

Total number of printed pages-15

4 (Sem I) BMAT

2014

BUSINESS MATHEMATICS

(Compulsory for Major)

Paper : 101

Full Marks : 80

Time : Three hours

*The figures in the margin indicate full marks
for the questions.*

1. Answer the following questions : $1 \times 10 = 10$

তলৰ প্ৰশ্নবোৰৰ উত্তৰ দিয়া :

(i) Give an example of null set.

বিন্দু সংহতিৰ এটা উদাহৰণ দিয়া।

(ii) Find $\text{Log}_{\sqrt{5}} 25$

$\text{Log}_{\sqrt{5}} 25$ নিৰ্ণয় কৰা।

Contd.

(iii) In case of compound interest, what is the formula for amount if interest is compounded quarterly.

চক্রবৃদ্ধি সুতৰ ক্ষেত্ৰত, সৰ্ব্ব্বিক্ৰমূলৰ সূত্ৰটো কি, যদি সুত পৰিশোধ চাৰি মাহৰ মূৰে-মূৰে কৰা হয় ?

(iv) Show that (দেখুওৱা যে),

$${}^n C_{n-r} = {}^n C_r$$

(v) What is the twelfth term of the A.P.
3, 7, 11, 15, ...

3, 7, 11, 15, ... সমান্তৰ প্ৰগতিটোৰ দ্বাদশ পদটো কি?

(vi) Choose the correct answer :

শুদ্ধ উত্তৰ নিৰ্বাচন কৰা :

The line $y = 5x$ is :

$y = 5x$ ৰেখাডাল

(a) parallel to the x -axis.

x -অক্ষৰ সমান্তৰাল।

(b) parallel to the y -axis.

y -অক্ষৰ সমান্তৰাল।

(c) perpendicular to the x -axis.

x -অক্ষৰ ওপৰত লম্ব।

(d) passing through the origin

মূল বিন্দুৰ মাজেদি পাৰ হৈ গৈছে।

(vii) Define limit of a function $f(x)$ at $x = a$.

$x = a$ ত $f(x)$ ফলনত সীমামানৰ সংজ্ঞা দিয়া।

(viii) Fill in the blank (খালী ঠাই পূৰোৱা) :

$\frac{d}{dx}(TR) = \text{-----}$, where x denotes the volume of output (য'ত x এ উৎপাদিত সামগ্ৰীৰ পৰিমাণক বুজাইছে)।

(ix) What is integration of $\frac{1}{x+1}$ with respect to x ?

x সাপেক্ষে $\frac{1}{x+1}$ ৰ অনুকলন কিমান ?

(x) Define 'objective function' associated with linear programming.

ৰৈখিক প্ৰক্ৰমণৰ লগত জড়িত 'অভিলক্ষ ফলন'ৰ সংজ্ঞা দিয়া।

2. Answer the following questions : $2 \times 5 = 10$

তলৰ প্ৰশ্নকেইটাৰ উত্তৰ দিয়া :

(i) If the third and the sixth terms of an A.P. are 7 and 13 respectively, find the first term and the common difference.

যদি কোনো এটা সমান্তৰ শ্ৰেণীৰ তৃতীয় আৰু ষষ্ঠ পদ যথাক্ৰমে 7 আৰু 13 হয়, তেনেহ'লে প্ৰথম পদ আৰু সাধাৰণ অন্তৰ নিৰ্ণয় কৰা।

(ii) If (যদি) $U = \{1, 2, 3, 4, 5, 6, 7, 8\}$, $A = \{1, 2, 3, 4\}$, $B = \{2, 4, 6\}$, and (আৰু) $C = \{1, 2, 5\}$, then write down the elements of $A' \cap (B - C)$ [তেনেহ'লে $A' \cap (B - C)$ ৰ মৌলবোৰ লিখা।]

(iii) Evaluate the following determinant (তলৰ নিৰ্ণায়কটোৰ মান নিৰ্ণয় কৰা) :

$$\begin{vmatrix} o & -h & g \\ h & o & -f \\ -g & f & o \end{vmatrix}$$

(iv) Find $\frac{d}{dx}(x \log x)$

$\frac{d}{dx}(x \log x)$ নিৰ্ণয় কৰা

(v) Evaluate (মান নিৰ্ণয় কৰা)

$${}^7P_4 \div {}^8P_3$$

3. Answer the following questions : $5 \times 4 = 20$

তলৰ প্ৰশ্নবোৰৰ উত্তৰ দিয়া :

(a) Robin borrows Rs. 32,760 without interest and agrees to pay back in 12 monthly instalments, each instalment being twice the preceding one. Find the second and the last instalments.

