Total No. of Printed Pages—7

4 SEM TDC COAC (CBCS) C 408

2025

(May/June)

COMMERCE

(Core)

Paper : C–408

(Cost Accounting)

Full Marks : 80

Pass Marks : 32

Time : 3 hours

The figures in the margin indicate full marks for the questions

1. *(a)* Fill in the blanks : 1×5=5

(i) Fixed cost per unit _____ when volume of production increases.

(ii) _____ is the combination of direct materials, direct labour and direct expenses.

(iii) Cost of abnormal idle time and overtime is transferred to _____.

(iv) Depreciation on showroom building is to be treated as _____ overheads.

(v) In contract costing _____ clause allows adjustment of the prices of materials or rate of labour, etc., when these rise beyond a specified limit.

(b) Choose the correct answer : 1×3=3

(i) Rent of a factory building is a variable cost / fixed cost / semi-variable cost.

(ii) A high labour turnover increases/ decreases the cost of production.

(iii) The basis of apportionment for canteen and staff welfare expenses is floor area occupied/number of workers/wages.

2. Write short notes on any *four* of the following : 4×4=16

(a) Economic Order Quantity (EOQ)

(b) LIFO

(c) Stock control

(d) Objectives of material control

(e) Reorder level

(f) Bin card

3. (a) Discuss the nature of cost accounting and the different cost concepts. 7+7=14

Or

(b) From the following information, prepare a cost sheet showing the cost and profit : 14

Opening raw materials—₹ 29,500

Closing raw materials—₹ 36,000

Opening work-in-progress—₹ 31,200

Closing work-in-progress—₹ 38,400

Opening finished goods—200 units @₹ 84

Closing finished goods—1600 units

Purchase of raw material—₹ 1,50,000

Carriage on purchase—₹ 1,500

Sale of scrap of raw materials—₹ 5,000

Wages—₹ 2,97,000

Works overhead @60% of direct labour cost

Administrative overhead @₹ 12 per unit produced

Selling and distribution overhead @20% on selling price

Sales 7600 units at a profit of 10% on cost price

4. *(a)* The following are the transactions of a firm in purchase and issue of raw materials :

2.01.2023 : Purchased 4000 units @₹ 4 per unit

23.01.2023 : Purchased 500 units @₹ 5 per unit

5.02.2023 : Issued 2000 units

10.02.2023 : Purchased 6000 units @₹ 6 per unit

12.02.2023 : Issued 4000 units

2.03.2023 : Issued 1000 units

5.03.2023 : Issued 2000 units

15.03.2023 : Purchased 4500 units @₹ 5·50 per unit

20.03.2023 : Issued 3000 units

From the above, prepare Stores Ledger Account using *(i)* LIFO and *(ii)* FIFO method of pricing the issues. 7+7=14

(Continued)

Or

(b) *(i)* Describe the essential characteristics of a good system of wage payment. 7

(ii) Describe with illustration the salient features of Rowan Plan and Halsey Plan. 7

5. *(a)* From the following information, compute machine hour rate of a machine in a shop consisting of 3 machines occupying equal floor space. The estimated working hours per year are fixed at 2500 hours in which normal idle time is estimated at 20% of the standard time :

Rent and taxes of the shop per annum—₹ 3,600

General electricity for the shop per month—₹ 200

Repairs and maintenance expenses for the machine per annum—₹ 600

Rate of power charges for 100 units (the machine consuming 10 units per hour)—₹ 3

Foreman's salary for supervising all the machines per month—₹ 750

Indirect labour cost—₹ 2 per hour for the machine

The machine cost—₹ 1,30,000

Scrap value is estimated—₹ 10,000

Estimated life is 10 years. The Foreman devotes equal attention for each machine in the shop. 14

(Turn Over)

Or

(b) What factors would you consider for determining the overhead absorption rate? Explain the causes of over- and under-absorption of overheads. 7+7=14

6. (a) A product of a manufacturing concern possesses through two processes *A* and *B* and then to finished stock. It is ascertained that in each process 5% of the total weight is lost and 10% is scrap, which from processes *A* and *B* realises ₹ 80 per tonne and ₹ 200 per tonne respectively. The following are the figures relating to both the processes :

