This Question Paper contains 4 Printed Pages.

MATHEMATICS, Paper - I

(English version)

(Parts A and B)

Time : 2 hrs. 45 min.]   *[Maximum Marks : 40*

Instructions :

1. *15 minutes of time is allotted exclusively for reading the Question Paper and 2.30 hours for writing the answers.*

2. *Part - A answers should be written in separate answer book.*

3. *There are three sections in Part-A.*

4. *Answer all questions.*

5. *Every answer should write visibly and neatly.*

6. *There is an internal choice in section - III of Part-A.*

Part - A

Time : 2 Hours   *Marks : 30*

SECTION - I   *(Marks : 4×1=4)*

Note :

(i) *Answer all questions.*

(ii) *Each question carries 1 mark.*

1. Find the value of $\log_2 512$.

2. Write A = {1, 4, 9, 16, 25} in set-builder form.

3. Two angles are complementary and one angle is 18° more than the other, then find angles.

4. Find the total surface area of a hemisphere, whose radius is 7 cm.

SECTION - II   (Marks : 5×2=10)

Note :

    (i)   Write answers to all questions.

    (ii) Each question carries 2 marks.

5. Find the zeroes of the quadratic polynomial $x^2 - 2x - 8$ and verify the relationship between zeroes and co-efficients.

6. Which term of A.P. 21, 18, 15, ... is '– 81' ?

7. The curved surface area of a cone is 4070 cm^2 and its diameter is 70 cm. What will be its slant height?

8. Find the discriminant of $2x^2 - 4x + 3 = 0$ and discuss the nature of its roots.

9. Express as Algebraic expressions of the following.

    (i)   Five times of a number, when increased by 10 gives 20.

    (ii) The digits in ones and tens places of a two digit number are 'x' and 'y'; then find the number.

Note :

    (i)   *Answer **all** questions.*

    (ii)   *Each question carries **4** marks.*

10.   (*a*)   Solve the following pair of equations by reducing them to a pair of linear equations.

$$\frac{5}{x-1} + \frac{1}{y-2} = 2, \quad \frac{6}{x-1} - \frac{3}{y-2} = 1$$

<div align="center">OR</div>

    (*b*)   A well of diameter 14 m is dug 15 m deep. The earth taken out of it has been spread evenly all around it in the shape of a circular ring of width 7 m to form an embankment. Find the height of the embankment.

11.   (*a*)   Show that the cube of any positive integer is of form $9m$ or $9m+1$ or $9m + 8$, where m is an integer.

<div align="center">OR</div>

    (*b*)   If A = {3, 6, 9, 12, 15, 18, 21}, B = {4, 8, 12, 16, 20}; then check whether $A \cup B = B \cup A$ and $A - B = B - A$.

12.   (*a*)   A manufacturer of TV sets produced 600 sets in the 3rd year and 700 sets in the 7th year. Assuming that the production increases uniformly by a fixed number every year, find :

        (*i*)   The production in the 1st year.

        (*ii*)   The production in the 10 year.

        (*iii*)   Total production in first seven years.

<div align="center">OR</div>

    (*b*)   There is a motor-boat, whose speed in still water is 18 km/h. It takes 1 hour more to go 24 km upstream than to return down-stream to the same spot. Find the speed of the stream.

13. *(a)* Solve the quadratic polynomial $x^2 - 3x - 4$ by graphical method.

<div align="center">**OR**</div>

(b) Half of the perimeter of a rectangular garden, whose length is 4 m more than its width, is 36 m. Find the dimensions of the garden. (use graph).

———————————

New Pattern

15E(B)

MATHEMATICS, Paper - I
(English version)
(Parts A and B)

Time : 2 hrs. 45 min.]   [Maximum Marks : 40

Instructions : Write the answers to the questions in this **Part-B** on the Question
paper itself and attach it to the answer book of **Part-A**.

Part - B

Time : 30 minutes   Marks : 10

(i)   Each question has four options. Write the CAPITAL LETTERS (A, B, C, D)
      showing the correct answer for the following questions in the
      brackets provided against them.

(ii) Marks are **not** awarded for overwritten answers.

(iii) All questions carry equal marks.

SECTION - IV   (Marks : 20 × ½ = 10)

Note :

(i)   Answer **all** questions.

(ii) Each question carries $\frac{1}{2}$ mark.

14. A rational number that equals to $2.\overline{6}$ is ......   [   ]

(A) $\frac{7}{3}$ (B) $\frac{8}{3}$

(C) $\frac{16}{7}$ (D) $\frac{17}{7}$

15. The value of $\log_{25} 5 = $ ......   [   ]

(A) $\dfrac{1}{2}$ (B) 2

(C) 5   (D) 25

16. If '4' is one of the zeroes of $p(x) = x^2 + kx - 8$, then the value of $k = $ .... [   ]

(A) 1   (B) -1

(C) 2   (D) -2

17. If the pair of equations $2x + 3y + k = 0$, $6x + 9y + 3 = 0$

having infinite solutions, the value of 'k' is .....   [   ]

(A) 2   (B) 3

(C) 0   (D) 1

18. If the roots of $x^2 + 6x + 5 = 0$ are α and β, then $\alpha + \beta = $ ....   [   ]

(A) 5   (B) -6

(C) 6   (D) -1

19. Which term of G.P. $3, 3\sqrt{3}, 9, ...$ equals to 243 ?   [   ]

(A) 6   (B) 7

(C) 8   (D) 9

20. If $n(A) = 12$ and $n(A \cap B) = 5$, then find $n(A - B) = $ ....   [   ]

(A) 4   (B) 7

(C) 17   (D) 0

21. If $x, x + 2, x + 6$ are three consecutive terms in G.P.,

find the value of 'x'.   [   ]