ৰবীনে বিনা সুতত 32,760 টকা ধাৰলৈ লৈ 12টা মাহেকীয়া কিস্তিত টকাখিনি পৰিশোধ কৰাব চুক্তি কৰিলে যাতে প্ৰতিটো কিস্তিৰ টকাৰ পৰিমাণ আগৰ কিস্তিৰ টকাৰ পৰিমাণৰ দুগুণ হয়। দ্বিতীয় আৰু শেষৰ কিস্তিৰ টকাৰ পৰিমাণ নিৰ্ণয় কৰা।

Or / নাইবা

If $a^{\frac{1}{x}} = b^{\frac{1}{y}} = c^{\frac{1}{z}}$ and a, b, c are in G.P., prove that x, y, z are in A.P.

যদি $a^{\frac{1}{x}} = b^{\frac{1}{y}} = c^{\frac{1}{z}}$ হয় আৰু a, b, c গুণোত্তৰ
প্রগতিত থাকে, প্রমাণ কৰা যে x, y, z সমান্তৰ প্রগতিত
থাকিব।

(b) Find the effective rate equivalent to nominal rate of (i) 6% converted quarterly, (ii) 8% converted semi-annually.

(i) তিনি মাহৰ মূৰে মূৰে সংযোজিত হোৱাৰ ক্ষেত্ৰত 6% আৰু (ii) ছমাহৰ মূৰে মূৰে সংযোজিত হোৱাৰ ক্ষেত্ৰত 8% নমিনেল হাৰৰ সমতুল্য কাৰ্যকৰী হাৰ নিৰ্ণয় কৰা।

Or / নাইবা

In how many years will an annuity of Rs. 400 amount to Rs. 4064 at 3% p.a. compound interest? [Given : $\log(1.03) = 0.0128$ and $\log(1.3048) = 0.1155$].

বছৰি 3% চক্ৰবৃদ্ধি হাৰ সুতত কিমান বছৰত 400 টকাৰ বাৰ্ষিকীৰ সৰ্ব্বমূল 4064 টকা হ'ব ?

(c) A committee of 5 is to be formed out of 7 male entrepreneurs and 4 female entrepreneurs. In how many ways the committee can be formed if at least one female entrepreneur is to be included in it ?

7 জন পুৰুষ আৰু 4 গৰাকী মহিলা উদ্যোগকাৰীৰ মাজৰ পৰা 5 জনীয়া সমিতি এখন গঠন কৰিব লাগে। যদি কমেও এগৰাকী মহিলা উদ্যোগকাৰী সমিতিখনত অন্তৰ্ভুক্ত কৰিব লাগে, তেন্তে কিমান প্ৰকাৰে সমিতিখন গঠন কৰিব পাৰি ?

Or / নাইবা

Of the 100 boarders of a hostel 80 drink tea, 40 drink coffee and 25 drink tea and coffee both. How many of them drink neither tea nor coffee ?

ছাত্ৰাবাস এটাত থকা 100 জন আৱাসীৰ 80 জনে চাহ খায়, 40 জনে কফি খায় আৰু 25 জনে চাহ আৰু কফি দুয়োটাই খায়। তেওঁলোকৰ কিমানজনে চাহ নাইবা কফি একো না খায় ?

