

**SARDAR PATEL UNIVERSITY**  
**F. Y. B. B. A. (ITM) II<sup>nd</sup> SEMESTER EXAMINATION**  
**2016**  
**Thursday, 20<sup>th</sup> October**  
**2.00 p.m. to 4.00 p.m.**  
**UM02CBB106 - Business Mathematics - II**

**Total Marks : 60**

- Q.1 [A] There are 3 English books, 4 Hindi Books and 5 Gujarati books on a shelf. [05]  
 How many total arrangements are possible? In how many cases the books of the same languages are never together?
- [B] In how many ways 10 boys can be seated around a round table. [05]
- [C] Find n, if  ${}_nP_4 = 840$  [05]
- OR
- Q.1 [A] A cricket team of 11 players is to be formed from 17 players including 4 [05]  
 bowlers and two wicketkeepers. In how many different ways can a team be formed so that the team contains at least 3 bowlers and at least one wicket-keeper?
- [B] In how many ways a committee of 4 persons can be formed from 5 boys [05]  
 and 3 girls in which there are at most 2 girls?
- [C] Find n, if  ${}_2nC_3 = {}_nP_4$ . [05]
- Q.2 [A] Write the rules of differentiation. [05]
- [B] Differentiate the following with respect to x: [05]  
 (1)  $y = 3x^5 + 5x^4 - 2x^3 + 12x + 9$   
 (2)  $y = \log(\log x)$
- [C] Find the derivative of  $f(x) = x^3$  using the definition of a derivative. [05]
- OR
- Q.2 [A] If Cost function  $C = 500 + 0.5x^2$  and  $R = 200x$ , find the production x at [05]  
 which the profit is maximum and also find the maximum profit.
- [B] Find the equilibrium price if  $d = 20 - 4p$  and  $s = 10p - 8$ . [05]
- [C] If the supply function is  $x = 5 + 2p^2$ , find the elasticity of supply. Also find [05]  
 the elasticity of supply at  $p = 3$ .
- Q.3 [A] Cost of building a new house is Rs. 4, 76, 000 at present. If it increases at [06]  
 8% every year, find out the increased cost of a similar house if it is built after 3 years.
- [B] Neha borrows Rs. 32,000 at the rate 16% of simple interest and invests it [05]  
 on the same day at the rate 14% of compound interest. At the end of 4 years how much profit or loss will she have?
- [C] Define: (1) simple interest, (2) compound interest. [04]

OR

- Q.3 [A] Shiva Limited issued Rs. 50,000 debentures each of Rs: 100 to be redeemed after 10 years. It was decided to create a sinking fund for this purpose and to invest it at 12.5% rate of compound interest. Find out the sum to be transferred to this fund at the end of every year. [06]
- [B] If the rate of interest is 12%, what sum should Mrs. Rajulben deposit in her recurring account in bank in the beginning of every year so that her 5 years old son can receive Rs.1, 50, 000 when he is 25 years old? [05]
- [C] Define: (1) Sinking Fund, (2) Annuity. [04]

- Q.4 [A] What is time series? Discuss one of its components in brief. [05]
- [B] Determine trend for the following by 3 year moving average method. [05]
- Years: 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999
- Prices: 120 122 222 126 225 224 334 443 333 111
- [C] Determine the seasonal variations by simple average method: [05]

years	Q1	Q2	Q3	Q4
1992	229	223	334	112
1993	223	333	445	223
1994	334	343	221	335

OR

- Q.4 [A] Write the utilities of time series. [05]
- [B] Determine trend for the following by 4 year moving average method. [05]
- Years: 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999
- Prices: 120 122 222 126 225 224 334 443 333 111
- [C] Determine the seasonal variations by simple average method: [05]

years	summer	monsoon	winter
2000	22	23	34
2001	23	33	45
2002	34	43	21
2003	20	36	52
2004	25	47	34
2005	50	58	45

$$\bar{x} = \frac{\sum x}{n}$$