



- 7 Assertion (A): If  $A = \{a, e, i\}$ ,  $B = \{o, u\}$ , then the number of relations from A to B is equal to 64.  
Reason (R): The total number of relation from set A to set B is equal to  $\{2^{n(A).n(B)}\}$ .  
(A) Both A and R are true and R is the correct explanation of A  
(B) Both A and R are true but R is NOT the correct explanation of A  
(C) A is true but R is false  
(D) A is false and R is True

### SECTION – B

- 8 Two finite sets have ‘m’ and ‘n’ elements. The number of subsets of the first set is 112 more than that of the second set. The values of ‘m’ and ‘n’ respectively. (2m)
- 9 The second hand of the watch is 2 cm long. How far the tip will move in 40 seconds? (2m)

- OR -

Show that,  $\tan 3x \cdot \tan 2x \cdot \tan x = \tan 3x - \tan 2x - \tan x$

- 10 If  $\left(\frac{x}{3} + 1, y - \frac{2}{3}\right) = \left(\frac{5}{3}, \frac{1}{3}\right)$ , then find x and y. (2m)

### SECTION – C

- 11 Find the range of  $f(x) = \frac{3}{2 - x^2}$  (3m)

- 12 Prove that  $\cos^2 \frac{\pi}{8} + \cos^2 \frac{3\pi}{8} + \cos^2 \frac{5\pi}{8} + \cos^2 \frac{7\pi}{8} = 2$  (3m)

- OR -

Prove that  $\sqrt{2 + \sqrt{2 + 2 \cos 4x}} = 2 \cos x, \quad 0 < x < \frac{\pi}{4}$

- 13 Find the value of  $\tan \frac{\pi}{8}$  (3m)

### SECTION – D (Case Study)

- 14 Students of Indian Public School was conducting a quiz. The questions for round 4 was as follows. The participants are required to finish the task in five minutes.



- (i) If  $A = \{-1, 1\}$ , then find the number of elements in  $A \times A \times A$  (1m)
- (ii) Write the domain of the function  $f(x) = \frac{x^2+2x+3}{x^2-8x+12}$  (1m)
- (iii) Find the domain of the function  $f(x) = \sqrt{25 - x^2}$  (2m)

- OR -

Find the domain of the function  $f(x) = \sqrt{x^2 - 25}$

- 15 Khusbu with her friends were solving math question from chapter sets. In few questions they are not confident about their answers. Find the answer for the following questions and help Khusbu and friends to verify their answers.



- (i) Write in the interval form  $\{x : x \in \mathbb{R}, -4 < x \leq 6\}$  (1m)
- (ii) Given  $A = \{1, 3, 5\}$ ,  $B = \{2, 4, 6\}$  and  $C = \{0, 2, 4, 6, 8\}$   
Find  $A \cup (B \cap C)$  (1m)
- (iii) Let  $S = \{x : x \text{ is a positive multiple of 3 less than 100}\}$  and  
 $P = \{x : x \text{ is a prime number less than 20}\}$ , then find  $n(S) + n(P)$  (2m)

- OR -

Let  $f = \left\{x, \frac{x^2}{1+x^2} : x \in \mathbb{R}\right\}$  be a function from  $\mathbb{R}$  to  $\mathbb{R}$ . Determine the range of  $f$ .