(d) প্রমাণ কৰা যে (Prove that)

$$\begin{vmatrix} 1+a & 1 & 1 \\ 1 & 1+a & 1 \\ 1 & 1 & 1+a \end{vmatrix} = a^2(a+3)$$

Or / নহিবা

If (যদি) $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \\ 4 & -3 \end{bmatrix}$ and (আৰু)

$$B = \begin{bmatrix} -2 & -3 \\ 1 & 0 \\ -2 & 4 \end{bmatrix}$$

then find the matrix C (তেন্তে C মৌলকক্ষটো
নিৰ্ণয় কৰা) so that (যাতে) $A+B+C=O$, where O
represents zero matrix (য'ত O শূন্য মৌলকক্ষ
বুজাইছে)।

4. (a) Solve the following system of equations by
Cramer's rule :

(ক্ৰেমাৰৰ নিয়মমতে তলৰ সমীকৰণকেইটা সমাধা কৰা) :

$$x + y + z = 3$$

$$2x - 3y + 5z = 4$$

$$x + 2y - 4z = -1$$

7

Or / নহিবা

A manufacturer produces three products A ,
 B , and C and sells in two markets. Annual
sales of these products in the two markets
are given below :

এজন নিৰ্মাণকাৰীয়ে A , B আৰু C সামগ্ৰী তিনিবিধ
উৎপাদন কৰে আৰু এই উৎপাদিত সামগ্ৰীসমূহ দুখন
বজাৰত বিক্ৰী কৰে। বজাৰ দুখনত এই সামগ্ৰীকেইবিধৰ
বাৰ্ষিক তথ্য তলত দিয়া হৈছে :

Products (উৎপাদিত সামগ্ৰী)

| | A | B | C |
|------------------------|--------|--------|-------|
| Market I (বজাৰ I) | 10,000 | 2,000 | 8,000 |
| Market II (বজাৰ II) | 6,000 | 20,000 | 4,000 |

(i) If the unit sales price of A , B , and C are
Rs.25, Rs.12 and Rs. 15 respectively, find
the total revenue in each market.

যদি A , B , আৰু C সামগ্ৰী তিনিবিধৰ প্ৰতি এককৰ
বিক্ৰি মূল্য যথাক্ৰমে 25 টকা, 12 টকা আৰু
15 টকা হয়, তেন্তে প্ৰতিখন বজাৰত মুঠ বিক্ৰী
আয় নিৰ্ণয় কৰা।

- (ii) If the unit cost of products A , B and C
are Rs.18, Rs.10 and Rs.8 respectively,
find the gross profit.

যদি A , B , আৰু C সামগ্ৰী তিনিবিধৰ প্ৰতি এককৰ
উৎপাদন ব্যয় যথাক্ৰমে 18 টকা, 10 টকা আৰু
8 টকা হয়, তেন্তে মুঠ লাভ নিৰ্ণয় কৰা।

- (b) If ${}^{m+n}P_2 = 56$, ${}^{m-n}P_2 = 12$, find m and n .

যদি ${}^{m+n}P_2 = 56$, ${}^{m-n}P_2 = 12$ তেনেহ'লে m আৰু
 n ৰ মান উলিওৱা।

5. (a) Establish the equation of a line in the form :

$$\frac{x}{a} + \frac{y}{b} = 1$$

5

$\frac{x}{a} + \frac{y}{b} = 1$ আকাৰত সৰল ৰেখাৰ সমীকৰণ প্ৰতিষ্ঠা
কৰা।

- (b) Find the equation of the line passing through
the origin and the point of intersection of
the lines $2x - 7y + 11 = 0$ and $x + 3y - 8 = 0$.

5

মূল বিন্দু আৰু $2x - 7y + 11 = 0$ আৰু
 $x + 3y - 8 = 0$ ৰেখা দুডালৰ ছেদবিন্দুৰ মাজেদি যোৱা
ৰেখাৰ সমীকৰণ নিৰ্ণয় কৰা।

Or / নহিবা

A firm finds that its customers will buy 15%
more of its product if the price of the product
is reduced by Rs.5. When the price is
Rs.25, the firm is selling 1000 units.
Assuming the demand curve to be linear,
find its equation.