	Process—A	*Process—B*
Materials (tonnes)	1000	70
Cost of materials (₹ per tonne)	125	200
Wages (₹)	28,000	10,000
Manufacturing expenses (₹)	8,000	5,250
Output (tonnes)	830	780

Prepare the Process Cost Accounts showing cost per tonnes of each process. There was no work-in-progress in any process. 14

(Continued)

Or

(b) (i) Define job costing. Where is it applied? 2+2=4

(ii) Under what circumstances, we need to prepare reconciliation of Cost Account and Financial Account and how is it prepared? 10

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Total No. of Printed Pages—15

4 SEM TDC BUMT (CBCS) C 409

2025

(May/June)

COMMERCE

(Core)

Paper : C–409

(Business Mathematics)

Full Marks : 80

Pass Marks : 32

Time : 3 hours

The figures in the margin indicate full marks for the questions

1. যি কোনো পাঁচটা প্রশ্নৰ উত্তৰ দিয়া : 2×5=10

Answer any *five* questions :

(a) মান নির্ণয় কৰা :

Find the value of

$$\begin{vmatrix} 2 & 1 & 0 \\ 3 & 0 & 2 \\ 5 & 1 & -2 \end{vmatrix}$$

(b) মৌলকক্ষৰ সংজ্ঞা দিয়া।
Define matrix.

(c) মান নির্ণয় কৰা :
Find the value of

$$\lim_{x \to 2} \frac{x^2 - 4}{x - 2}$$

(d) $\frac{dy}{dx}$ ৰ জ্যামিতিক সংজ্ঞা লিখা।
Give the geometrical interpretation of $\frac{dy}{dx}$.

(e) কিস্তিৰ নগদ মূল্য বুলিলে কি বুজা?
What do you mean by present worth of annuities?

(f) LPP বুলিলে কি বুজা?
What do you mean by LPP?

(g) $u = f(x, y)$ ফলনৰ আংশিক অৱকলজ $\frac{\partial u}{\partial x}$ আৰু $\frac{\partial u}{\partial y}$ ৰ ধাৰণা দিয়া।
If $u = f(x, y)$ is a function, then define the partial derivatives $\frac{\partial u}{\partial x}$ and $\frac{\partial u}{\partial y}$.

(Continued)

2. (a) (i) যদি $\begin{bmatrix} 1 & x+y \\ x-y & 0 \end{bmatrix} = \begin{bmatrix} 1 & 3 \\ 1 & 0 \end{bmatrix}$ হয়, তেনেহ'লে x আৰু y ৰ মান কিমান? 2

If $\begin{bmatrix} 1 & x+y \\ x-y & 0 \end{bmatrix} = \begin{bmatrix} 1 & 3 \\ 1 & 0 \end{bmatrix}$, then find the values of x and y.

(ii) প্ৰমাণ কৰা যে
Prove that

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

(iii) সমাধান কৰা
Solve

$$\begin{vmatrix} 4 & x & 6 \\ 3 & 2 & 1 \\ -5 & 7 & x \end{vmatrix} = 0$$ 4

(iv) যদি $A = \begin{bmatrix} 2 & 1 & 3 \\ 1 & 4 & 2 \\ 5 & -2 & 6 \end{bmatrix}$ হয়, তেনেহ'লে A^{-1} কিমান? 5

(Turn Over)

If $A=\begin{bmatrix}2 & 1 & 3\\ 1 & 4 & 2\\ 5 & -2 & 6\end{bmatrix}$, then what will be A^{-1}?

অথবা / Or

(b) *(i)* মৌলকক্ষ আৰু নির্ণায়কৰ মাজত থকা পার্থক্যবিলাক কি কি? 2

Write the differences between a matrix and a determinant.

