This Question Paper contains 4 printed pages.

New Pattern
15E (A)

MATHEMATICS, Paper-I

(English Version)

Parts A and B

Time : 2 Hours, 45 Minutes **Maximum Marks : 40**

Instructions :

1. *Read the whole question paper and understand every question thoroughly without writing any thing and 15 minutes of time is allotted for this.*
2. *Answer the questions under* **Part 'A'** *on a separate answer book.*
3. *Write the answers to the questions under* **Part 'B'** *on the question paper itself and attach it to the answer book of* **Part 'A'**.
4. *Answer all questions from the given three* **Sections I, II** *and* **III** *of* **Part 'A'**.
5. *In* **Section III** *every question has internal choice, answer* **any one** *alternative.*

Part A

Time : 2 Hours ***Marks : 30***

SECTION I

$4 \times 1 = 4$

Notes : 1. Answer **all** questions.

2. Each question carries **one** mark.

1. Express $\frac{23}{2^3 . 5^2}$ in decimal form.

2. If $A = \{\text{Prime numbers less than } 10\}$, and

$B = \{\text{Positive odd numbers less than } 10\}$,

then find

(i) $A \cap B$

(ii) $B - A$

3. Find the value of 'k' for which the system of equations $x+2y-3=0$ and $5x+ky+7=0$ has no solution.

4. Show that the sum of multiples of 3 between 1 and 100 is 1683.

SECTION II

$5 \times 2 = 10$

Notes : 1. Answer **all** questions.

2. Each question carries **two** marks.

5. If $x^2 + y^2 = 7xy$, then prove that $Log\left(\frac{x+y}{3}\right) = \frac{1}{2}(Log\, x + Log\, y)$.

6. Write two more polynomials and create two questions for each of them.

7. Two cubes each of volume 125 cm^3 are joined end to end together. Find the total surface area of the resulting cuboid.

8. The base area of a cone is 616 sq. cm and its height is 48 cm. Find its total surface area.

9. n^{th} term of an A.P. is a_n. If $a_1 + a_2 + a_3 = 102$ and $a_1 = 15$, then find a_{10}.

SECTION III

$4 \times 4 = 16$

Notes : 1. Answer **all** questions.

2. Each question carries **four** marks.

3. There is internal choice for each question, only one option from each question is to be attempted.

10. a) Prove that $\sqrt{5} + \sqrt{7}$ is irrational.

OR

b) Verify that 1, –1 and –3 are the zeroes of the cubic polynomial $x^3 + 3x^2 - x - 3$ and check the relationship between zeroes and the coefficients.

11. a) Find the roots of the equation $5x^2 - 6x - 2 = 0$ by the method of completing the square.

OR

b) Spherical marbles of diameter 1.4 cm are dropped into a cylindrical beaker of diameter 7 cm; which contains some water. Find the number of marbles that should be dropped into the beaker, so that water level raises by 5.6 cm.

12. a) A sum of Rs. 1,000 is invested at 8 % simple interest per year. Calculate the interest at the end of each year. Do these interests for 1^{st}, 2^{nd} and 3^{rd} years form an A.P.? If so, find the total interest to be paid for 30 years making the use of this fact.

OR

b) A cylindrical container is filled with ice-cream, whose diameter is 12 cm and height is 15 cm. The whole ice-cream is distributed to 10 children in equal cones having hemispherical tops. If the height of the conical portion is twice the diameter of its base, then find the diameter of the ice-cream cone.

13. a) Draw the graph of the polynomial $4x^2 + 4x - 3$ and find the zeroes, using the graph.

OR

b) Solve the following equations graphically.

$$\frac{1}{3}x - \frac{1}{2}y = 1$$

$$2x - \frac{1}{3}y = -\frac{2}{3}$$

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New Pattern
15E (B)

MATHEMATICS, Paper-I

(English Version)

Parts A and B

Time : 2 Hours, 45 Minutes **Maximum Marks : 40**

Part B

Attach **Part *'B'*** question paper to the main answer book of **Part *'A'***.

Time : 30 Minutes ***Marks : 10***

Instructions :

1. *Answer **all** questions.*
2. *Each question carries ½ mark.*
3. *Answers are to be written in question paper only.*
4. *Marks will not be awarded in case of any overwriting, rewriting or erased answers.*

SECTION IV **20 × ½ = 10**

Write the CAPITAL LETTER showing the correct answer for the following questions in the brackets provided against each question.

14. The fundamental theorem of arithmetic is applicable to ..... [ ]

(A) 4 (B) 3

(C) 2 (D) 1

15. The last digit of 6^{50} is ..... [ ]

(A) 1 (B) 6

(C) 2 (D) 3

16. $\{x : x$ is a prime number and a divisor of $6\} =$ ..... [ ]

(A) $\{1, 2, 3, 6\}$ (B) $\{1, 2, 3\}$

(C) $\{2, 3\}$ (D) $\{2, 3, 6\}$

17. Number of subsets of the set $A=\{1, 2, 3, 4\}$ is ..... [ ]

(A) 4 (B) 8

(C) 12 (D) 16

18. The point of intersection of the line $y = ax + b$ with X-axis is ..... [ ]

(A) $\left(-\frac{b}{a}, 0\right)$ (B) $\left(\frac{b}{a}, 0\right)$

(C) $\left(0, \frac{b}{a}\right)$ (D) $\left(0, -\frac{b}{a}\right)$

19. If one zero of the polynomial $f(x) = 5x^2 + 13x + k$ is reciprocal of the other, then the value of k = ... [ ]

(A) 13 (B) 5

(C) -5 (D) $-\frac{13}{5}$

20. A quadratic polynomial, the sum of whose zeroes is zero and one zero is 4, is ..... [ ]

(A) $x^2 - 16$ (B) $x^2 + 16$

(C) $x^2 - 4$ (D) $x^2 + 4$

21. The point of intersection of the lines $x=2016$ and $y=2017$ is ..... [ ]

(A) (2017, 2016) (B) (0, 2017)

