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SCANNER'S APPENDIX

ICWA Stage II

December 2007

Paper - 9
Management Accounting – Performance Management

Chapter - 1 : Performance Measurement Systems

2007−Dec [8] Write short notes on the following *:*

(d) Objectives of Balanced Score Card; (4 marks)

Chapter - 3 : CVP Analysis

2007−Dec [4] (b) GADGETS LTD. which makes and sells only one product, sold 1,20,000 units incurring a loss of Rs. 1,20,000. The variable cost per unit of the product is Rs. 8 and the fixed costs are Rs.3,60,000.

The company has estimated its sales demands as under:

Sales Units	*Probability*
1,20,000	0.10
1,44,000	0.15
1,68,000	0.20
1,92,000	0.30
2,16,000	0.25

Requirements:

(i) What is the probability that the company will continue to make losses?

(ii) What is the probability that the company will make a profit of at least Rs. 72,000? (2+2+2 marks)

Chapter - 4 : Linear Programming

2007−Dec [3] (a) Four products A, B, C and D have Rs. 5, Rs. 7, Rs. 3 and Rs. 9 profitability respectively. First type of material (limited supply of 800 kg) is required by A, B, C and D at 4 kg, 3 kg, 8 kg and 2 kg, respectively per unit. Second type of material has a limited supply of 300 kg, and is for A, B, C and D at 1 kg, 2 kg, 0 kg and 1 kg per unit. Supply of other types of material consumed is unlimited. Machine hours available are 500 hours and requirements are 8, 5, 0 and 4 hours for A, B, C and D each per unit. Labour hours are limited to 900 hours and requirements are 3, 2, 1 and 5 hours for A, B, C and D respectively.

How should a firm approach so as to maximize it profitability? Formulate this as Linear Programming Problem. You are not required to solve the LPP. (8 marks)

Chapter - 6 : Queuing Theory

2007−Dec [7] (a) (i) What do you understand by the terms: Queue, Queue Length, and Traffic Intensity?

(ii) "Using the assumptions of Poisson arrivals and Exponential service times, operational Research specialist have developed certain formulae, which define the operating characteristics of a single channel waiting time."

In this context, establish the formulae for:

1. Mean (expected or average) number of units in the queue waiting for service;
2. Mean (expected) waiting time in the system; and
3. Mean average time a unit spends waiting in queue. (3+5 marks)

2007−Dec [7] (b) In ICICI Bank, every 12 minutes one customer arrives to encash the cheque. The staff in the only one payment counter takes 8 minutes for serving a customer on an average.

Required: Determine the—

(i) Average queue length; and

(ii) Increase in arrival rate in order to justify a second counter (when the waiting time of a customer is at least 10 minutes the management will increase one more counter).

[Assume that the arrival pattern follows Poisson distribution and service time follows Exponential distribution.] (8 marks)

Chapter - 7 : Simulation

2007−Dec [3] (b) The Indian Airlines operates daily flights from Mumbai to Kolkata. The scheduled take−off time is 10.00 hours. The normal duration of the flight is 2 hours. On occasions, because of administrative and technical problems, the take-off gets delayed and the pattern of delays from past data is as shown below:

Hours	Probabilities
0	0.30
0.5	0.25
1.0	0.20
1.5	0.15
2.0	0.10

Further, depending on weather conditions, the actual air-borne time may fluctuate marginally and its pattern from past data is as shown below:

Minutes	*Probabilities*
−10	0.10
−5	0.15

0	0.50
+5	0.15
+10	0.10

Simulate the flight operations for a period of 10 days and assess:

(i) Probability that the flight will arrive late in Kolkata, and

(ii) The average delay on arrival.

Use the Random numbers given below in a table:

(1) For take-off delays					*(2) For air-borne delays*				
17	43	74	31	72	78	16	35	23	44
46	51	68	93	54	92	58	8	58	78
96	9	65	43	90	54	77	31	87	75

Select the Random numbers horizontally from the top left corner. (8 marks)

Chapter - 8 : Budgetary Control

2007−Dec [4] (a) MODERN MANUFACTURERS LTD. manufactured and sold two products during the year 2006-07 as per particulars given below:

Quantity	*Product A*	*Product B*
	6,00,000	*3,00,000*
	Rs./Unit	*Rs./Unit*
Selling Price	6.00	10.00
Direct Materials	1.00	2.00
Direct Wages	1.20	2.60
Other Overheads (50% variable)	1.00	0.60

Variable factory overheads are absorbed as 50% of Direct Wages.

