विद्या सर्वार्थि साधिका

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PERIODIC TEST-1

Class : XI

Subject: Mathematics M.M: 40

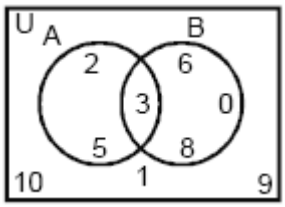
Date : 20/07/2019 Time: 2 Hours

General Instructions:

i) All questions are compulsory.
ii) This question paper contains 18 questions.
iii) Questions 1- 8 in Section A are very short-answer type questions carrying 1 mark each.
iv) Questions 9-13 in Section B are short-answer type questions carrying 2 marks each.
v) Questions 14-17 in Section C are long-answer I type questions carrying 4 marks each.
vi) Question 18 in Section D is long-answer II type question carrying 6 marks.

SECTION – A

1. From the adjoining Venn diagram, the set (A ∩ B)'_____. (1)



A) {3} B) {2, 5 , 6, 0, 8 }
C) {1 , 9, 10 } D) {2, 5, 10, 1, 6, 8, 0, 9}

2. Roster form of the set $\left\{x: x = \frac{n^2-1}{n^2+1},\ n < 4,\ n \in N\right\}$ is _____. (1)

A) $\left\{\frac{3}{5}, \frac{4}{5}\right\}$, B) $\left\{\frac{3}{5}, \frac{4}{5}, \frac{15}{17}\right\}$
C) $\left\{0, \frac{3}{5}, \frac{4}{5}\right\}$ D) $\left\{0, \frac{3}{5}, \frac{8}{10}, \frac{15}{17}\right\}$

3. A wheel makes 270 revolutions in one minute. Through how many radians does it turn in one second? (1)

A) 9πradian. B) 6π radian C) 11π radian D) 10π radian

4. A and B are two sets such that n (A) = 3 and n (B) = 6. (1)
Find (*i*) Minimum value of n (A ∪ B) (*ii*) Maximum value of n (A ∪ B).

A) Minimum 3 , Maximum 6 . B) Minimum 3 , Maximum 9 .
C) Minimum 6 , Maximum9 . D) None of the above.

5. Let A = {– 1, 0, 2, 3}, B = {1, 2, 5, 8, 9, 10} and $f = \{(x, y) : y = x^2 + 1, x \in A \text{ and } y \in B\}$. List the elements of f. (1)

6. Show that : $\frac{1}{2}\left(\sqrt{3}\cos 35° - \sin 35°\right) = \cos 65°$ (1)

OR

Prove that: $\sin(150° + x) + \sin(150° - x) = \cos x$.

7. Prove that : $\frac{\cos 29° + \sin 29°}{\cos 29° - \sin 29°} = \tan 74°$ (1)

8. Find the range of the following functions given by : $f(x) = \frac{|x-4|}{x-4}$. (1)

SECTION –B

9. If $f(x) = \begin{cases} x^2 & , \ x < 0 \\ 3x - 2 & , \ 0 \le x \le 2 \\ x^2 + 1 & , \ x > 2 \end{cases}$ find the value of $f(-1) + f(1) + f(3)$. (2)

OR

Given f: R → R as $f(x) = 3x + 4$. If ordered pairs $(a, 8)$ and $(2, b)$ belong to 'f'. Find a and b.

10. If $tanA = \frac{1}{2}$, $tanB = \frac{1}{3}$, find the value of $tan(2A + B)$. (2)

11. If $f(x) = \frac{1+x}{1-x}$, show that $\frac{f(x) \times f(x^2)}{1 + [f(x)]^2} = \frac{1}{2}$ (2)

12. If $tanx = \frac{3}{4}$, $\pi < x < \frac{3\pi}{2}$, find the value of $sin\frac{x}{2}$. (2)

13. If A = $\{x: x \in N, 1 < x \le 6\}$, B = $\left\{x: x \in Z \text{ and } \frac{-5}{2} \le x \le \frac{5}{2}\right\}$, (2)
Find i) $B - A$ ii $A \cap B$

SECTION – C

14. In a survey of 100 students in a music school the number of students learning different music instruments was found to be Guitar 28, Violin 30, Flute 42, Guitar and Violin 8, Guitar and Flute 10 , Violin and Flute 5 , all musical instruments 3. How many students were learning: (4)
i) Only Guitar ii) none of the instruments.

15. Find the domain and range of the function y = $\frac{x^2}{1+x^2}$ (4)

OR

Let $A = \{-2, -1, 0, 1, 2\}$ and $f : A \to Z$ given by $(x) = x^2 - 2x - 3$. Find a) the range of f

b) Pre- images of 6, -3 and 5 (if exists).

16. If A = $\{x : x \in W, x < 2\}$, $B = \{x : x \in N, 1 < x < 5\}$, (4)
$C = \{x : x \text{ is an odd prime number} \le 5\}$
Find (i) $A \times (B \cap C)$. (ii) $A \times (B \cup C)$.

17. Solve the trigonometric equation: sin $2x$ – sin $4x$ + sin $6x$ = 0. (4)

SECTION – D

18. Prove that: $\cos^2 x + \cos^2\left(x + \frac{\pi}{3}\right) + \cos^2\left(x - \frac{\pi}{3}\right) = \frac{3}{2}$ (6)

OR

In Δ ABC, prove that : $(b^2 - c^2)$ cot A + $(c^2 - a^2)$ cot B + $(a^2 - b^2)$ cot C = 0