BBA–201(O)

B. B. A. (Second Semester)
EXAMINATION, May, 2012

(Old Course)

Paper First

BUSINESS MATHEMATICS

Time : Three Hours]   [*Maximum Marks : 75*

Note : All questions are compulsory and carry equal marks.

1. (a) The coins of one rupee, 50 paise and 25 paise denomination in a box have a ratio of 4 : 5 : 6. In the aggregate the coins are worth ₹ 96. Find the number of each denomination.

   (b) The difference between selling an article at 6% profit and at 9% profit is ₹ 9. Find the cost price of the article and also the two selling prices of it.

   Or

   (a) The mixture of milk and water in one pot has a ratio of 6 : 9. The same mixture in another pot has a ratio 5 : 1. In what ratio the mixture should be extracted from each pot and paired into a third pot, so that the ratio of milk and water becomes 8 : 3 in the third pot ?

(b) Two trains, running in opposite directions to each other, travelling at 75 km/h and 60 km/h respectively, crossed each other in 8 seconds. When both the trains travel in the same direction, a passenger of faster train feels that he crossed the other train in 30 seconds. Find the length of the fast train.

2. (a) The Gross National Income of a country was ₹ 1,000 crores 10 years ago. This year it is ₹ 2,500 crore. Calculate the rate of growth of GNI using logarithm.

   (b) If a person quotes 30% more than the cost price on his goods and allows a discount of 10%, what is his gain percent, if he quotes 60% over the cost price and then allows a discount of 40% ?

Or

(a) Solve :

$$1563 (1 + x)^8 = 1624$$

using log table.

(b) A certain number of men can complete a work in 90 days. If, however, there are 15 men less, it would take 10 days more for the work to be completed. How many men were there originally ?

3. (a) A sum of three numbers of G. P. is 13 and the sum of their squares is 91. Find the numbers.

   (b) By selling a loan of ₹ 3,750 of 6% at ₹ 92, a person buys some shares of ₹ 100 each of a company at ₹ 230. By this his income increases by 1/3 of the previous income. Find the rate of dividend declared by the

company, no. of shares bought by him and also the actual rate of interest.

Or

(a) If $^{n}P_{r} = 240$, $^{n}C_{r} = 120$, find n and r.

(b) There are 15 teachers in Science group of a school. 4 of them teach Maths only and 3 of them teach both Math and Science. Find the number of those teachers who teach Science only.

4. (a) Find x and y if :

$$2x - y = \begin{bmatrix} 3 & -3 & 0 \\ 3 & 3 & 2 \end{bmatrix}$$

and

$$2y + x = \begin{bmatrix} 4 & 1 & 5 \\ -1 & 4 & -4 \end{bmatrix}$$

(b) Evaluate :

$$\lim_{x \to 3} \frac{x^5 - 243}{x^3 - 27}$$

Or

(a) Find a matrix X such that :

$$\begin{bmatrix} 1 & -4 \\ 3 & -2 \end{bmatrix} X = \begin{bmatrix} -16 & -6 \\ 7 & 2 \end{bmatrix}$$

(b) If $y = \dfrac{x}{1+x}$, show that $x\dfrac{dy}{dx} = y(1-y)$.

5. (a) Find the maximum and minimum values of the following functions :

(i) $x^3 - 12x + 10$

(ii) $x^3 - 2x^2 + x + 6$

(b) If $y = (\log x)^x + x^{\log x}$, find $\dfrac{dy}{dx}$.

Or

(a) Determine the local maximum and local minimum values of the following functions :

(i) $2x^2 - 3x + 5$

(ii) x^2

(b) Evaluate the following integrals :

(i) $\displaystyle\int (\log x)^2\, dx$

(ii) $\displaystyle\int \log\left(x + \sqrt{a^2 + x^2}\right) dx$

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