The summarized statement of profitability for the year ending March 31, 2007 is as under:

	Rs. In Lakhs	
Sales	66.00	
Direct Materials	12.00	
Direct Wages	15.00	
Factory Overheads	13.50	(of this Rs. 6 lakhs is fixed)
Other Overheads (50% fixed)	7.80	

For the year 2007-08 due to fall in demand, the production and sales of Product A will be reduced by 20% and of Product B by 40%. It is therefore decided to introduce a new Product M, the cost particulars for the same are as under:

Production and Sales	2,00,000 Units
Selling Price	Rs. 7.00 per Unit
Direct Materials	Rs. 1.40 per Unit
Direct Wages	Rs. 2.40 per Unit
Other Variable Overheads	Same as in Product A

The fixed overheads will remain the same and the variable overheads will continue to be incurred at the same rate as in 2006-07. Requirements:

(i) Prepare a productwise and overall budget for the year 2007-08

(ii) State what conclusions can be drawn from the budget for 2007-08 by using marginal costing technique. (8+2 marks)

2007–Dec [8] Write short notes on the following **:**

(b) Zero Base Budgeting as an approach towards productivity improvement;

(e) Residual Income (RI);

(f) Responsibility Accounting (RA). (4 marks each)

Chapter - 9 : Transfer Pricing

2007–Dec [5] (a) In transfer pricing, what is the common conflict between a division and the company as a whole. (6 marks)

2007–Dec [5] (b) Division Z is a profit centre, which produces four products A, B, C and D. Each product is sold in the external market also. Data for the period are as follows:

	A	*B*	*C*	*D*
Market price per unit (Rs.)	150	146	140	130
Variable cost of production per unit (Rs.)	130	100	90	85
Labour hours required per unit	3	4	2	3
Maximum external sales units	2,800	2,500	2,300	1,600

Product D can be transferred to Division Y, but the maximum quantity that might be required for transfer is 2,500 units of D.

Division Y can purchase the same product at a slightly cheaper rate (price) of Rs. 125 per unit instead of receiving transfers of Product D from Division Z. What should be the transfer price for each unit for 2,500 units of D, if the total labour hours available in Division Z are:

(i) 20,000 hours?

(ii) 30,000 hours? (10 marks)

2007–Dec [8] Write short notes on the following**:**

(a) Pricing by Service Sector; (4 marks)

Chapter - 10 : Standard Costing

2007–Dec [6](a) The following information has been obtained from the records of ZENITH LTD., a manufacturing organization using Standard Costing System:

Budget:

No. of working days	25
Working hours per day	8
No. of direct workers	16
Efficiency: One standard hour per clock hour	
Down time	20%
Overheads:	
Fixed	Rs. 30,720
Variable	Rs. 40,960

The actual data for the month of December 2007 are as under:

Fixed overhead costs	Rs. 33,000
Net operating hours worked	1,920
Standard hours produced	2,112

There was a special holiday in December, 2007.

Required: Work out the Fixed Overhead Variances. (9 marks)

2007–Dec [6] (b) "All variances should not be investigated."—Do you agree with this statement? What are the reasons for the occurrence of variances and which variances should be investigated? (4+3 marks)

Chapter - 11 : Resource Allocation

2007–Dec [2] (b) What is ERP and what are benefits occurring to organization on account of implementation of ERP system? (2+6 marks)

2007–Dec [8] Write short notes on the following**:**

(c) Total Quality Management (TQM); (4 marks)

Chapter - 12 : Objective Questions

2007–Dec [1]{C} (a) Match each expression under Column I with Column II:

	I		II
(i)	Residual Income	(A)	Scalar chain
(ii)	Balanced Score Card	(B)	Each man should report only to one manager or superior
(iii)	Fayol	(C)	Measures the divisional performance
(iv)	Unity of Command	(D)	Process of continuous quality improvement
(v)	TQM	(E)	Customer perspective

(1×5 marks)

2007–Dec [1]{C} (b) Fill in the blanks:

(i) A company being an _________ _________ can function only through human beings.

(ii) Algorithm is a ____ ____ ____ for solving problems.

(iii) Degeneracy in a simplex problem is a situation where a ______________ takes on value zero.

(iv) At BE point, _________ is equal to fixed cost.

(v) Any transfer pricing system has to ensure the resource allocation in a way that promotes______ (1×5 marks)

2007–Dec [1]{C} (c) Which of the following statements are TRUE or FALSE:

(i) The variable cost ratio is equal to (1-P/V ratio).

(ii) A budget manual is the summary of all budgets.

(iii) Zero Base Budgeting is alternatively termed as Budgetary Control.

(iv) A 'bill of materials' is the bill that a supplier submits for payment to a purchaser of materials and components.

(v) Under two-part tariff the selling division transfers goods at marginal cost including any opportunity cost. (1×5 marks)

2007−Dec [1]{C} (d) Define the following terms in not more than two sentences:

(i) Backflush Costing.
(ii) Value Added Activities.
(iii) Value Engineering.
(iv) Cost Driver.
(v) Balanced Score Card. (1×5 marks)

New Chapter

2007−Dec [2] (a) "Change has become inevitable in the dynamic business world of today. Employees in the organization often tend to vehemently resist the change for various reasons."

