



INSTITUTE OF HUMAN RESOURCE ADVANCEMENT
UNIVERSITY OF COLOMBO, SRI LANKA
Masters Degree in Business Management - Course No.02
1st Semester Examination
(Held in December, 2013)
MBM 02 – Business Mathematics

Instructions to the Candidates

- (1) Total number of pages – Three (03)
- (2) Total number of questions – Five (05)
- (3) Answer all questions.
- (4) If a page or a part of this question paper is not printed, please inform the Supervisor immediately.
- (5) Time allocated for the examination is three (03) hours.
- (6) Write your index number in all pages of answer script
- (7) Tie up all answer sheets at the end of the examination

- (1) i. Solve the following equations
- a. $(X^2 - 4)^2 - 41(X^2 - 4) + 400 = 0$ (03 Marks)
- b. $3^{2x} - 12(3^x) + 27 = 0$ (04 Marks)
- ii. It is expected that there will be equal contribution from share holders to the 570000 capital of a company. But four share holders are less than the expected. Therefore; other share holders have to pay additional Rs.8000 each. Find the expected number of share holders and their contribution. (06 Marks)
- iii. If $F(X) = 4X^6 + 3X^5 - 5X^4 + 6X^3 - 3X^2 + X - 5$ and $g(X) = X + 2$, Find $F(X) \div g(X)$ (04 Marks)
- iv. Show that $(X - 3)$ is a factor of $2X^2 - X - 15$ (03 Marks)
- (Total 20 marks)**

- (2) i. $\frac{7n-2}{4!} + \frac{5n}{3!} + \frac{3-n}{2!}$ Simplify (03 Marks)
- ii. Selecting five members out of seven lawyers and five accountants, a committee should be appointed. Both the lawyers & accountants should represent the committee but the maximum number of accountants should be three. Find the number of ways to arrange the committee. (05 Marks)
- iii. $(a + b)^6$ Expand (04 Marks)
- iv. Find the 7th term of $\left(x^2 - \frac{2}{x}\right)^8$ (04 Marks)
- v. What is the independent term of $\left(2x^5 + \frac{6}{x^4}\right)^9$ (04 Marks)
- (Total 20 marks)**

(3) i. Find partial fractions of $\frac{1}{4x^2-9}$

(05 Marks)

ii. If $B = \begin{pmatrix} 1 & 3 & 4 \\ 3 & 2 & 3 \\ 1 & 2 & 3 \end{pmatrix}$ Find Inverse Matrix of B

(05 Marks)

iii. The "Y" company produces three products A, B and C. Their selling prices are Rs.20, Rs.30 and Rs.40 respectively. The unit cost of each product is respectively Rs.10, Rs.15 and Rs.20. Total daily profit of these three products is Rs.800. If the selling price of each product is reduced by Rs.5, total the daily profit declined by Rs.300. Without changing the price, if the efficiency is increased, the cost of product A and B can be reduced by Rs.2. Thus, the total daily profit increased by Rs.100. How many units are sold by the company before the prices are changed? (Use Inverse matrix method)

(10 Marks)

(Total 20 marks)

(4) i. You are willing to buy a car worth of 2mn after 8years from today. If annual interest rate is 12% and compounded quarterly, how much should you save at the end of every year to buy the car.

(08 Marks)

ii. A manufacturer expects to buy a new building worth of Rs.3, 000,000 to the factory after 8 years from today. He plans to deposit Rs.250, 000 at the end of every year to make a fund to buy the machine. The annual interest rate is 12% compounded quarterly for first 5 yrs. After 5 yrs the annual interest rate is 14% compounded quarterly. Will the manufacturer's expect be successful.

(12 Marks)

(Total 20 marks)

(5) i. If $g(t) = \sqrt{t^2 - 9}$, Find the domain

(03 Marks)

ii. If $f(x) = \frac{2x+3}{3x+4}$ find $f^{-1}(x)$

(04 Marks)

iii. Find the second order derivative of $Y = e^{3x} + e^x$

(03 Marks)

iv. Find the slope of the business function $Y = 2x^2 + 5x + 7$ at (2, 25)

(04 Marks)

v. Demand function of a product is given by $P = \frac{80-x}{4}$. Where “x” is the quantity and “P” is the price. Find the quantity which maximize total revenue.

(06 Marks)

(Total 20 marks)