmonic mean of two numbers is 4, their arithmetic mean A and geometric mean G satisfy the relation $2A + G^2 = 27$, then the numbers are :

(A) 4 and 4

(B) 8 and 8/3

(C) 3 and 6

- (D) 5 and 10/3
- (E) Question not attempted

10 Let $\cos \theta = x + \frac{p}{x'}$ where x is a real number for all real values of θ , then:

(A) $p \ge \frac{1}{4}$

(B) $\frac{1}{2} \ge p \ge \frac{1}{4}$

(C) $p \le \frac{1}{4}$

- (D) $p \ge \frac{1}{2}$
- (E) Question not attempted

If the straight line, 2x - 3y + 17 = 0 is perpendicular to the line passing through the point (7, 17) and (15, a), then a is equal to :

(A) -5

(B) $\frac{35}{3}$

(C) $-\frac{35}{3}$

- (D) 5
- (E) Question not attempted

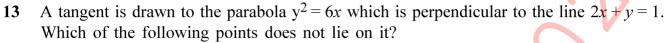
12 The two circles $x^2 + y^2 = ax$ and $x^2 + y^2 = c^2$, (c > 0) touch each other if:

(A) |a| = c

(B) |a| = 2c

(C) 2|a| = c

- (D) |a| = 3c
- (E) Question not attempted



(A) (3, 1)

(C) (0, 3)

- (D) (2, 4)
- (E) Question not attempted
- The equation of a common tangent to the parabolas $y = x^2$ and $y = -(x-2)^2$ is : 14
 - (A) v = 4(x-2)

(C) y = 4(x + 2)

- (B) y = 4(x-1)(D) y = 4(x+1)
- (E) Question not attempted
- The general solution of $\sin^2\theta \sec\theta + \sqrt{3}\tan\theta = 0$ is: 15
 - (A) $\theta = \frac{n\pi}{2}, n \in I$

- (B) $\theta = n\pi, n \in I$
- (C) $\theta = n\pi + \frac{\left(-1\right)^{n+1}\pi}{3}, \theta = n\pi, n \in I$
- (D) $\theta = n\pi + \frac{(-1)^{n+1}\pi}{2}, n \in I$
- (E) Question not attempted
- The value of 16

$$\sum_{n=1}^{3} \tan^{-1} \frac{1}{n}$$

is equal to:

(A) 0

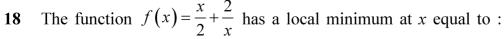
(B)

(C)

- (D) 2π
- Question not attempted
- is equal to: **17**

(B) e^2

- (D) $\frac{1}{\rho^2}$
- Question not attempted



(A) -1

(B) 1

(C) 2

- (D) -2
- (E) Question not attempted

19 If
$$\int_{1}^{2} \frac{dx}{\left(x^2 - 2x + 4\right)^{\frac{3}{2}}} = \frac{k}{x + 5}$$
, then k is equal to:

(A) 1

(B) 2

(C) 3

- (D) 4
- (E) Question not attempted
- 20 The solution of the equation

$$x \frac{dy}{dx} = y(\log_e y - \log_e x + 1)$$
 is:

(A)
$$\log_e \frac{x}{v} = cy$$

(B)
$$\log_e \frac{y}{x} = cy$$

(C)
$$\log_e \frac{y}{x} = cx$$

(D)
$$\log_e \frac{x}{y} = cx$$

- (E) Question not attempted
- 21 The differential equation of all parabolas, whose axes are parallel to the y-axis, is:

$$(A) \quad \frac{d^3y}{dx^3} = 1$$

(B)
$$\frac{d^3y}{dx^3} = -1$$

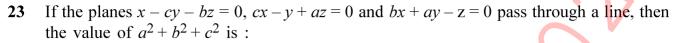
(C)
$$\frac{d^3y}{dx^3} = 0$$

- (D) None of these
- (E) Question not attempted
- If a, b, c are unit vectors such that a.b = a.c = 0 and the angle between b and c is $\frac{\pi}{6}$, then the value of $|a \times b a \times c|$ is :
 - $(A) \quad 0$

