

Case based question:

Section E



Q.24)

200 students of a school in class XI, appeared in the Mid Term Examination. 15 of them failed in Mathematics, 12 failed in Science and 7 failed in Mathematics and Science. Using the above information, answer the following questions:

- i) How many failed in Mathematics but not in Science? (1)
 - ii) How many failed in Science but not in Mathematics? (1)
 - iii) How many students failed in one of the two subjects? (2)
- OR
- (iii) How many students passed in Science? 186

....

1. The following question consists of two statements- Assertion (A) and Reason (R). Answer the following question selecting the appropriate option given below:
- Both A and R are true and R is the correct explanation for A.
 - Both A and R are true but R is not the correct explanation for A.
 - A is true but R is false.
 - A is false but R is true.

Assertion (A): If $A \subset B$ and $B \subset A$, then $A = B$.

Reason (R): Two sets are equal if and only if they have the same elements.

Section B

Q 12. Using Venn Diagram, Prove:

$$(A - B) - C = A - (B \cup C)$$

[5]

Q 13. If $A = \{8, 11, 12, 15, 18, 23\}$ and f is a function from $A \rightarrow N$ such that $f(x)$ = highest prime factor of x , find f and its range.

Q 14. If a set A has 'm' and set B has 'n' elements, then find the number of possible relations from set A to B.

Q 15. Let $f(x) = \sqrt{x}$, $g(x) = 3x + 1$ and $h(x) = x - 1$ defined over the set of non-negative real numbers, find $(f + g)(x)$ and $(gh)(x)$.

Q 16. Prove $\sec(-1600^\circ) \cdot \sin(330^\circ) = 1$

Section C

Q 17. Prove: $\sin 20^\circ \sin 40^\circ \sin 80^\circ = \frac{\sqrt{3}}{8}$

Q 18. Prove:

$$\frac{\sin 2\theta}{\sin \theta} - \frac{\cos 2\theta}{\cos \theta} = \sec \theta$$

Q 19. Find the Domain and Range of the function $f(x) = \sqrt{9 - x^2}$

Q 20. Find the Domain and Range of the following function:
 $f(x) = 2 - |x - 5|$

Q 21. If $\tan x = \frac{1}{2}$, find the value of $\sin 2x$

Section D

Q 22. If $\cos A = \frac{1}{7}$ and $\cos B = \frac{13}{14}$, A and B being positive acute angles, prove that $A + B = 60^\circ$

Q 23. Prove:

$$\cos^2 x + \cos^2 \left(x + \frac{\pi}{2}\right) + \cos^2 \left(x - \frac{\pi}{2}\right) = \frac{3}{2}$$

1st Unit Test 2025-26
Std XI
Subject: Mathematics

Time: 1 hr

Instructions:

1. Section A consists of 10 multiple choice type questions and one Assertion Reasoning Question (1 mark each).
2. Section B consists of 5 questions of 2 marks each.
3. Section C consists of 5 questions of 3 marks each.
4. Section D consists of 2 questions of 5 marks each.
5. Section E consists of one case study which comprises of 4 case based questions.
6. All questions are compulsory.

Section A

Q 1. Express the function $f: A \rightarrow B, f(x) = x^2 - 1$, where $A = \{-4, 0, 1, 4\}$ as a set of ordered pairs.
(A) $\{(4, 15), (0, -1), (1, 0), (4, 15)\}$ (B) $\{(1, 0), (4, 15), (0, -1), (1, 0), (4, 15)\}$
(C) $\{(4, 15), (0, -1), (1, 0), (4, 15)\}$ (D) $\{(4, 15), (0, -1), (1, 0)\}$

Q 2. The value of $\cos 1^\circ \cos 2^\circ \cos 3^\circ \dots \cos 179^\circ$ is
(A) 121 (B) 0 (C) 1 (D) 1

Q 3. If $\sin \theta + \operatorname{cosec} \theta = 2$, then $\sin^2 \theta + \operatorname{cosec}^2 \theta$ is equal to
(A) 1 (B) 4 (C) 2 (D) None of these

Q 4. Write the following set in roster form: $C = \{x \in \mathbb{N} : x \text{ divides } 14\}$
(A) $\{1, 2, 3, 4, 5, 6\}$ (B) $\{1, 2, 3, 4, 5, 6, 12\}$ (C) $\{1, 2, 3, 4, 5, 6, 12, 24\}$ (D) None of these

Q 5. What is $n[P(A)]$ when set $A = \{0, \{0\}, 05\}$?
(A) 3 (B) 8 (C) 7 (D) 5

Q 6. If $A = \{1, 2, 3\}$ and $B = \{a, b\}$, then $n(B \times A)$ is
(A) 3 (B) 2 (C) 4 (D) 5

Q 7. Find the radian measure of the angle the minute hand of a watch subtends at the centre of the watch in 40 minutes.

(A) $\frac{4\pi}{3}$ (B) $\frac{3\pi}{4}$ (C) $\frac{2\pi}{3}$ (D) $\frac{5\pi}{2}$

Q 8. Find the positive value in sexagesimal system for angle $\left(-\frac{35\pi}{4}\right)$.
(A) 315° (B) 135° (C) 225° (D) 210°

Q 9. Evaluate $\cot\left(\frac{\pi}{2} - x\right)$.
(A) $\tan x$ (B) $-\tan x$ (C) $\cot x$ (D) $-\cot x$

Q 10. If $n(A) = 10$ and $n(B) = 6$ for two disjoint sets A and B, then, $n(A \cup B)$ is
(A) 10 (B) 16 (C) 6 (D) None of these