

This Question Paper contains 4 Printed Pages.

New Pattern

15E(A)

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 : $5 \times 2 = 10$)

Note :

- (i) Write answers to all questions.
 - (ii) Each question carries 2 marks.
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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.

SECTION - III

(Marks : 4×4=16)

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.

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

OR

- (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.

OR

- (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.

OR

- (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.

OR

(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).

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 : $20 \times \frac{1}{2} = 10$)

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) $\frac{16}{7}$

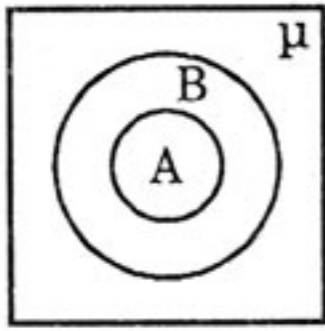
(D) $\frac{17}{7}$

15. The value of $\log_{25} 5 = \dots$ []
- (A) $\frac{1}{2}$ (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 $k = \dots$ []
- (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 $\alpha + \beta = \dots$ []
- (A) 5 (B) -6
(C) 6 (D) -1
19. Which term of G.P. $3, 3\sqrt{3}, 9, \dots$ equals to 243? []
- (A) 6 (B) 7
(C) 8 (D) 9
20. If $n(A) = 12$ and $n(A \cap B) = 5$, then find $n(A - B) = \dots$ []
- (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 $2 - \sqrt{3} = \dots$ []
- (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 $a_n = \frac{n(n+3)}{n+2}$, then find a_{17} . []
- (A) $\frac{340}{20}$ (B) $\frac{341}{19}$
- (C) $\frac{340}{19}$ (D) $\frac{341}{20}$
24. The curved surface area of a sphere will be, whose radius is 10 cm. []
- (A) 239π (B) 400π
- (C) 221π (D) 129π
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 $\sqrt{2}x^2 - 3x + 1 = \dots\dots$ []
- (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 $A = \{x : x \text{ is a letter in the word HEADMASTER}\}$;
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) $A = \{h, e, a, d, m, a, s, t, r\}$

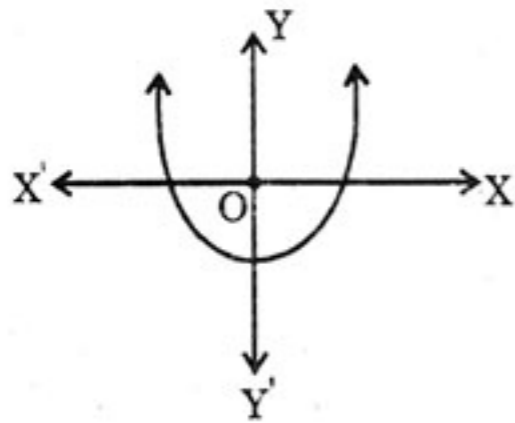
30. The following Venn diagram indicates

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

31.



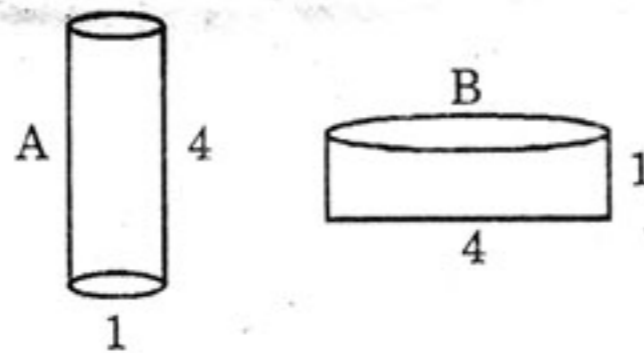
The adjacent diagram indicates

[]

- (A) $b^2 - 4ac > 0$
- (B) $b^2 - 4ac = 0$
- (C) $b^2 - 4ac < 0$
- (D) None of the given.

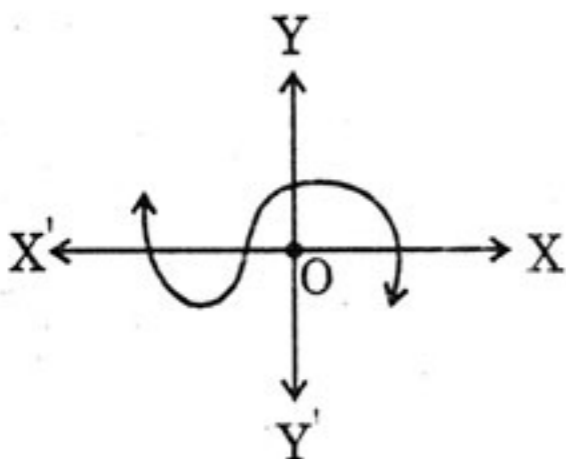
32. Which of the following vessel can be filled with more water (A, B are in cylindrical shape)?

[]



- (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