(C) (2016, 0) (D) (2016, 2017)

22. If α, β are the roots of $x^2 - 10x + 9 = 0$, then $|\alpha - \beta|$ = ... [ ]

(A) 9 (B) 8

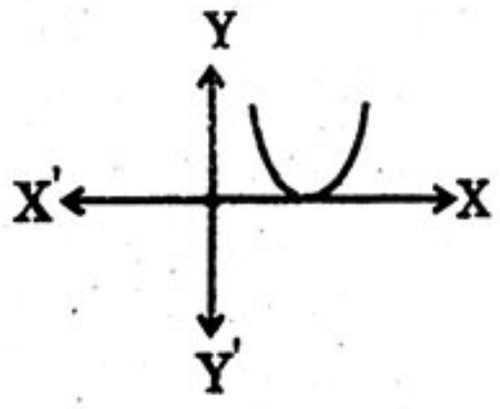
(C) -10 (D) 10

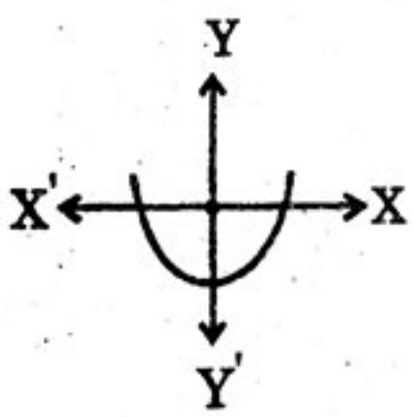
23. The number of diagonals in a polygon having 'n' sides is ..... [ ]

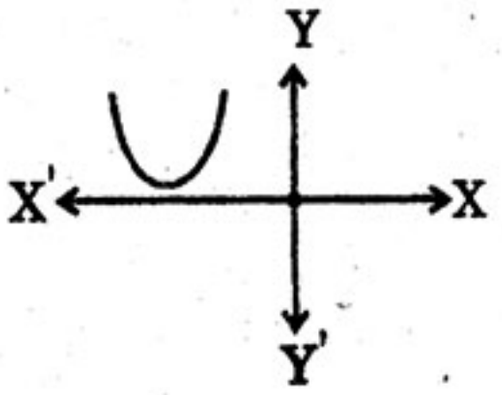
(A) $\frac{n(n+1)}{2}$ (B) $\frac{n(n-1)}{2}$

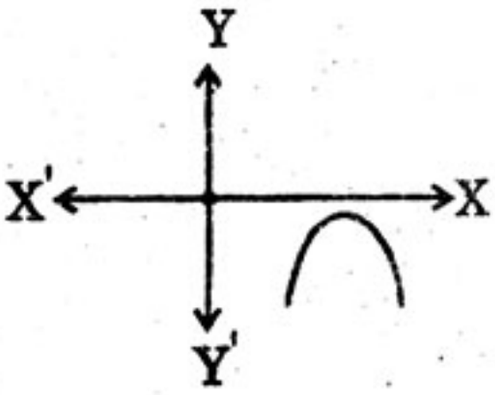
(C) $\frac{n(n-3)}{2}$ (D) $\frac{n(n+3)}{2}$

24. Which one of the following figures shows the quadratic equation $ax^2 + bx + c = 0\ (a \neq 0)$ having distinct roots? [ ]

(A) 

(B) 

(C) 

(D) 

25. If 1 is a common root of $ax^2 + ax + 2 = 0$ and $x^2 + x + b = 0$, then $a \cdot b$ = ... [ ]

(A) 2 (B) -2

(C) 3 (D) -3

26. The 21st term of an A.P., whose first two terms are -3 and 4 is ..... [ ]

(A) 143 (B) -143

(C) 137 (D) 17

27. The common difference of an A.P. for which $a_{18} - a_{14} = 32$ is ..... [ ]

(A) 8 (B) -8
(C) -4 (D) 4

28. In an A.P., if $a = 1$, $a_n = 20$ and $S_n = 399$, then $n =$ ..... [ ]

(A) 19 (B) 42
(C) 28 (D) 38

29. If α, β are the zeroes of $x^2 + x + 1$, then $\frac{1}{\alpha} + \frac{1}{\beta} =$ ..... [ ]

(A) 1 (B) -1
(C) 2 (D) -2

30. Which term of the G.P. $\frac{1}{3}, \frac{1}{9}, \frac{1}{27}, \ldots\ldots\ldots$ is $\frac{1}{2187}$? [ ]

(A) 5^{th} (B) 6^{th}
(C) 7^{th} (D) 8^{th}

31. The volume of right circular cylinder with radius 6 cm and height 7 cm is ..... cm^3. [ ]

(A) 642 (B) 927
(C) 264 (D) 792

32. A sphere of radius 'r' inscribed in a cylinder. The surface area of the sphere ..... of the cylinder. [ ]

(A) total surface area (B) curved surface area
(C) volume (D) none of these

33. The maximum length of the stick that can be placed in a cuboid, whose measurements are $8 \times 4 \times 1$, is ..... [ ]

(A) 8 (B) 9
(C) 12 (D) 13