

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  $18^\circ$  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  $4070 \text{ cm}^2$  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).

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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)  $\frac{16}{7}$

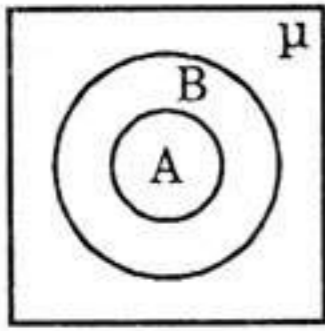
(D)  $\frac{17}{7}$

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  $\alpha$  and  $\beta$ , 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)  $239\pi$  (B)  $400\pi$
- (C)  $221\pi$  (D)  $129\pi$
25. The volume of a cube will be ..... (in  $\text{cm}^3$ ),  
whose total surface area is  $216\text{ cm}^2$ . [ ]
- (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)  $A = \{h, e, a, d, m, a, s, t, r\}$

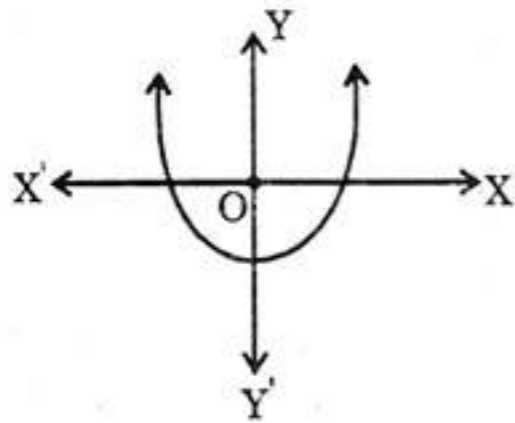
30. The following Venn diagram indicates .....

[   ]



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

31.



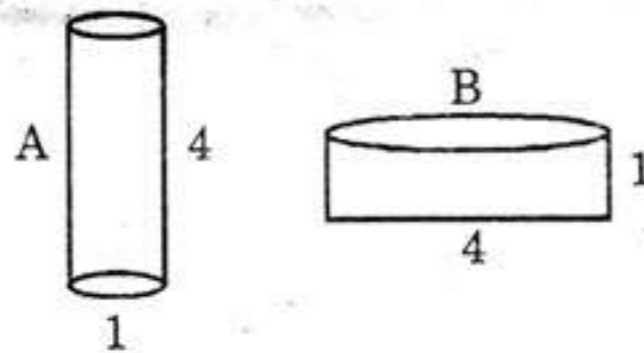
The adjacent diagram indicates ....

[   ]

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

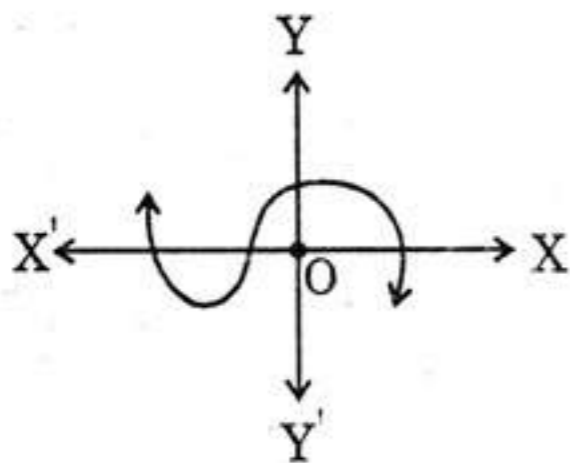
32. Which of the following vessel can be filled with more water (A, B are in cylindrical shape)?

[   ]



- (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