(B) 1

(C) $\sqrt{2}$

- (D) $\sqrt{2-\sqrt{3}}$
- (E) Question not attempted



(A) 1-2abc

(B) 1

(C) 2 abc

- (D) abc
- (E) Question not attempted
- 24 If the mean of square of first *n* natural numbers is 105, then the median of first *n* natural numbers is :
 - (A) 7

(B) 8

(C) 9

- (D) 10
- (E) Question not attempted
- 25 If $\frac{1-3p}{2}$, $\frac{1+4p}{3}$, $\frac{1+p}{6}$ are the probabilities of three mutually exclusive and exhaustive events then the set of all possible values p is:
 - (A) [0, 1]

(B) $\begin{bmatrix} \frac{1}{4}, \frac{1}{3} \end{bmatrix}$

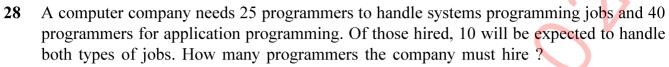
(C) $\left[0, \frac{1}{3}\right]$

- (D) (0, 1)
- (E) Question not attempted
- 26 The minimal polynomial associated with the matrix $\begin{bmatrix} 0 & 0 & 3 \\ 1 & 0 & 2 \\ 0 & 1 & 1 \end{bmatrix}$ is :
 - (A) $x^3 x^2 2x 3$

(B) $x^3 - x^2 + 2x - 3$

(C) $x^3 - x^2 - 3x - 3$

- (D) $x^3 x^2 + 3x 3$
- (E) Question not attempted
- 27 For the function $f(z) = \sin\left(\frac{1}{\cos(1/z)}\right)$, the point z = 0 is :
 - (A) a removable singularity
- (B) a pole
- (C) an essential singularity
- (D) a non-isolated singularity
- (E) Question not attempted



(A) 45

(B) 55

(C) 65

- (D) 75
- (E) Question not attempted

29 Let
$$A = \{ a_1, a_2, a_3 \}$$
 and $B = \{ b_1, b_2, b_3 \}$. Consider the function $f = \{ (a_1, b_2), (a_2, b_3), (a_3, b_1) \}$. Then:

- (A) f is both one to one and onto
- (B) f is not one to one but onto
- (C) f is one to one but not onto
- (D) f is neither one to one nor onto
- (E) Question not attempted

30 Let
$$P(n)$$
 be the statement $2 \mid (2n+1)$. Then:

- (A) P(n) is true for every integer n.
- (B) P(n) is true for n = 10.
- (C) P(n) is true for every integer n except 10.
- (D) P(n) is true implies that P(n+1) is true for every integer n.
- (E) Question not attempted
- 31 The number of seven person committees consisting of 3 women and 4 men that can be formed from a group of 20 women and 30 men, is:
 - (A) 312417

(B) 3124170

(C) 31241700

- (D) 312417000
- (E) Question not attempted
- 32 The complex number $\frac{2-7i}{8+3i}$ is equal to :

(A)
$$-\frac{5}{73} - \frac{62}{73}i$$

(B)
$$-\frac{5}{73} + \frac{62}{73}i$$

(C)
$$+\frac{5}{73} + \frac{62}{73}i$$

(D)
$$\frac{5}{73} - \frac{62}{73}i$$

(E) Question not attempted

- 33 If $-5x + 19 \le -11$, then:
 - (A) $x \in (-\infty, -6)$

(B) $x \in (-\infty, 6)$

(C) $x \in (6, \infty)$

- (D) $x \in [6, \infty)$
- (E) Question not attempted
- 34 The coefficient of the middle term in the expansion of $(2x-7)^4$ is:
 - (A) 168

(B) 216

(C) 432

- (D) 1176
- (E) Question not attempted
- 35 The geometric series $1 + x + x^2 + x^3 + \dots$ is convergent to 1/(1 x) in the interval :
 - (A) x > 1

(B) x < 1

(C) |x| > 1

- (D) |x| < 1
- (E) Question not attempted
- 36 For a natural number, let $\varphi(n)$ denote the number of positive integers $\leq n$ which are coprime to n. The value of $\varphi(60)$ is
 - (A) 7