(ii) প্ৰমাণ কৰা যে

Prove that

$$\begin{vmatrix} a-b & b-c & c-a\\ b-c & c-a & a-b\\ c-a & a-b & b-c\end{vmatrix}=0$$ 3

(iii) $A+B=\begin{bmatrix}1 & 0 & 2\\ 2 & 2 & 2\\ 1 & 1 & 2\end{bmatrix}$ আৰু

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

হ'লে, A আৰু Bৰ মান কিমান? 4

(Continued)

Find the values of A and B, when

$$A+B=\begin{bmatrix}1 & 0 & 2\\ 2 & 2 & 2\\ 1 & 1 & 2\end{bmatrix}$$ and

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

(iv) যদি $A=\begin{bmatrix}2 & 1 & -2\\ 3 & 1 & 4\\ 1 & 2 & 3\end{bmatrix}$ আৰু I এটা একক মৌলকক্ষ হয়, তেনেহ'লে প্ৰমাণ কৰা যে $AI=IA$. 5

If $A=\begin{bmatrix}2 & 1 & -2\\ 3 & 1 & 4\\ 1 & 2 & 3\end{bmatrix}$ and I is an identity matrix, then prove that $AI=IA$.

3. *(a)* *(i)* যদি $f(x)=e^x$, তেনেহ'লে প্ৰমাণ কৰা যে $f(a)\cdot f(b)=f(a+b)$. 2

If $f(x)=e^x$, then prove that $f(a)\cdot f(b)=f(a+b)$.

(Turn Over)

(ii) কোনো এটা বিন্দুত এটা ফলনৰ অস্তিত্ব থকাৰ চর্তবিলাক কি কি? 3

What are the conditions for the existence of the limit of a function at a point?

(iii) মান নির্ণয় কৰা : 4

Evaluate :

$$\lim_{x\to 0}\frac{\sqrt{2+x^2}-\sqrt{2-x^2}}{x^2}$$

(iv) প্রমাণ কৰা যে $x^3+\frac{1}{x^3}$ ফলণৰ বৃহত্তম মান ক্ষুদ্রতম মানতকৈ কম। 5

Prove that the maximum value of the function $x^3+\frac{1}{x^3}$ is less than its minimum value.

অথবা / Or

(b) (i) যদি $f(x)=2x^2+5x-7$ হয়, তেনেহ'লে $f(1)$, $f(-1)$ৰ মান কিমান? 2

If $f(x)=2x^2+5x-7$, then what are the values of $f(-1)$ and $f(1)$?

(Continued)

(ii) মান নির্ণয় কৰা :

Find the value of

$$\lim_{x\to 2}\frac{x^2-3x+2}{x^2+x-6}$$ 3

(iii) যদি $y=\sqrt{\frac{1+x}{1-x}}$ হয়, তেনেহ'লে $\frac{dy}{dx}$ৰ মান নির্ণয় কৰা। 4

If $y=\sqrt{\frac{1+x}{1-x}}$, then find $\frac{dy}{dx}$.

(iv) এটা কোম্পানীয়ে প্রতিদিনে x একক তামৰ উৎপাদন কৰোঁতে মুঠ খৰচ হয়

$$TC=\frac{1}{3}x^3-5x^2+6x+55$$

দৈনিক উৎপাদনৰ পৰিমাণ কিমান একক হ'লে কোম্পানীত মুঠ খৰচৰ পৰিমাণ আটাইতকৈ কম হ'ব? 5

A company produces x units of copper per day at a total cost of

$$TC=\frac{1}{3}x^3-5x^2+6x+55$$

Find the output level at which total cost will be minimum.

(Turn Over)

4. (a) (i) ফলনৰ আংশিক অৱকলজ বুলিলে কি বুজা? 2

What do you mean by the partial derivative of a function?