(i) List some of the most important reasons for resistance to change.
(ii) Suggest measures which could be used to overcome such a resistance (4+4 marks)

Paper - 10
Advanced Financial Accounting

Chapter - 1 : Accounting Principles Concepts & Conventions

2007−Dec [1]{C} (j) Distinguish between proprietory theory and entity theory. (2 marks)

2007−Dec [8] Write short notes on the following ;

(a) Phases of Accounting process. (4 marks)
(b) Accrual basis of Accounting . (4 marks)

Chapter - 2 : National & International Accounting Standards

2007−Dec [1]{C} (c) What are the disclosure requirements pertaining to events occurring after the Balance Sheet date under the Accounting standards? (2 marks)

(d) When can an item qualify to be a prior period item? (2 marks)
(f) What is the objective of Accounting standard? (2 marks)
(h) Can a company change the method of providing depreciation? (2 marks)
(i) What are the principal sources of Indian GAAP? (2 marks)

2007−Dec [8] Write short notes on the following ;

(d) Advantages of setting Accounting standards. (4 marks)

Chapter - 4 : Valuation of Shares

2007−Dec [6] The Balance Sheet of AB Ltd. as at 31st March, 2006 was as follows :

Sources of Funds	Rs.
8000 'A' Class Equity Shares of Rs. 100 each fully paid	8,00,000
2000 'B' Class Equity Shares of Rs. 100 each fully paid	2,00,000
Security premium	1,00,000

General reserve	4,00,000
10% Debentures of Rs. 100 each	14,00,000
Secured loans	6,00,000
	35,00,000
Employment of funds	
Fixed Assets Net of Depreciation	28,00,000
Working Capital	7,00,000
	35,00,000

You are given the following information :

(a) 'B' Class Equity Shares are with differential rights as to dividends, voting or otherwise.

(b) On 1st April, 2006 company in terms of its articles and through its special resolution decided to buy-back the 'B' Class equity shares at a premium of Rs. 50 per share. Necessary approvals were obtained in due course and the buy-back arrangement was completed by 30th June, 2006.

(c) On 30th September,2006 company declared the issue of fully paid bonus shares('A'Class) to 'A'Class equity shareholders in the ratio of one share for every four shares held and the issue was successfully completed by 31st December, 2006.

Journalise the transactions in the books of AB Ltd. (12+4 marks)

Chapter - 7 : Internal & External Reconstruction

2007–Dec [5] (a) What is the procedure for reduction of share capital? (6 marks)

2007–Dec [5] (b) From the summarized Balance Sheet of Weak Company Ltd. as on 31st March, 2007 are given below :

Balance Sheet

	Rs.		Rs.
10,000 Equity Shares of Rs.100/-each	10,00,000	Net Sundry Assets	4,05,600
		P/L Account	5,94,400
	10,00,000		**10,00,000**

The company feels that the worst is over and hence it adopts the scheme of reconstructions reducing all its equity shares into an equal number of fully paid equity shares of Rs. 40 each.

Pass Journal entries and give the Balance Sheet immediately after Reconstruction. (4+6 marks)

Chapter - 8 : Holding Companies & Merger Accounts

2007–Dec [4] The Balance Sheet of Small Ltd. as at 31st March,2007 was as under:

(Rupees in lakhs)

Liabilities	**Assets**		
Share Capital	Land & Building		4.00
In Equity shares of	Machinery balance B/F	3.50	

Rs. 100 each		6.00	*Less:* Depreciation for	
General Reserve		3.00	the year 0.50	
Profit & Loss A/c:				3.00
Balance B/F	1.20		Stock at cost	2.00
Profit for the year	0.60	1.80	Debtors	1.50
Trade creditors		1.20	Cash and Bank Balances	1.00
			Preliminary expenses	0.50
		12.00		12.00

Big Ltd. purchased 4000 Equity shares of Rs.100 each on 1st October, 2006 on which date it was found that land and building were undervalued by Rs.1 lakh and machinery was worth only Rs. 2.75 lakhs. In preparing the consolidated Balance Sheet of holding company, it was decided to adopt proper values of Assets, and write off preliminary expenses. On the above information given—

Ascertain :(a) Capital Profits

(b) Revenue Profits and

(c) Minority interest (8+4+4 marks)

Chapter - 17 : Accounting for Non Profit Making Organisation

2007–Dec [3] The following information were obtained from the books of Dignity Foundation Recreation Club as on 31-03-2007. At the end of the first year of the club you are asked to prepare Receipts and Payments Account, Income and Expenditure Account for the year ended 31-03-2007 and a Balance Sheet as at 31-03-2007 on mercantile basis.