(B) 10

(C) 13

- (D) 16
- (E) Question not attempted
- 37 One root of the quadratic equation $4x^2 kx 5 = 0$ is known to be $\frac{1}{2}$. The value of k is:
 - (A) -2

(B) -5

(C) -7

- (D) -8
- (E) Question not attempted
- 38 Let A be the matrix $\begin{bmatrix} 1 & 1 & 3 \\ 1 & 3 & -3 \\ -2 & -4 & -4 \end{bmatrix}$. Then A^3 is equal to:
 - (A) 20A 8I

(B) 20A + 8I

(C) 8A - 20I

- (D) 8A + 20I
- (E) Question not attempted

- 39 If a vertex of a triangle is at (1, 1) and the mid points of two sides through this vertex are (-1,2) and (3, -2), the centroid of the triangle is:
 - (A) (-1, 7)

(B) (-1/3, 7/3)

(C) (1, 7/3)

- (D) (1, -3/7)
- (E) Question not attempted
- 40 The value of tan 1° tan 3° tan 5°....tan 89° is:
 - (A) 0

(B) 1

(C) 2

- (D) 3
- (E) Question not attempted
- 41 The domain of $\sin^{-1}\frac{2x}{3}$ is:

(A)
$$\left[-\frac{2}{3}, \frac{2}{3}\right]$$

(B) $\left[-\frac{2}{3}, \frac{3}{2}\right]$

(C)
$$\left[-\frac{3}{2}, \frac{3}{2}\right]$$

- (D) [-1,1]
- (E) Question not attempted
- 42 The value of $\frac{dy}{dx}$ if $y = \tan(5 \sin 2x)$ is equal to:
 - (A) $-2(\cos 2x)\sec^2(5-\sin 2x)$
 - (B) $-2\sec^2(5-\sin 2x)$
 - (C) $(\cos 2x)\sec^2(5-\sin 2x)$
 - (D) $-2(\cos 2x)\tan(5-\sin 2x)$
 - (E) Question not attempted
- 43 Let $f(x) = x^2$. Then by mean value theorem, there exists a point c in the interval [0,2]

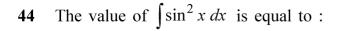
where $\frac{df}{dx}$ is equal to :

 $(\mathbf{A}) \quad 0$

(B) 1

(C) 2

- (D) 3
- (E) Question not attempted



$$(A) \quad \frac{x}{2} + \frac{\sin 2x}{4} + C$$

(B)
$$\frac{x}{2} - \frac{\sin 2x}{4} + C$$

(C)
$$\frac{x}{4} + \frac{\sin 2x}{2} + C$$

(D)
$$\frac{x}{4} - \frac{\sin 2x}{2} + C$$

- (E) Question not attempted
- 45 The area of the region between the curve $y = 4 x^2$, $0 \le x \le 3$ and the x-axis is equal to :

(A)
$$\frac{4}{3}$$

(B)
$$\frac{8}{3}$$

(C)
$$\frac{16}{3}$$

(D)
$$\frac{32}{3}$$

- (E) Question not attempted
- 46 If θ is the angle between the vectors \overrightarrow{a} and \overrightarrow{b} , such that $|\overrightarrow{a} \times \overrightarrow{b}| = |\overrightarrow{a} \cdot \overrightarrow{b}|$, then θ is equal to:

(B)
$$45^{\circ}$$

- (E) Question not attempted
- 47 The coordinates of the point of intersection of the line $\frac{x+1}{1} = \frac{y+3}{3} = \frac{z+2}{-2}$ with the plane 3x + 4y + 5z = 5 is :

(A)
$$(5, 15, -14)$$

(B)
$$(1, 3, -2)$$

$$(C)$$
 $(3, 4, 5)$

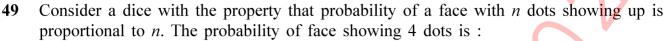
(D)
$$(3, 12, -10)$$

- (E) Question not attempted
- 48 Section of a sphere by a plane is a:
 - (A) parabola

(B) circle

(C) cone

- (D) ellipse
- (E) Question not attempted



(A) 1/7

(B) 5/42

(C) 1/21

- (D) 4/21
- (E) Question not attempted
- Four coins are tossed. Two of them fall within the view of an observer who sees that both are heads. What is the probability to this observer that exactly three of the four coins come up heads?
 - (A) 4/11