(A) 3   (B) 4

(C) 2   (D) 1

22. A quadratic equation, whose roots are $2 + \sqrt{3}$ and $2 - \sqrt{3}$ = ...   [   ]

(A) $x^2 - x - 4 = 0$ (B) $x^2 - 4x + 1 = 0$

(C) $x^2 + 4x + 3 = 0$ (D) $x^2 + x - 3 = 0$

23. If $a_n = \dfrac{n(n+3)}{n+2}$, then find a_{17}.   [   ]

   (A) $\dfrac{340}{20}$ (B) $\dfrac{341}{19}$

   (C) $\dfrac{340}{19}$ (D) $\dfrac{341}{20}$

24. The curved surface area of a sphere will be ...., whose radius is 10 cm. [   ]

   (A) $239\,\pi$ (B) $400\,\pi$

   (C) $221\,\pi$ (D) $129\,\pi$

25. The volume of a cube will be ..... (in cm^3),

   whose total surface area is $216\ cm^2$.   [   ]

   (A) 216   (B) 196

   (C) 212   (D) 144

26. A famous book written by ancient mathematician Aryabhata is ...   [   ]

   (A) Arya Tharkam   (B) Aryabhatteeyam

   (C) Siddhantha Siromani   (D) Karana Kuthuhalam

27. The degree of the polynomial $\sqrt{2}\,x^2 - 3x + 1 = $ ....   [   ]

   (A) $\sqrt{2}$ (B) 3

   (C) 1   (D) 2

28. Which of the following equations has the solution of $(2, -3)$?   [   ]

   (A) $2x - 3y = 10$ (B) $2x + 3y = 13$

   (C) $2x - 3y = 13$ (D) $2x + 3y = -13$

29. If $A = \{x : x$ is a letter in the word HEADMASTER$\}$;

   then its Roster form is ....   [   ]

   (A) $A = \{h, e, a, d, m, a, s, t, e, r\}$

   (B) $A = \{h, e, a, d, m, s, t, r\}$

   (C) $A = \{h, e, a, d, m, s, t, e, r\}$
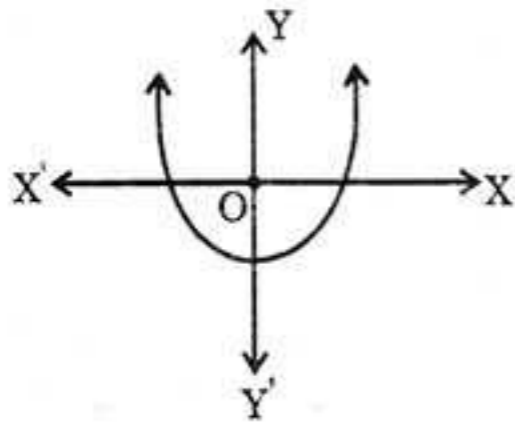
   (D) $A = \{h, e, a, d, m, a, s, t, r\}$

30. The following Venn diagram indicates ......   [   ]
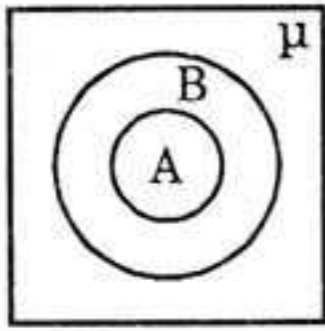
(A) $A \subset B$

(B) $B \subset A$
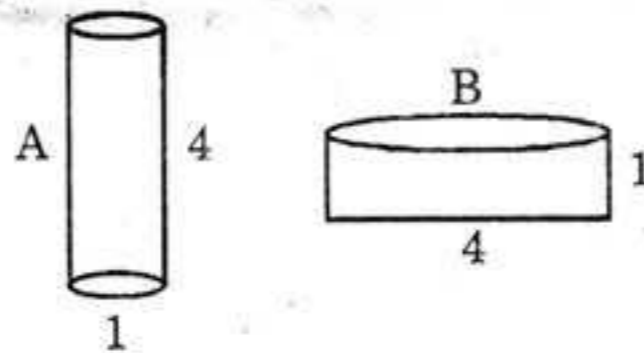
(C) A, B are disjoint sets.

(D) $\mu \subset B$

31.

The adjacent diagram indicates ....   [   ]

(A) $b^2 - 4ac > 0$ (B) $b^2 - 4ac = 0$

(C) $b^2 - 4ac < 0$ (D) None of the given.
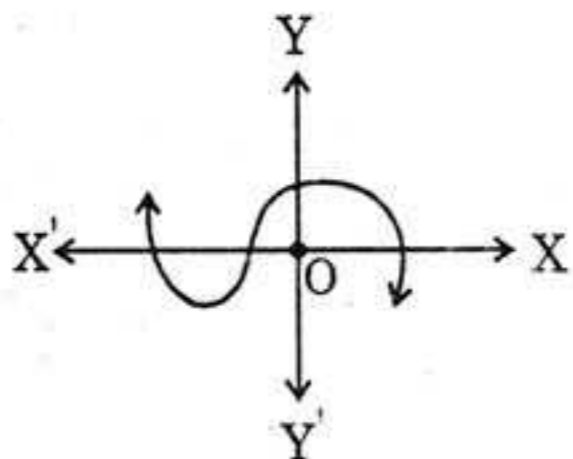
32. Which of the following vessel can be filled with more water (A, B are in cylindrical shape) ?   [   ]

(A) A   (B) B

(C) Both are equal.   (D) can not be determined.

33.

Number of zeroes can be identified by the adjacent figure.   [   ]

(A) 0

(B) 1

(C) 2

(D) 3