(i) Donation received for building and library room Rs.1,00,000/-

(ii) Other revenue income and actual receipts :

	Revenue Income	Actual Receipts
	Rs.	Rs.
Entrance Frees	20,000	20,000
Subscription	17,000	16,000
Locker rent	800	800
Sundry Income	1,400	860
Refreshment account	–	20,000

(iii) Other revenue expenditure and actual payments :

	Revenue Expenditure	Actual Payment
	Rs.	Rs.
Land (Cost Rs.10,000)	—	10,000
Furniture (Cost Rs.1,46,000)	—	1,30,000
Salaries	6,000	5,800
Maintenance of club	3,000	2,000
Rent	6,000	6,000
Refreshment account	—	12,000

Donations to the extent of Rs.12,500 were utilised for the purchase of library books, balance was still unutilised. In order to keep it safe, 9% Govt. bonds of Rs. 80,000 were purchased on 31.03.2007. Remaining amount was put in the bank on 31.03.2007 under the term deposit. Depreciation at 10% P.A. was to be provided for the whole year on Furniture and Library books. (6+6+4 marks)

Chapter - 20 : Insurance Claims

2007−Dec [1]{C} (g) State the importance of "Average clause" in an insurance policy for loss of stock. (2 marks)

2007−Dec [2] From the following details find out the claims under a loss of profit policy :

Indemnity period	6 months
Policy value	Rs.30,000/-
Date of fire	01.04.2007
Dislocation up to 01.08.2007	
Sale for 2006 accounting year	Rs.1,20,000/-
Net profit for 2006 accounting year	Rs.13,000/-
Standing charges for 2006 accounting year (all insured)	Rs.17,000/-
Sale from 01.04.2006 to 31.03.2007	Rs.1,60,000/-
Sale from 01.04.2007 to 01.08.2007	Rs.15,000/-
Sale from 01.04.2006 to 01.08.2006	Rs.50,000/-

There is a clear 10% upward trends in the business. (4+6+6 marks)

Chapter - 22 : Government Accounting in India

2007−Dec [8] Write short notes on the following ;

(c)Treasury System. (4 marks)

(e)Votable and non-votable items. (4 marks)

(f) Income and expenditure classifications of Central Government. (4 marks)

Chapter - 24 : Miscellaneous

2007−Dec [7] Due to paucity of profits a company proposes to declare dividends out of its general reserves. From the undermentioned data you are asked to ascertain the amount which can be drawn from general reserves as per Declaration of Dividend and Reserve Rules 1975 :

		Rs.
10,000 10% preference shares of Rs. 100 each fully paid		10,00,000
30,000 equity shares of Rs. 10 each fully paid		30,00,000
General reserve		8,00,000
Securities Premium		2,00,000
Credit balance of profit and loss account		20,000
Net profit for the year (after tax)		1,80,000
Average dividend during last five years	15%	

(16 marks)

New Chapter

2007–Dec [1]{C} State why the following two propositions is not correct:

(a) (i) Bonus issue can be made out of profits to make partly paid-up shares as fully paid-up shares.

(ii) An intangible asset is an identifiable monetary asset. (2 marks)

(b) Match the following items shown in Column(I) with the items shown in Column(II)

Column I	Column II
(i) Cum. interest Purchase	(1) Secret Reserve
(ii) Average Clause	(2) Double Accounting System
(iii) Undervaluation of Asset	(3) Fire-claim Policy
(iv) Statement of Net Revenue and Appropriation Account	(4) Price includes Interest

(2 marks)

(e) State with reasons whether the following statements are true or false:

(i) The debit balance in the Profit & Loss A/c is treated as surplus.

(ii) Goodwill is a fictitious Asset. (2 marks)

Paper - 11
Auditing

Chapter - 1 : Auditing Techniques and Practices

2007–Dec [6] (a) Is the disclosure of accounting policies, mandatory for companies? What should the Auditor do in this regard? (8 marks)

Chapter - 2 : Verification of Assets and Liabilities

2007–Dec [2] Your client seeks your opinion on how the following matters should be accounted and/or disclosed. Give your views with reasons for the same:

(a) Sundry Debtors include charges made for returnable packing cases. (4 marks)

(b) Assets bought on hire purchase basis were stated at their full value and the outstanding instalments payable were shown under Sundry Creditors. (4 marks)

(c) The Debit Balance in the Profit and Loss Account is shown as a deduction from 'Dividend Equalisation Reserve' on the Liabilities side of the Balance Sheet. (3 marks)

(d) Expenditure incurred on grading and preparing the soil for plantations are charged to Cultivation Expenses. (5 marks)

2007–Dec [4] Write short notes on the following:

(c) Outstanding Assets; (4 marks)

(d) Treatment of Purchased Goodwill versus Inherited Goodwill; (4 marks)

2007–Dec [5] (c) How will you vouch/verify the following and what are the related aspects to be looked into?