(ii) তলত দিয়াবোৰৰ আংশিক অৱকলজবোৰ $\frac{\partial u}{\partial x}$ আৰু $\frac{\partial u}{\partial y}$ নিৰ্ণয় কৰা : 3

Find partial derivatives $\frac{\partial u}{\partial x}$ and $\frac{\partial u}{\partial y}$ of the following :

1. $u = x^2 + y$
2. $u = 6x^2y$

(iii) যদি $u = \frac{y}{z} + \frac{z}{x} + \frac{x}{y}$, প্ৰমাণ কৰা যে

$$x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} + z\frac{\partial u}{\partial z} = 0$$ 4

If $u = \frac{y}{z} + \frac{z}{x} + \frac{x}{y}$, prove that

$$x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} + z\frac{\partial u}{\partial z} = 0$$

(iv) ইউলাৰৰ সমগোত্ৰীয় ফলনৰ সূত্ৰটো লিখা। $u = \frac{xy}{x+y}$ ফলনৰ বাবে প্ৰমাণ কৰা যে u এটা সমগোত্ৰীয় ফলন।

2+3=5

(Continued)

Write Euler's theorem on homogeneous function. Verify Euler's theorem for the function $u = \frac{xy}{x+y}$.

অথবা / Or

(b) (i) $u = x^2 + y^2 + 3xy$ ফলনটো সমগোত্ৰীয় হয় বুলি প্ৰমাণ কৰা। 2

Verify that the function $u = x^2 + y^2 + 3xy$ is a homogeneous function.

(ii) $u = \log(x^2 + y^2)$ ফলনটোৰ মুঠ অৱকলজ du উলিওৱা। 3

For the function $u = \log(x^2 + y^2)$, find the total derivative du.

(iii) যদি $f(x, y) = x^2y^2 + x^5 + y^6$ এটা ফলন হয়, তেন্তে $f_{xx}, f_{xy}, f_{yx}, f_{yy}$ কি হ'ব? 4

If $f(x, y) = x^2y^2 + x^5 + y^6$, then find $f_{xx}, f_{xy}, f_{yx}, f_{yy}$.

(Turn Over)

(iv) যদি $u = x^2y + y^2z + z^2x$ এটা ফলন হয়, তেন্তে প্ৰমাণ কৰা যে $u_x + u_y + u_z = (x + y + z)^2$. 5

If $u = x^2y + y^2z + z^2x$, then show that $u_x + u_y + u_z = (x + y + z)^2$.

5. *(a)* (i) কাৰ্যকৰী সুত আৰু নামমাত্ৰ সুতৰ মাজৰ সম্বন্ধটো লিখা। 2

What is the relation between effective rate of interest and nominal rate of interest?

(ii) কিস্তিৰ বিভিন্ন প্ৰকাৰসমূহ কি কি? 3

What are the different types of annuities?

(iii) কিছু টকা চক্ৰবৃদ্ধি সুতৰ হাৰত 2 বছৰত সুতেমূলে ₹ 4,840 টকা আৰু 3 বছৰত সুতেমূলে ₹ 5,324 টকা হ'লে সুতৰ হাৰ কিমান? 4

An amount of money with compound interest turned to be ₹ 4,840 in 2 years and ₹ 5,324 in 3 years. What is the rate of interest?

(Continued)

(iv) 25 বছৰৰ পিছত 1,00,000 টকাৰ ডিবেঞ্চাৰ পৰিশোধ কৰাৰ বাবে বছৰি 4% চক্ৰবৃদ্ধি হাৰ সুতত কমপক্ষে বছৰি কিমান টকাকৈ জমা কৰিব লাগিব? 5

Debentures of ₹ 1,00,000 are to be redempted after 25 years. At 4% PA rate of compound interest, what minimum amount is to be saved every year?

অথবা / Or

(b) (i) কিস্তিৰ নগদ মূল্য বুলিলে কি বুজা? 2

What do you mean by present worth of annuities?

(ii) 3,000 টকাৰ 4% হাৰ সুতত 2 বছৰৰ সৰল সুত আৰু চক্ৰবৃদ্ধি সুতৰ পাৰ্থক্য কিমান? 3

What is the difference between 2 years' simple interest and compound interest on ₹ 3,000 at 4% PA?

(iii) বছৰি 4% কাৰ্যকৰী সুতৰ হাৰৰ সমতুল্য 3 মহীয়া নামমাত্ৰ সুতৰ হাৰ কিমান? 4

(Turn Over)

What is the nominal rate of interest PA payable quarterly which is equivalent to the effective rate 4% PA?