(B) 1/4

(C) 2/11

- (D) 4/21
- (E) Question not attempted
- 51 The probability of guessing the correct answer to a certain test question is $\frac{x}{12}$. If the

probability of not guessing the correct answer to this question is $\frac{2}{3}$, then x is equal to:

(A) 2

(B) 3

(C) 4

- (D) 6
- (E) Question not attempted
- 52 Let $L: \mathbb{R}^2 \to \mathbb{R}^2$ be the linear transformation such that L(1, 1) = (1, -2), L(-1, 1) = (2, 3). Then L(-1, 5) is equal to:
 - (A) (2,3)

(B) (2, -4)

(C) (6,9)

- (D) (8,5)
- (E) Question not attempted
- 53 An eigen value and corresponding eigen vector of the matrix $\begin{bmatrix} 5 & 4 \\ 1 & 2 \end{bmatrix}$, respectively are :
 - (A) 6, (1, 4)

(B) 1, (4, 4)

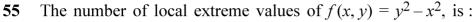
(C) 6, (-1, 1)

- (D) 1, (1, -1)
- (E) Question not attempted
- **54** Laplace Transform of e^{2t} sin t is equal to :
 - $(A) \quad \frac{1}{s^2 4s + 5}$

(B) $\frac{1}{s^2 - s + 5}$

(C) $\frac{1}{s^2 - 5s + 1}$

- (D) $\frac{1}{s^2 + 5s + 4}$
- (E) Question not attempted



(A) 0

(B) 1

(C) 3

(D) 5

56
$$\int_0^2 \int_0^x (x+y) dy dx$$
 is equal to :

(A) 1

(B) 2

(C) 3

- (D) 4
- (E) Question not attempted

(A) 1

(B) 2

(C) 3

- (D) empty set
- (E) Question not attempted

58 Suppose
$$X = \{a, b, c, d\}$$
 and \Re is a relation on X .

If
$$\Re = \{ (a,a), (b,b), (d,d), (a,b), (b,a), (b,d), (d,b) \}$$
 then:

- (A) \Re is an equivalence relation.
- (B) R is symmetric, but not reflexive.
- (C) \Re is transitive, but not symmetric and reflexive.
- (D) \Re is reflexive, but not transitive and symmetric.
- (E) Question not attempted

(A) $\frac{12!}{2!3!}$

(B) $\frac{12!}{2!2!3!}$

(C) $\frac{12!}{2!2!2!}$

- (D) $\frac{12!}{2!2!2!3!}$
- (E) Question not attempted

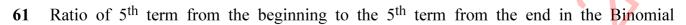
60 The correct polar form of the complex number 1 - i is :

(A) $\sqrt{2} e^{\frac{\pi}{4}i}$

(B) $e^{\frac{-\pi}{4}i}$

(C) $\sqrt{2} e^{\frac{-\pi}{4}i}$

- (D) $e^{\frac{\pi}{4}}$
- (E) Question not attempted



expansion of
$$\left(2^{1/3} + \frac{1}{2(3)^{1/3}}\right)^{10}$$
 is:

(A) $1:2(6)^{1/3}$

(B) $1:4(36)^{1/3}$

(C) $4(36)^{1/3}:1$

- (D) $2(36)^{1/3}$: 1
- (E) Question not attempted
- The remainder when 2^{50} is divided by 7 is: **62**
 - (A) 1

(B) 4

(C) 7

- (D) 9
- (E) Question not attempted
- The number of solutions of $3x \equiv 5 \pmod{7}$ is/are: 63
 - (A) 3

(B) 2

(C) 1

- (D) 4
- (E) Question not attempted
- What is the smallest positive integer in the set $\{12x + 30y + 3000z \mid x, y, z \in \mathbb{Z}\}$? 64
 - (A) 2

(C)

- (E) Question not attempted
- The product of the roots of the equation $6x^2 5|x| + 1 = 0$ is : 65

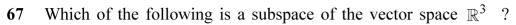
(B) $\frac{1}{36}$

(C)