(i) Research and Development Costs; (3 marks)

(ii) Sale proceeds of Junk Materials. (3 marks)

Chapter - 4 : Statutory Auditors

2007–Dec [3] (a) What is meant by Joint Audit? (1 mark)

2007–Dec [3] (b) What kind of mutual relationship should prevail among Joint Auditors? (7 marks)

2007–Dec [3] (c) What are the reporting responsibilities of the Joint Auditors? (4 marks)

2007–Dec [3] (d) Ram is the principal auditor of an entity as a whole. Rahim is another auditor of one of the divisions of the same entity.

(i) Do they become Joint Auditors? (2 marks)

(ii) What are their reporting responsibilities? (2 marks)

2007–Dec [5] (a) Briefly state the objectives of cost audit from the point of view of Government. (5 marks)

2007–Dec [7] (b) The Audit Report of V Ltd. is signed by Mr. 'X', a partner of Z & Co., a partnership firm properly appointed as auditors. Mr.'X ', is practicing in Singapore. Is this proper? (2 marks)

Chapter - 5 : Audit Report

2007–Dec [5] (b) State the circumstances under which a qualified Audit Report is issued (*any five* circumstances). (5 marks)

2007–Dec [7] (a) How will you deal with the following in the course of audit of the accounts of a limited company?

(i) The sales are very high at the year end when compared to the earlier months in the ratio of around 2:1. (3 marks)

(ii) Debentures issued at face value but repayable at premium. (4 marks)

(iii) Payment of Rs. 50,000/- each to the Directors as allowances to cover travelling and entertainment expenses in the course of their normal duties. (3 marks)

(iv) Under the head 'Reserves and Surplus ' of Rupees 5 lakhs includes secret reserve of Rupees 1 lakh. (4 marks)

2007–Dec [8] (b) Distinguish between:

(i) Negative Opinion and Disclaimer of Opinion; (4 marks)

Chapter - 8 : Internal Auditing

2007–Dec [4] Write short notes on the following:

(a) Pre-Audit; (4 marks)

(e) Propriety Audit; (4 marks)

Chapter - 9 : MAOCARO and Internal Audit

2007−Dec [8] (a) What are the categories of companies which are specially exempted from the application of Companies (Auditors Report) Order, 2003? (4 marks)

Chapter - 11 : Planning of Internal Audit

2007−Dec [8] (b) Distinguish between:

(ii) Internal Check and Internal Auditing. (8 marks)

Chapter - 12 : Verification of Evidence

2007−Dec [4] Write short notes on the following:

(b) Analytical Procedures; (4 marks)

Chapter - 13 : Flow Chart Techniques

2007−Dec [4] Write short notes on the following:

(f) Auditing through the Computer. (4 marks)

2007−Dec [6] (b) What precautions are required to be taken in establishing a system of internal control for applications processed at an outside Computer Service Bureau? (8 marks)

Chapter - 15 : Audit Notes and Working Papers

2007−Dec [1]{C} (b) Explain the necessity and method of presentation of summary report to the top management by the internal auditor of a company. (7 marks)

Chapter - 19 : Objective Questions

2007−Dec [1] {C} (a) Discuss with reasons, whether the following statements are 'True' or 'False' (Answers without reasons will not be given any credit):

(i) A shareholder wishing to nominate another eligible person as Auditor of the company in the place of existing auditor, can do so by giving ordinary notice to the company and sending copy to the existing auditor. (1 mark)

(ii) For an internal audit function to be effective, the same must be independent of the activities to be audited.. (2 marks)

(iii) Non-adjusting events of a material nature, need not be adjusted in accounts and can be disclosed by way of explanatory notes to the accounts. (2 marks

(iv) A company can appoint its Cost Auditor at its Annual General Meeting. (1 mark)

(v) Working papers of the auditor are to be returned to his client after audit since these are the property of the client. (2 marks)

(vi) Compliance procedures adopted by auditors are in relation to Internal Control System. (2 marks)

(vii) Efficiency audit examines whether the transactions have been done in conformity with established rules, principles and some established standards. (1 mark)

(viii) Auditors' primary job is to detect errors and frauds. (1 mark)

(ix) A and B are joint auditors of XYZ Ltd. During the year under audit A died. The Board of Directors appointed C in place of A.

(1 mark)

Paper - 12
Quantitative Methods

Chapter - 1 : Algebra of Vectors

2007–Dec[1]{C} Attempt any questions:

(a) If $\vec{a}=2i+j-k, \vec{b}=i+2j+k, \vec{c}=3i-2j+2k,$ find the unit vector parallel to $\vec{a}-2\vec{b}+\vec{c}.$ (2 marks)

2007–Dec[2](b) Given that $\vec{a}=2i+3j+6k, \vec{b}=3i-6j+2k$ and $\vec{c}=6i+2j-3k,$ show that $\vec{a}\times\vec{b}=7\vec{c}.$ Also find a unit vector perpendicular to each of the vectors $\vec{a}$ and $\vec{b}$. (5 marks)