এখন পামে ঠাৱৰ কৰিলে যে যদি পামখনৰ উৎপাদিত
বস্তুৰ মূল্য প্ৰতি এককত 5 টকাকৈ কমে তেনেহ'লে
গ্ৰাহকে কিনা বস্তুৰ পৰিমাণ 15% বাঢ়িব। যেতিয়া প্ৰতি
একক সামগ্ৰীৰ মূল্য 25 টকা হয়, পামখনে 1000 একক
সামগ্ৰী বিক্ৰী কৰে। চাহিদা বক্ৰ ৰৈখিক বুলি ধৰি লৈ
ইয়াৰ সমীকৰণ নিৰ্ণয় কৰা।

6. (a) (i) If (যদি) $f(x) = \frac{1-x}{1+x}$, show that (দেখুওৱা)

যে) $f\left(\frac{1-x}{1+x}\right) = x$ 3

(ii) Prove that (প্ৰমাণ কৰা যে)

$$\lim_{x \rightarrow 0} \frac{\sqrt{1+x} - 1}{x} = \frac{1}{2}$$
 2

Or / নহিবা

The function $f(x)$ is defined as follows :

তলত উল্লেখ কৰাৰ দৰে $f(x)$ ফলনৰ সংজ্ঞা দিয়া হৈছে :

$$f(x) = \begin{cases} 1-x, & 0 \leq x \leq 1 \\ x-1, & x > 1 \end{cases}$$

Is $f(x)$ continuous at $x=1$?

$f(x)$ ফলনটো $x=1$ ত অনবিচ্ছিন্ন হয়নে ?

(b) Find (i) the average revenue function and (ii) the marginal revenue function for the total revenue function (R) given below. Evaluate them at $Q=2$ and $Q=3$. 5

$$R = 12Q - Q^2$$

তলৰ মুঠ ৰাজহ ফলন (R)ৰ বাবে (i) গড় ৰাজহ ফলন আৰু (ii) প্ৰান্তিক ৰাজহ ফলন নিৰ্ণয় কৰা। $Q=2$ আৰু $Q=3$ ত ইহঁতৰ মান নিৰ্ণয় কৰা।

Or / নহিবা

A steel plant produces x tons of steel per week at a total cost of

$$\text{Rs.} \left(\frac{x^3}{3} - 7x^2 + 111x + 50 \right).$$
 Find the output

level at which the marginal cost attains its minimum.

এটা ইস্পাত কাৰখানাই প্ৰতি সপ্তাহত মুঠ

$$\left(\frac{x^3}{3} - 7x^2 + 111x + 50 \right)$$
 টকা ব্যয় কৰি x টন

ইস্পাত উৎপাদন কৰে। যি পৰ্যায়ৰ উৎপাদনত প্ৰান্তিক ব্যয় ন্যূনতম হয় সেই উৎপাদনৰ পৰিমাণ নিৰ্ণয় কৰা।

7. (a) Integrate (অনুকলন কৰা)

2×2=4

(i) $\int \frac{4x-5}{4x^2-10x+8} dx$

(ii) $\int \left(\sqrt{x} - \frac{1}{\sqrt{x}} \right) dx$

Or / নাইবা

The marginal cost (M.C.) of a product is given by $25 + 30x - 9x^2$ and the fixed cost (F.C.) is known to be 55 units. Find the total cost (T.C.) and the average cost (A.C.) functions. x denotes the number of units of output produced.

এবিধ সামগ্ৰীৰ প্ৰাথমিক ব্যয় (M.C.) ক $25 + 30x - 9x^2$ ৰ দ্বাৰা দৰ্শোনা হয় আৰু সামগ্ৰীবিধৰ স্থিৰ ব্যয় (F.C.) হ'ল 55 একক। মুঠ ব্যয়ফলন (T.C.) আৰু গড় ব্যয় ফলন (A.C.) নিৰ্ণয় কৰা। x এ উৎপাদিত সামগ্ৰীৰ এককৰ সংখ্যক বুজাইছে।

(b) What is a linear programming problem ? Illustrate with an example. 3+3=6

ৰৈখিক প্ৰক্ৰমণ সমস্যা কি ? এটা উদাহৰণেৰে ব্যাখ্যা কৰা।

Or / নাইবা

Solve the following linear programming problem by graphical method :

তলৰ ৰৈখিক প্ৰক্ৰমণ সমস্যাটো লেখ পদ্ধতিৰে সমাধা কৰা :

Maximize $Z = 8x_1 + 5x_2$

subject to the constraints

$x_1 \leq 150$

$x_1 + x_2 \leq 250$

$2x_1 + x_2 \leq 500$

$x_1, x_2 \geq 0$.