- (D) $\frac{1}{24}$
- Question not attempted
- If a+b+c+x=0, then the determinant of the matrix
 - 0 (A)

(B) 1

- (D) 10
- Question not attempted



(A) $\{(x, y.z) \mid x + y = 0\}$

(B) $\{(x, y.z) \mid x + y = 1\}$

(C) $\{(x, y.z) | x-y=1\}$

- (D) $\{(x, y.z) \mid x y = 2\}$
- (E) Question not attempted
- **68** Which of the following is NOT diagonalisable over \mathbb{R} ?
 - $\begin{array}{cccc}
 (A) & \begin{pmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{pmatrix}
 \end{array}$

 $\begin{array}{cccc}
(B) & \begin{pmatrix} 0 & 1 & 0 \\ -1 & 0 & 0 \\ 0 & 0 & 2 \end{pmatrix}
\end{array}$

(C) $\begin{pmatrix} 2 & -3 & 0 \\ -5 & 4 & 0 \\ 0 & 0 & 1 \end{pmatrix}$

- $\begin{array}{cccc}
 (D) & \begin{pmatrix} 0 & 1 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & 1 \end{pmatrix}$
- (E) Question not attempted
- 69 The value of $\sin^{-1}\left(\frac{3}{5}\right) + \tan^{-1}\left(\frac{1}{7}\right)$:
 - (A) 0

(B) $\frac{\pi}{4}$

(C) $\frac{\pi}{3}$

- (D) $\frac{\pi}{2}$
- (E) Question not attempted
- 70 The angle between the lines $y \sqrt{3}x 5 = 0$ and $\sqrt{3}y x + 6 = 0$ is :
 - (A) 120°

(B) 30°

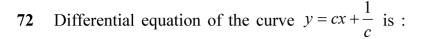
(C) 60°

- (D) 90°
- (E) Question not attempted
- 71 The equation of tangent at the point (0, 2) to the circle $x^2 + y^2 4x + 2y 8 = 0$ is :
 - (A) 3y 2x = 2

(B) 3y + 2x = 2

(C) 3y + 2x = 6

- (D) 3y 2x = 6
- (E) Question not attempted



(A)
$$xy'^2 - yy' + 1 = 0$$

(B)
$$xy'^2 - yy' + 2 = 0$$

(C)
$$xy^{2} + 4 = 0$$

(D)
$$xy'^2 - 4 = 0$$

73 If the integrating factor of $(x^7y^2 + 3y) dx + (3x^8y - x) dy = 0$ is $x^m y^n$, then:

(A)
$$m = -7, n = 1$$

(B)
$$m = 1, n = -7$$

(C)
$$m = n = 0$$

(D)
$$m = n = 1$$

74 The maximum number of linearly independent solutions of $\frac{d^4y}{dx^4} = 0$, y(0) = 1, is:

(A) 1

(B) 2

(C) 3

(D) 4

75 Which of the following is NOT an indeterminate form?

(A) ₁∞

(B) 0°

(C) ∞°

- (D) 0^{∞}
- (E) Question not attempted

76 The set of points where $f(x) = |2 \sin x \cos x|$ is not differentiable is :

(A) Empty set

(B) {0}

(C) $\{k\pi | k \in \mathbb{Z}\}$

- (D) $\left\{ \frac{k\pi}{z} | k \in \mathbb{Z} \right\}$
- (E) Question not attempted

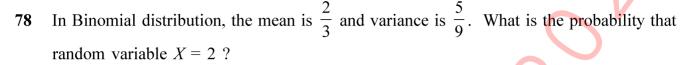
77 If all the natural number between 1 and 20 are multiplied by 4 then what is the variance of the resulting series ?

(A) 133

(B) 532

(C) 1596

- (D) 235
- (E) Question not attempted



(A) $\frac{5}{36}$

(B) $\frac{25}{36}$

(C) $\frac{25}{54}$

- (D) $\frac{25}{216}$
- (E) Question not attempted

79 If f(x) is continuous on [0,1]. Let $F(x) = \int_0^x f(x) dx \ \forall x \in [0,1]$, then which of the following is false?