Chapter - 2 : Matrix Algebra

2007–Dec[1]{C} Attempt any questions:

(b) Compute A^2 and A^3 if A= $\begin{pmatrix} 0 & -i \\ -i & 0 \end{pmatrix}$ where $i=\sqrt{-1}.$

(2 marks)

(c) Prove that $\begin{vmatrix} bc & a & a^2 \\ ca & b & b^2 \\ ab & c & c^2 \end{vmatrix} = \begin{vmatrix} 1 & a^2 & a^3 \\ 1 & b^2 & b^3 \\ 1 & c^2 & c^3 \end{vmatrix}$ (2 marks)

(d) Find the value of x when $A=\frac{1}{\sqrt{2}}\begin{pmatrix} 1 & 1 \\ x & 1 \end{pmatrix}$ is orthogonal. (2 marks)

2007–Dec[2](a) If A= $\begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$ find f(A) If $f(x) = x^2-4x-2.$

(5 marks)

2007–Dec[2] (c) If $\begin{bmatrix} a & 1 & 1 \\ 1 & b & 1 \\ 1 & 1 & c \end{bmatrix} = 0$, show that $\frac{1}{1-a}+\frac{1}{1-b}+\frac{1}{1-c}=1$

(5 marks)

Chapter - 3 : Differential Calculus

2007–Dec[1]{C} Attempt any questions:

(e) If y = $f(x) = \dfrac{ax + b}{cx - a}$, prove that $f(y) = x$. (2 marks)

(f) Draw the graph : $y \le |x|$. (2 marks)

(g) Prove that $\lim\limits_{x \to 0} \dfrac{a^x - b^x}{x} = \log \dfrac{a}{b}$. (2 marks)

(h) Find $\dfrac{d^2y}{dx^2}$, when $x = at^2$ and $y = 2at$. (2 marks)

(j) if $f(x,y) = x^2 - 3xy + y^2$, find the value of $\dfrac{\partial f}{\partial x} - \dfrac{\partial f}{\partial y}$. (2 marks)

2007–Dec[3] (a) A function $f(x)$ is defined as follows:

$$f(x) = \begin{cases} x + 1 \text{ when } x \le 1 \\ 3 - ax^2 \text{ when } x > 1 \end{cases}$$

For what value of a will $f(x)$ be continuous? (5 marks)

2007–Dec[3](b) If y = $(x + \sqrt{x^2 + a^2})^n$,

show that $(x^2 + a^2)\dfrac{d^2y}{dx^2} + x\dfrac{dy}{dx} - n^2 y = 0.$ (5 marks)

2007–Dec[3] (c) Find the extreme value of the function $f(x, y) = x^2 - y^2 + xy + 5x$ subject to $x + y + 3 = 0$. (5 marks)

Chapter - 4 : Integration

2007–Dec[1]{C} Attempt any questions:

(i) Show that $\int_0^1 \dfrac{dx}{\sqrt{x} + x} = 2 \log 2$. (2 marks)

2007–Dec[4](a) Show that $\int_3^4 \dfrac{dx}{3x^2 - 3x - 6} = \dfrac{1}{9} \log \dfrac{8}{5}$. (5 marks)

2007–Dec[4](b) Find the area cut off from the parabola $y^2 = 12x$ by its latus rectum. (5 marks)

Chapter - 5 : Linear Programming

2007–Dec[4] (c) Solve the following LPP by simplex method; Maximize z = 4x + 6y

subject to constraints:

$x + 2y \le 40$;

$2.5x + 1.5y \le 60$;

$x, y \ge 0$. (5 marks)

Chapter - 6 : Game Theory

2007–Dec[5] (a) Given the pay-off matrix for player A, obtain the optimum strategies for both the players and determine the value of the game:

$$\begin{array}{cc} & \textit{Player B} \\ \textit{Player A} & \begin{bmatrix} 3 & 8 & -4 \\ 10 & 11 & 13 \\ 12 & 14 & 8 \end{bmatrix} \end{array}$$

(5 marks)

Chapter - 7 : Transportation

2007–Dec[5] (b) Determine the initial basic feasible solution of the following transportation problem by the least cost method:

	D_1	D_2	D_3	D_4	Capacity
0_1	3	2	1	5	12
0_2	4	6	2	8	8
0_3	7	4	3	5	10
0_4	2	6	7	5	4
Demand	8	10	6	10	

(5 marks)

Chapter - 8 : Queuing Theory

2007–Dec[5](c) Customers arrive at the booking office window being manned by a single individual at a rate of 25 per hour. The time required to serve a customer has an exponential distribution with a mean = 120 seconds. Find the average waiting time of a customer (i) in the system (ii) in the queue.

