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Roll No. :

FIRST UNIT TEST-2014-2015
SUBJECT- MATHEMATICS
CLASS-XI

Time 1½ Hrs.

M.M.40

Note : Attempt all questions.

SECTION-A (1 MARK EACH)

1. ✓ Which is greater : $\sin 40^\circ$ or $\cos 40^\circ$ *cos 40°*
2. ✓ Write the given set in roaster form
 $P = \{x/x \text{ is a positive integer less than } 10 \text{ and } 2^x - 1 \text{ is an odd integer}\}$ *(NCERT, Example 1)*
3. ✓ Express $\{(x, y) : y + 2x = 5, x, y \in W\}$ as set of ordered pair. *(W is set of whole numbers). (0, 5), (1, 3), (2, 1)*
4. ✓ In a right angled triangle the difference between two acute angles is $\frac{\pi}{8}$ radians. Express the angles in degrees.

SECTION-B (4 MARKS EACH)

5. Solve the equation $(\sqrt{3} - 1)\cos x + (\sqrt{3} + 1)\sin x = 2$.
6. If $\tan x = \frac{\sin \alpha - \cos \alpha}{\cos \alpha + \sin \alpha}$ then show that $\sin \alpha + \cos \alpha = \sqrt{2} \cos x$
7. ✓ State which of the following statements are true and which are false. Justify your answer.
 - (i) $37 \notin \{x : x \text{ has exactly two positive factors}\}$
 - (ii) $35 \in \{x : x \text{ has exactly four positive factors}\}$

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- (iii) ✓ Cardinal number of the set $A = \{0\}$ is zero.
- (iv) $\{x : x \in \mathbb{N}, x < 5 \ \& \ x > 8\} = \{0\}$
- 8. ✓ On the real axis if $A = [0, 3]$ and $B = [2, 6]$ then find
 - (i) A'
 - (ii) $A \cup B$
 - (iii) $A \cap B$
 - (v) $A - B$
- 9. ✓ If $A = \{2, 4, 6, 9\}$, $B = \{4, 6, 18, 27, 54\}$ and a relation R from A to B is defined by $R = \{(a, b) : a \in A, b \in B, a \text{ is a factor of } b \text{ and } a < b\}$ then find R in roaster form also find its domain and range.
- 10. ✓ In a school, out of 100 students 15 offered mathematics only 12 offered statistics only, 8 offered only physics, 40 offered physics and mathematics, 20 offered physics and statistics, 10 offered mathematics and statistics, 65 offered physics. By using Venn diagram find the no. of students (i) who offered mathematics (ii) who offered statistics (iii) who did not offer any of the three subjects.

SECTION-C (6 MARKS EACH)

- 11. (i) Find domain and Range of function $f(x) = \sqrt{4-x} + \frac{1}{\sqrt{x^2-1}}$
- (ii) ✓ Draw graph and find image $f(x) = \begin{cases} x-1 & x < 2 \\ 2x+3 & x \geq 2 \end{cases}$
- 12. if $\tan \beta = \frac{\tan \alpha + \tan \gamma}{1 + \tan \alpha \tan \gamma}$, then prove that $\sin 2\beta = \frac{\sin 2\alpha + \sin 2\gamma}{1 + \sin 2\alpha \sin 2\gamma}$