Total number of printed pages--7

4 (Sem I) HRMN (M1)

2014

HUMAN RESOURCE MANAGEMENT

Paper : 105 (M)

Full Marks : 80

Time : Three hours

*The figures in the margin indicate full marks
for the questions.*

1. Choose the correct answer : 1×10
- (a) 'Kaizen' means —
- (i) All time improvement
 - (ii) Continuous or ongoing improvement
 - (iii) Temporary improvement
 - (iv) Improvement of working conditions
- (b) Rowan Premium Plan was developed by David Rowan in the year
- (i) 1910
 - (ii) 1911
 - (iii) 1901
 - (iv) 1921

Contd.

- (c) Which one of the following is a type of financial incentive ?
- (i) Better working conditions
 - (ii) Educational opportunities
 - (iii) Promotion policies
 - (iv) Leave encashment
- (d) Virtual organisation is also known as —
- (i) Informal organisation
 - (ii) Technical organisation
 - (iii) Digital organisation
 - (iv) Mobile organisation
- (e) Selection tests that are designed to measure the proficiency achieved by a person is called :
- (i) Judgement Tests
 - (ii) Projective Tests
 - (iii) Achievement Tests
 - (iv) Personality Tests

- (f) Which one of the following factors do not affect the International Human Resource Management ?
- (i) Economic Factors
 - (ii) Labour Cost Factors
 - (iii) Political Factors
 - (iv) Cultural Factors
- (g) The status of a Human Resource Manager can be analysed :
- (i) As a line manager
 - (ii) As a co-ordinator
 - (iii) As a staff manager
 - (iv) All of the above
- (h) When a company attracts talents from another firm by offering attractive pay packages and other terms and conditions, it is known as :
- (i) Outsourcing
 - (ii) Poaching
 - (iii) Hiring
 - (iv) Stimulating

- (i) Blue collar employees are those
- (i) who receive wages on hourly, daily or weekly basis
 - (ii) who are provided blue coloured uniform
 - (iii) who work in blue coloured machines
 - (iv) who are paid remuneration on monthly or annual basis
- (j) Which one of the following benefits is not included in Employees' State Insurance Act, 1948 ?
- (i) Sickness Benefit
 - (ii) Maternity Benefit
 - (iii) Old age Benefit
 - (iv) Disablement Benefit

2. Write very short answer (within 30 words each) to **any five questions** : $2 \times 5 = 10$
- (i) What is Six Sigma ?
 - (ii) What is a Stress interview ?

- (iii) Explain the meaning of fringe benefits.
- (iv) What is poaching ?
- (v) Explain *two* benefits offered by outsourcing to the HRM functions.
- (vi) Show *two* differences between personnel management and HRM.
- (vii) What is Halo Effect in interview ?

3. Write short answer on **any four** of the following : (within 150 words each) : $5 \times 4 = 20$
- (i) What are the pre-requisites of a sound recruitment policy ?
 - (ii) Discuss the qualities of a good Human Resource Manager.
 - (iii) Explain the external sources of recruitment preferred by an organisation.
 - (iv) Describe the factors that affect the wage and salary structure in an organisation.

- (v) What are the benefits of incentive schemes to the workers and the producers ?

Or

Distinguish between Domestic HRM and International HRM.

4. Discuss the significance of HRM from organisational, social and professional point of view. 10

Or

What are the future challenges to Human Resource Manager ? Discuss.

5. What are the objectives of job evaluation ? Discuss the factor comparison method of job evaluation with its merits and demerits. 10

Or

Discuss the principles of wage and salary administration.

6. Give the meaning of Human Resource Information System. State the type of information generated by HRIS. 10

Or

What is downsizing strategy ? Suggest some measures to manage work force diversity effectively in modern organisation.

7. Write briefly on *any two* of the following :
5×2=10

- (i) Outplacement
- (ii) Voluntary Retirement Scheme (VRS)
- (iii) Benefits of Induction Programme
- (iv) Steps in TQM process.