(iv) এখন চহৰৰ জনসংখ্যা বছৰি 2% চক্রবৃদ্ধি হাৰত বৃদ্ধি হ'লে, কিমান বছৰত চহৰখনৰ মুঠ জনসংখ্যা 40% বৃদ্ধি পাব? 5

If the population of a city increases every year by 2% of total population at the beginning of that year, in how many years will the total increase of population be 40%?

6. (a) (i) LPPৰ দ্বৈততা বুলিলে কি বুজা? 2

What do you mean by duality of an LPP?

(ii) LPPৰ সমাধানৰ বাবে ৰৈখিক পদ্ধতিৰ বিষয়ে বৰ্ণনা কৰা। 3

Describe graphic method used to solve LPP.

(Continued)

(iii) এটা কোম্পানীয়ে দুবিধ বস্তু A আৰু Bৰ উৎপাদনৰ বাবে প্রয়োজনীয় যন্ত্রপাতি-ঘণ্টা, মজদুৰ আৰু কেঁচামালৰ বিৱৰণ তলৰ তালিকাত দিয়া ধৰণৰ। এক এটা A আৰু এক এটা Bৰ পৰা লাভৰ পৰিমাণ ক্রমাত 3 টকা আৰু 4 টকা। সমস্যাটোক LPPৰ আকাৰে প্রকাশ কৰা : 4

A company produces two products A and B. The amount of machine hours, labour and raw materials required are given in the following table. Profits from each unit of A and B are ₹ 3 and ₹ 4 respectively. Formulate the LPP :

চলক *Variable*	উৎপাদন *Product*	যন্ত্রপাতি-ঘণ্টা (ঘণ্টাত) *Machine-hours* (in hr)	মজদুৰ *Labour*	কেঁচামাল *Raw Material*	লাভ *Profit*
x	A	4	4	1	3
y	B	2	6	1	4
লভ্য *Available*		100	180	40	

(Turn Over)

(iv) তলত দিয়া LPPৰ বৈখিকভাৱে সমাধান কৰা : 5

Solve the following LPP graphically :

ন্যূনতম মান নির্ণয় কৰা (Minimize)

$$Z = 2x + 3y$$

সাপেক্ষে (subject to)

$$6x + y \geq 36$$

$$x + 4y \geq 12$$

$$2x + y \geq 10$$

$$x,\ y \geq 0$$

অথবা / Or

(b) (i) LPPৰ সাধাৰণ গাণিতিক আৰ্হিটো লিখা। 2

Write the general mathematical model for LPP.

(ii) LPPৰ মৌলিক সমাধানৰ বিষয়ে লিখা। 3

Write about basic solution of LPP.

(iii) LPPৰ সীমাবদ্ধতাৰ বিষয়ে আলোচনা কৰা। 4

Discuss about the limitations of LPP.

(iv) এটা কোম্পানীয়ে তিনিবিধ বস্তু A, B আৰু Cৰ উৎপাদন কৰিব পাৰে আৰু প্রতিবিধৰ পৰা পোৱা মুঠ লাভৰ পৰিমাণ ক্রমে 18 টকা, 12 টকা আৰু 24 টকা। এই বস্তুবিলাক উৎপাদন কৰোঁতে দুটা মেচিন M_1 আৰু M_2ৰ প্রয়োগ কৰিব লাগে। প্রত্যেকটো মেচিনৰ প্রয়োগকাল তলত দিয়া ধৰণৰ :

(Continued)

A company produces three products A, B and C and net profit available from them are ₹ 18, ₹ 12 and ₹ 24 respectively. To produce these two machines M_1 and M_2 are to be engaged. Requirement of each machine is given below :

মেচিন Machine	বস্তু Product A	B	C	উপলব্ধি Available
M_1	14	13	15	2000
M_2	12	12	14	2500

অধিকতম লাভৰ বাবে এটি LPP প্রস্তুত কৰা। 5

Prepare an LPP to maximize profit.

★★★