- (A) F'(x) is not Riemann integrable.
- (B) F'(x) is continuous.
- (C) F'(x) is uniformly continuous.
- (D) f(x) is Lebesgue integrable.
- (E) Question not attempted

80 Which of the following is correct?

- (A) If f(z) is analytic function, then it satisfies Cauchy-Riemann equations.
- (B) If f(z) satisfies Cauchy-Riemann equations then f(z) is analytic.
- (C) If f(z) is analytic in complex plane C then $u_x = -v_y$, $u_y = -v_x$
- (D) If f(z) is differentiable for some points in domain D, then f(z) is analytic in domain D.
- (E) Question not attempted

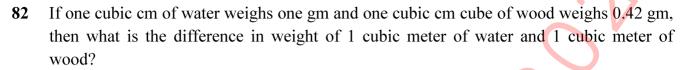
81 If $\frac{(\sqrt{11})^n \times (121)^{1/3} \times (11)^{1/3}}{11 \times (1331)^{3/2}} = (11)^3$, then find the value of 'n'.

(A) 11

(B) 13

(C) 15

- (D) 17
- (E) Question not attempted



(A) 560 kg

(B) 570 kg

(C) 580 kg

- (D) 600 kg
- (E) Question not attempted
- 83 In applying for admissions to a certain university the students opted for different streams.

 $\frac{1}{13}^{th}$ of the students opted for Engineering, $\frac{1}{9}^{th}$ opted for Business Studies and $\frac{1}{5}^{th}$ of

the remaining students opted for Humanities. If the number of students who opted for Humanities is 76, how many more students opted for Business Studies than Engineering?

(A) 14

(B) 16

(C) 18

- (D) 20
- (E) Question not attempted
- A tank can be filled by Tap-A in 30 minutes and by Tap-B in 45 minutes. Both the taps are kept open for 6 minutes and then Tap-B is turned off. In how many minutes more does the tank get filled?
 - (A) 20 minutes

(B) 18 minutes

(C) 16 minutes

- (D) 14 minutes
- (E) Question not attempted
- A solid cuboidal box has dimensions $20 \text{ cm} \times 16 \text{ cm} \times 6 \text{ cm}$. A cube of side 4 cm is removed from each corner of the solid. What percent of the volume of the original box is reduced?
 - (A) 25%

(B) 4%

(C) $26\frac{2}{3}\%$

- (D) $16\frac{1}{3}\%$
- (E) Question not attempted

Qs. 86-87: Each of these questions contains six statements followed by four sets of combinations of three. Choose the set in which the statements are logically related.

86 a. Laxman is a man.

b. Meera is Laxman's wife.

c. Some women are islands.

d. No man is an island.

e. Meera is not an island.

f. Laxman is not an island.

(A) ade

(B) abe

(C) adf

(D) cde

(E) Question not attempted

87 a. All snakes are reptiles.

b. All reptiles are not snakes.

c. All reptiles are cold blooded.

d. All snakes lay eggs.

e. All reptiles lay eggs.

f. Snakes are cold blooded.

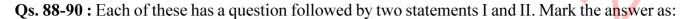
(A) ade

(B) bde

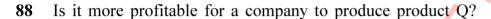
(C) abe

(D) acf

(E) Question not attempted



- (A) if the question can be answered with the help of statement I alone,
- (B) if the question can be answered with the help of statement II alone,
- (C) if both the statements I and II are needed to answer the question, and
- (D) if the question cannot be answered even with the help of both the statements.
- (E) Question not attempted



- I. Product R is sold at a price four times that of Q.
- II. One unit of Q requires 2 units of labour, while one unit of R requires 5 units of labour. There is no other constraint on production.
- 89 What is the value of prime number x?
 - I. $x^2 + x$ is a two-digit number greater than 50.
 - II. x^3 is a three-digit number.
- 90 The average of three unequal quotations for a particular share is ₹ 110. If all the quotations are in integral values of rupee, does the highest quotation exceed ₹ 129?
 - I. The lowest quotation is $\stackrel{?}{\underset{?}{?}}$ 100.
 - II. One of the quotations is ₹ 115.
- 91 Which of the following statements is / are correct about Nada?
 - 1. It lies about 2 km southeast of Panchkula across Ghaggar.
 - 2. There is a famous Gurudwara here, named after Nadu Shah.
 - 3. Guru Gobind singh ji camped at this place with his army.