(5 marks)

Chapter - 9 : Probabilities

2007–Dec[6]{C} Attempt of the following. Choose the correct alternative, stating proper reason:

(a) If $P(A) = \frac{1}{4}$, $P(B) = \frac{2}{5}$, and $P(A \cup B) = \frac{1}{2}$, then $P(A \cap \overline{B})$ is ,

(i) $\frac{1}{10}$ (ii) $\frac{3}{10}$ (iii) $\frac{5}{10}$ (iv) $\frac{7}{10}$

(2 marks)

(b) If for two events A and B, $P(B) = \frac{1}{2}$ and $P(A \mid B) = \frac{1}{4}$, then $P(A - B)$is

(i) $\frac{1}{8}$ (ii) $\frac{3}{4}$ (iii) $\frac{3}{8}$ (iv) $\frac{5}{8}$

(2 marks)

(c) Let A and B be two events such that $P(A) = 0.4$, $P(A \cup B) = 0.7$ and $P(B) = p$, then the choice of p for which A and B are independent is

(i) $\frac{1}{2}$ (ii) $\frac{1}{3}$ (iii) $\frac{1}{4}$ (iv) $\frac{1}{6}$

(2 marks)

(d) 8 fair coins are tossed simultaneously. The probability of getting at least 6 heads is

(i) $\frac{37}{256}$ (ii) $\frac{117}{256}$ (iii) $\frac{5}{64}$ (iv) $\frac{13}{64}$

(2 marks)

(e) In a summer a truck driver gets an average of one puncture in 500 km, then the probability that he will have no puncture in a journey of 2000 km is

(i) e^{-1} (ii) e^{-2} (iii) e^{-3} (iv) e^{-4}

(2 marks)

(g) If a random variable X is uniformly distributed with a probability density function $f(x) = 1$, $0 \le x \le 1$ then V(x) is

(i) $\frac{1}{3}$ (ii) $\frac{1}{12}$ (iii) $\frac{1}{10}$ (iv) $\frac{1}{4}$

(2 marks)

2007–Dec[7] (a) In a bolt factory, machines X_1, X_2 and X_3 manufacture respectively 20%, 30% and 50% of the total of their output. Of them, 5, 4 and 2 percent respectively are defective bolts. A bolt is drawn at random from the products and is found defective. What is the probability that it was manufactured by machine X_2 or X_3 ? (5 marks)

2007–Dec[7] (b) A can hit a target two times out of 3,B three times out of 7 and C four times out of 9. What is the probability that the target will be hit by 2 persons only when all three try? (5 marks)

2007–Dec[8] (a) Fit a binomial distribution to the following data:

x:	0	1	2	3	4
f:	28	62	46	10	4

(5 marks)

2007–Dec[8] (b) Marks obtained by a number of students are assumed to be normally distributed with mean 50 and variance 36.

If 4 students are taken at random, what is the probability that exactly two of them will have marks over 62?[Given $\int_0^2 \varnothing\,(z)\,dz = 0.4772$ where z is N (0, 1)] (5 marks)

Chapter - 10 : Population and Sampling

2007–Dec[6]{C} Attempt of the following. Choose the correct alternative, stating proper reason:

(f) A sample of 100 measurements of breaking strength of cotton threads gave a mean of 7.4 and s.d. of 1.2 Then the 95% upper confidence limit for the population mean breaking strength is

(i) 7.3526 (ii) 7.6352 (iii) 7.6325 (iv) 7.6123

(2 marks)

(i) A coin is tossed 4 times to test its unbiasedness and H_0 is accepted when 2 heads are obtained. Then Probability {Type I Error} is

(i) $\frac{1}{16}$ (ii) $\frac{3}{16}$ (iii) $\frac{5}{16}$ (iv) none of these

(2 marks)

(j) A simple random sample of size 6 is drawn without replacement from a finite population consisting of 10 units.
If the variance of the population is 9, the standard error of the sample mean is

(i) $\sqrt{\frac{3}{2}}$ (ii) $\sqrt{\frac{2}{3}}$ (iii) $\frac{2}{3}$ (iv) $\frac{1}{3}$

(2 marks)

2007–Dec[9] (a) In random samples of 600 and 1000 men from two cities, 400 and 600 men are found to be literate. Do the data indicate at 5% level of significance that the populations are significantly different in the percentage of literacy? (5 marks)

2007–Dec[10] (a) In an experiment on immunization of cattle from tuberculosis the following results were obtained:

	Affected	Unaffected
Inoculated	12	28
Not inoculated	13	7

Examine the effect of vaccine in controlling the incidence of the disease.