Total number of printed pages-7

4 (Sem I) COAC (M1)

2014

COST ACCOUNTING

(Major)

Paper : 105

Full Marks : 80

Time : Three Hours

*The figures in the margin indicate full marks
for the questions.*

1. Answer as directed : 1×6=6
- (a) What is 'Just-in-Time Purchasing' ?
 - (b) Define 'Codification of materials'.
 - (c) What is 'Time Booking' in Labour Cost Control ?
 - (d) Mention the meaning of 'Time and Motion Study'.

Contd.

(e) Give two features of 'Process Costing'.

(f) Mention two difficulties involved in Process Costing.

2. Answer the following questions briefly :

3×5=15

(a) Explain the practical difficulties faced while installing Cost Accounting System in an organisation.

(b) Define, with examples, the meaning of (i) Cost Unit and (ii) Cost Centre.

(c) What are the essentials of 'Perpetual Inventory System' ?

(d) Mention the causes of high labour turnover.

(e) Discuss the applicability of Process Costing.

3. Answer the following questions : 5×2=10

(a) Write a brief note on 'Methods of Classification' of overheads in cost accounting.

OR

Write a brief note on 'Methods of 'Overhead Absorption' in Cost Accounting.

(b) Describe the treatment of the following items in Cost Accounting :

(i) Depreciation

(ii) Interest on Capital.

OR

The following budget is presented before you for the year 2014-15.

Factory overheads : Rs. 62,000

Direct labour cost : Rs. 98,000

Direct labour hours : 15,500 Hours

Machine Hours : 50,000 Hours

There will be 3,000 direct labours and 10 Machines working during 2014-15.

You are required to calculate

(i) Direct Labour Hour Rate

(ii) Direct Labour Cost Rate

(iii) Machine Hour Rate.

4. Answer the following questions : $5 \times 2 = 10$

(a) Explain the meaning and basic features of 'Integral System of Cost Accounting Records'.

(b) Explain the possible reasons for differences between Profit (Loss) shown by Cost Accounts and Financial Accounts.

5. Answer the following :

(a) From the following information, prepare a Cost Sheet showing Cost Per Unit and show the profit for the month of January 2014.

9

| | |
|---------------------------|---------------------|
| Raw Materials Consumed | Rs. 80,000.00 |
| Direct wages | Rs. 48,000.00 |
| Selling Overhead per unit | Rs. 1.50 |
| Machine hours worked | 8,000 hours |
| Machine hour rate | Rs. 4 per hour |
| Office Overhead | 10% of Works Cost |
| Units Produced | 4,000 |
| Units Sold | 3,600 @ Rs. 50 each |

(b) From the following particulars find out the value of Closing Inventory as on 31-03-2014

10

Purchases :

2014, March 3 : 400 kgs @ Rs. 2.50 per kg

7 : 800 kgs @ Rs. 3.00 per kg

17 : 500 kgs @ Rs. 3.50 per kg

Issues :

2014, March 5 : 600 kgs

9 : 500 kgs

25 : 600 kgs

Stock on March 1, 2014 was 500 kgs valued @ Rs. 2.00 per kg. The stock verification on March 27 revealed that there was a loss of 10 kg. Apply FIFO Method.

OR

Discuss the merits and demerits of FIFO and LIFO methods of inventory valuation. 10

(c) Calculate the total monthly remuneration of two workers : A and B from the following data : 10

(i) Standard production per month per worker 2000 units.

Actual Production : A : 1,800 units

B : 1,600 units

(ii) Piece Work Rate in Re 1.00 per unit of actual production

(iii) Additional production bonus is Rs. 20 for each percentage actual production exceeding 80% of actual production

OR

Give the treatment of the following items as applied in Cost Accounting : 10

(i) Direct Expenses

(ii) Indirect Expenses

(iii) Interest on Capital

(iv) Research and Development expenses

(v) Depreciation.

(d) The following is the condensed record of transaction on 31st March, 2014 relating to a special contract completed on the same financial year.

| | Rs. |
|--|-------|
| Materials bought from Market | 3,000 |
| Materials issued from the Stores | 1,000 |
| Wages | 4,880 |
| Direct Expenses | 588 |
| Work oncost 25% of Direct wages ; Office oncost 10% of Prime Cost ; Contract Price Rs. 12,000. | |

You are required to prepare a contract Account Keeping in view that material returned amounted to Rs. 480. 10