Now choose the correct option from the options given below:

(A) 1 and 2 Only

(B) 2 and 3 Only

(C) 1 and 3 Only

- (D) 1, 2 and 3 All
- (E) Question not attempted

92 Match list I and List II:

List I

Tomb of Raja Khetri

- I. a. b.
 - II. Samadhi of Mungipa Charkhi Dadri
- Samadhi of Baba Shami Dayal III. Loharu c.
- Samadhi of Todar singh IV. Bhiwani d.

Now choose the correct answer from the following:

- (A) a-III, b-II, c-I, d-IV
- (B) a-II, b-I, c-IV, d-III

List II

Tosham

(C) a-III, b-I, c-II, d-IV

- (D) a-I, b-II, c-III, d-IV
- (E) Question not attempted
- Which of the following towns is said to have been founded by the famous Mahabharata 93 hero, Yudhisthira?
 - (A) Julana

(B) Uchana

(C) Pindara

(D) Kaithal

- (E) Question not attempted
- Read the following paragraph about revolt of 1857: 94

He was the only chief present with the British army at Delhi. After the fall of Delhi, he returned to his state, but not his troops. He left 25 men for service at Larsoli tahsil, and the same number at Delhi. He sent a detachment of 200 men with General van Courtland to Hansi and 100 men under their commander Khan Singh to Jhajjar with Col. Lawrence. Besides these 250 troops remained stationed at Rohtak, 50 at Gohana till the parganas were fairly settled for good. He was greatly rewarded after the expiry of the uprising of 1857.

The paragraph given above describes which prince/princely state?

- (A) Hassan Ali khan of Dujana
- (B) Akbar Ali of Pataudi
- Ahmad Ali of Farrukhnagar
- (D) Raja Sarup Singh of Jind
- (E) Question not attempted
- On whose advice, Kosli town of Haryana was founded by Kosal Singh?
 - (A) On advice of his wife

- (B) On advice of a sage
- (C) On advice of the British
- (D) On advice of his son
- (E) Question not attempted

Qs 96-100: Answer the questions based on the contents of the respective passages:

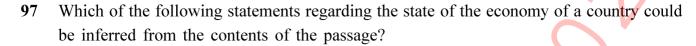
Current positions over the prospects of the Indian economy seem to swing between alarmism and triumphalism. For example, you can juxtapose Morgan Stanley's exuberant recent report on India's impending economic boom, with analysis that comes out of Centre for Monitoring Indian Economy (CMIE) on India's dismal employment record and the enduring constraint it poses. A lot of economic debate is shaped by political mood affiliation. There are genuine difficulties figuring out what is going on. In some cases, there just is not enough data, a situation not helped by the government's diffidence to data. Different shocks have taught us how much of our knowledge of the economy is post-facto. Growth is also often a product of some conjunctures. What may seem like a structural impediment to growth at a particular time can be compensated for by changing circumstances. But it is worth taking the optimists' case seriously. Why might we think India is more competitive and attractive now? Will any of these conditions obtain? The central element in the optimist's story is India's vastly improved infrastructure. India's logistics, while not top class, are improving. Interestingly, Morgan Stanley argues that land is not a binding constraint (perhaps it never was). India's digital infrastructure is potentially outstanding. Optimism here seems well founded. But the Morgan Stanley report makes two further claims. The first, that the digital infrastructure will lead to off shoring of services to India, and second, it will lead to enhanced access to credit which will enable growth. Both are plausible claims, but by no means certain. The second pitch is India's energy transition. India's economic performance traditionally has been tied to the price of oil. The optimists are betting on a major green energy transition that will not just bring more investment but make India energy self-sufficient and competitive. This is in the plausible but not easy category. There is a big "if" in this story. The third element is a revival of manufacturing optimism. The production-linked incentive schemes can, at the margins, work. The baby steps in defence manufacturing could reach a critical mass where we begin to create an ecosystem with enormous spillover effects. The pessimists are too quick to dismiss this possibility. This is now a plausible story, but whether and when it will materialise is still an open question.

