MBD-010-001107

Seat No. _____

First Year B. B. A. (Sem. I) (CBCS) Examination

November / December – 2016

107 - Business Mathematics - I

(Old Course)

Faculty Code : 010
Subject Code : 001107

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

Instruction : All questions are compulsory.

1 (a) Define following : **7**

(1) Domain

(2) Co-Domain

(3) Range of function

(4) Many one function.

(b) If $f(x)=\frac{x^2-x}{x+3}$ find, $\frac{f(1)+f(2)}{f(-2)+f(0)}$. **7**

OR

1 (a) Explain types of functions. **7**

(b) If $f(x)=x^2, g(x)=5x-6$ and $x\in\{2,3\}$. Prove that $f=g$. **7**

2 Attempt any **four** : **14**

(1) $\lim_{x\to 9}\frac{x-9}{\sqrt{x}-3}$

(2) $\lim_{x\to 2}\frac{x^2-4}{x^3-x-6}$

(3) $\lim_{x\to 2}\left(\frac{1}{x-2}-\frac{2}{x^2-2x}\right)$

(4) $\lim_{n\to\infty} \frac{4n+9}{18n^2-300}$

(5) $\lim_{x\to 0} \frac{e^{5x}-e^{2x}}{x}$

(6) $\lim_{n\to\infty} \frac{1+2+3+.....+n}{(n+3)(n+4)}$

3 (a) Define : **7**

(1) Arithmetic progression

(2) Geometric progression

(3) Harmonic progression.

(b) The sum of four numbers is G.P. is 60 and A.M. between the first and last is 18. Find four numbers. **7**

OR

3 (a) In usual notation prove that $S_n = \frac{n}{2}(a+\ell)$. **7**

(b) The sum of first 11 terms of A.P. is 19 and the sum of first 19 terms is 11. Find sum of first 30 terms. **7**

4 (a) Define : **7**

(i) Permutation

(ii) Combination.

(b) Find 'n' **7**

(i) $(n+3)P_3 : (n+2)P_4 = 14:1$

(ii) ${}^7P_n = 60 \cdot {}^7P_{n-3}$

OR

4 (a) Prove that : ${}^{n}C_{r} + {}^{n}C_{r-1} = {}^{n+1}C_{r}$ **7**

(b) In a college there are 20 Professors including the Principal and Vice principal, from whom a committee of 5 is to be appointed. Find how many committee will contain : **7**

(i) The principal and Vice principal

(ii) The principal but not Vice principal

(iii) Neither the principal nor Vice principal.

5 (a) In usual notation prove that $\sum n^3 = \frac{n^2(n+1)^2}{4}$. **7**

(b) Prove that there is no constant term in expansion of **7**

$\left(2x^2 - \frac{1}{4x}\right)^4$.

OR

5 (a) By using Principle of Mathematical induction prove that **7**

$$\frac{1}{1\cdot 5} + \frac{1}{5\cdot 9} + \frac{1}{9\cdot 13} + \ldots\ldots\ldots + \frac{1}{(4n-3)(4n+1)} = \frac{n}{4n+1}$$

(b) Find the middle terms in expansion of $\left(x - \frac{1}{x}\right)^4$. **7**