(5 marks)

2007–Dec[11] (b) A bakery keeps stock of a popular brand of cakes. Previous experience shows that daily demand pattern for the items with associated probabilities as given below:

Daily demand (numbers)	0	10	20	30	40	50
Probability	0.01	0.20	0.15	0.50	0.12	0.02

Use the following sequence of random numbers to simulate the damand for the next. 10 days:

48, 78, 19, 51, 56, 77, 15, 14, 68, 09

Also (i) estimate the daily average demand for the cakes on the basis of the simulated data and (ii) find out the stock situation if the owner of the bakery decides to make 30 cakes every day. (5 marks)

Chapter - 11 : Decision Tree Analysis

2007–Dec [10] (b) A newspaper agents' experience shows that the daily demand x of newspapers in his area has the following probability distribution:

Daily demand (x) :	300	400	500	600	700
Probability :	0.1	0.3	0.4	0.1	0.1

He sales the newspapers for Rs. 2.00 each while he buys each at Re. 1.00. Unsold copies are traded as scrap and each such copy fetches 10 paise.

Assuming that he stocks the newspapers in multiple of 100 only, how many should he stock so that his expected profit is maximum? (5 marks)

Chapter - 12 : Correlation

2007−Dec[6]{C} Attempt of the following. Choose the correct alternative, stating proper reason:

(h) If the rank correlation coefficient between height and weight of a group of students is 0.5 and the sum of squares of the rank differences is 60 then number of students is

(i) 8 (ii) 9 (iii) 10 (iv) 11 (2 marks)

Chapter - 13 : Simple Regression

2007−Dec[9] (b) If regression equations are $8x - 10y = 64$ and $40x - 18y = 320$, what are (i) the mean values of x and y, and (ii) the coefficient of correlation between x and y ? (5 marks)

Chapter - 14 : Decision Theory

2007−Dec[11] (a) Choose the best product applying Hurwitz method with coefficient of optimism $\alpha = 0.60$ to the following data:

State of nature →	Good	Fair	Poor
Acts ↓			
Product A	10000	8000	2000
Product B	12500	9000	−1000

(5 marks)

Chapter - 15 : Demand Analysis

2007−Dec[12] Attempt of the following:

(a) The demand law is $P = \dfrac{10}{(x+2)^2}$.Complete the elasticity of demand in terms of x. (2 marks)

2007−Dec [13] Answer of the following:

(a) The demand functions is $x = 20 + 2p + 3p^2$ where x is demand for the commodity at price p. Find the marginal quantity demand, average quantity demand and the elasticity of demand. Also compute elasticity of demand at a price $p = 2$. (5 marks)

(e) The demand function of a particular brand of watch is $P = 75 - 0.3Q - 0.05Q^2$.Find the consumer's surplus at a quantity of 10 watches. (5 marks)

Chapter - 16 : Forecasting Techniques

2007−Dec[12] Attempt of the following:

(b) Write down the normal equations in fitting a parabolic equation $y = a + bx + cx^2$ by the method of least squares. (2 marks)

(e) If $r_{12} = 0.4$, $r_{23} = 0.5$, r_{31} 0.6 then $R_{1.23}$ = ? (2 marks)

2007–Dec [13] Answer of the following:

(c) Fit a straight line trend by the method of least squares from the following figures of production of sponge iron in a factory and estimate the production (in tons) in 2001:

Year :	1995	1996	1997	1998	1999	2000
Production :	15	18	16	18	20	19

(5 marks)

2007–Dec [13] (f) Write short notes on the following:

(ii) Least squares theory. (5 marks)

Chapter - 17 : Index Number

2007–Dec[12] Attempt of the following:

(c) If the production is 28 and seasonal index is 90, then find the deseasonalised value. (2 marks)

(d) Calculate Laspeyre's Index Number from the following table:

Item	p_0	p_1	q_0	q_1
A	5	7	6	8
B	4	6	5	7
C	3	5	4	6
D	2	4	3	5

(2 marks)

(f) Net monthly income of an employee was Rs. 800 per month in 1980. The price index number was 160 in 1980. It rises to 200 in 1982. Calculate the additional dearness allowance to be paid to the employee if he has to be rightly compensated. (2 marks)

2007–Dec [13] Answer of the following:

(d) The price relatives and weights of a set of commodities are given in the following table:

Commodity :	A	B	C	D
Price relative :	120	127	125	119
Weight :	$2w_1$	w_2	w_1	$w_2 + 3$

If the index for the set is 122 and the sum of weights is 40; find w_1 and w_2. (5 marks)

2007–Dec [13] (f) Write short notes on of the following:

(i) Uses and limitations of index number: (5 marks)

Chapter - 18 : Production Function Analysis and Miscellaneous

2007–Dec[12] Attempt of the following:

(g) The total daily cost (in Rs.) for producing x toys is TC = 2.5x + 3000. If each toy is sold for Rs. 4, what is the break even point?

(h) Given total cost = $1400 + 30x - 12x^2 + x^3$; find at what level of x diminishing marginal return begins. (2 marks each)

2007 – Dec [13] Answer of the following:

(b) The marginal cost function when output is x units, is given by MC = $x^2 - 2x + 5$. Find the total cost function C and average cost function AC, if the fixed cost is 30. Also show that the slope of the average cost curve is $\frac{MC - AC}{x}$. (5 marks)