- Which of the following statements could be considered as conclusions of the author of the passage as borne out by its contents?
 - i. Currently the Indian economy is seemingly swinging wildly between pessimism and optimism.
 - ii. The shape of the economy of a country is as much dependent on emotional factors as it is on economic factors.
 - iii. Morgan Stanley is reportedly optimistic about the prospects of India's economy while CMIE is reportedly pessimistic about the same.
 - iv. The Government of India had tasked both Morgan Stanley and CMIE with analysing the current prospects of India's economy and received divergent reports about the same from the two parties.
 - (A) iii and iv

(B) iii only

(C) i, ii, iii

- (D) i, ii, iii and iv
- (E) Question not attempted



- i. Relevant data could play an important role in helping analyse the ground realities about the same.
- ii. The factors affecting it could vary over time and with circumstances.
- iii. Political leanings too affect an individual's perception about the same.
- iv. The government of the day decides how much data is gathered and analysed both qualitatively and quantitatively, to study the same.
- v. Several times it happens that one learns the actual truth about it by hindsight.
- vi. It is preferable to take the observations and opinions of the optimists on the same more seriously than those of the pessimists.
- (A) i, ii, iii and vi

(B) ii, iv and v

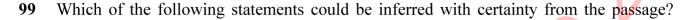
(C) i, ii, iii, iv and v

- (D) i, ii, iii, iv, v and vi
- (E) Question not attempted
- 98 The factors on which Morgan Stanley is basing its optimism about the Indian economy are:
 - i. The reasonably robust infrastructure facilities in the country
 - ii. The abundant land resources of India
 - iii. Offshore digital infrastructure services available to us
 - iv. Enhanced access to credit facilities brought about by the availability of digital infrastructure in India
 - (A) i, ii and iv

(B) i and ii

(C) i, ii and iii

- (D) i, ii, iii and iv
- (E) Question not attempted



- i. India is in a transitional phase in terms of its energy consumption pattern.
- ii. India is on the verge of becoming one of the top producers of green energy in the world.
- iii. India has for long been a large-scale consumer of oil.
- (A) i and ii

(B) ii and iii

(C) i and iii

- (D) i, ii and iii
- (E) Question not attempted

100 Which of the following statements about the manufacturing sector in India implied in the passage?

- i. It has been on a downswing and needs to be revived on priority for the economy to flourish.
- ii. It is the third most important factor in the economic development of the country.
- iii. The government should offer production-linked incentives for the industry to grow further.
- iv. The industries should offer productivity-linked incentives to their employees for increasing production.
- v. Defence manufacturing is presently in its nascent stage in the country but could grow significantly and even influence growth in other industries.
- (A) i, ii and iii

(B) i, ii, iii and iv

(C) i, ii, iii, iv and v

- (D) i, iii and v
- (E) Question not attempted



MA2_0

Final Answer Key of the Master Question Booklet of the Combined Screening Test held on 09.09.2023 for the Posts of Post Graduate Teachers (PGTs) in the subject of Mathematics for Rest of Haryana & Mewat Cadre

(Advt No. 29/2023 & 44/2023)

Q. No.	Ans Key	Q. No.	Ans Key		Q. No.	Ans Key	Q. No.	Ans Key
1	A	26	А		51	С	76	X
2	С	27	D		52	D	77	X
3	В	28	В		53	D	78	D
4	С	29	A		54	А	79	А
5	C	30	D		55	А	80	A
6	D	31	C		56	D	81	С
7	X	32	А		57	А	82	С
8	D	33	D		58	В	83	В
9	С	34	D		59	D	84	А
10	X	35	D		60	С	85	X
11	D	36	D		61	C	86	С
12	A	37	D		62	В	87	D
13	A	38	A		63	С	88	С
14	В	39	X		64	D	89	A
15	В	40	В		65	В	90	A
16	С	41	С		66	А	91	D
17	D	42	А		67	А	92	С
18	С	43	В		68	В	93	D
19	X	44	В		69	В	94	D
20	С	45	X		70	В	95	В
21	С	46	В		71	D	96	В
22	D	47	A	1	72	A	97	С
23	A	48	В		73	A	98	A
24	С	49	D		74	D	99	С
25	В	50	A		75	D	100	D