BK BIRLA CENTRE FOR EDUCATION

SARALA BIRLA GROUP OF SCHOOLS
SENIOR SECONDARY CO-ED DAY CUM BOYS' RESIDENTIAL SCHOOL

POST MID TERM EXAMINATION (2024-25)

MATHEMATICS (041)

Class: XI Science
Date: 06/01/25
Admission Number: _____

Duration: 1 Hour
Max. Marks: 25
Roll number: ____

General Instructions:
Question 1 to 5 carries ONE mark each. Questions 6 to 9 carries TWO marks each. Questions 10 to 13 carries THREE marks each.

1 $\lim_{x\to 0}\frac{(1+x)^n-1}{x}$

(A) n (B)1 (C) -n (D) 0

2 $\lim_{x\to 0}\frac{cosx}{\pi-x}$ is equal to

(A) 1 (B) $\frac{1}{\pi}$ (C) $-\frac{1}{\pi}$ (D) Does not exist

3 When we roll a die, then the events of getting odd numbers and even number, are

(A) Mutually exclusive events (B) Exhaustive event
(C) Both a and b (D) None of these

4 A single letter is selected at random from the word 'FAVOURABLE". The probability that it is a vowel

(A) $\frac{1}{5}$ (B) $\frac{2}{5}$ (C) $\frac{3}{5}$ (D) $\frac{1}{2}$

Assertion and Reasoning questions: In the following two questions, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.

(A) Both A and R are true and R is the correct explanation of A.
(B) Both A and R are true and R is not the correct explanation of A.
(C) A is true but R is false.
(D) A is false but R is true.

5 Assertion (A): If A and B are to events such that P (A) =$\frac{2}{5}$, P (B) =$\frac{3}{4}$, then$\frac{3}{20} \le P(A \cap B) \le \frac{2}{5}$.
Reason (R): P (AUB) $\ge$ max $\{P(A), P(B)\}$ and P (A$\cap$B) $\le \{P(A), P(B)\}$

6 Evaluate: $\lim_{x\to 0}\frac{\sqrt{1+x}-1}{x}$, $x \neq 0$.

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7 Find the value: $\lim_{x\to\frac{\pi}{4}} \frac{sec^2x-2}{tanx-1}$

8 If the probability that the home team will win an upcoming game is 0.77 and the probability that it will tie the game is 0.08, then find the probability that it will lose the game..

9 How many 2 digit positive integers are multiple of 3 and also find the probability that a a randomly chosen two digit positive integer is a multiple of 3.

10 Find n, if $\lim_{x\to 2} \frac{x^n-2^n}{x-2}$=80

11 $\lim_{x\to 1} \frac{x^4-1}{x-1} = \lim_{x\to k} \frac{x^3-k^3}{x-k}$, then find the value of k.

12 Two dice are thrown simultaneously. Find the probability that both of them shows same face and both shows distinct faces.

13 A five digit number is formed by the digits 1, 2,3,4,5 without repetition. Find the probability that the number is divisible by 4.

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