Duration: 2.5 Hours **Marks: 75**

Note:

1) All questions are compulsory subject to internal choice.
2) Figures to the right indicate full marks.
3) Use of simple calculator is allowed

Q.1.

(a) Multiple Choice Questions (any 8): **(08)**

(1) _____ is the branch of economics that studies the dynamics of exchange rates, foreign investments, and how these affect international trade.
(a) International Finance
(b) International Marketing
(c) International Economics
(d) International Monetary System

(2) The asset price at which the investor can exercise an option is called _____ price.
(a) Strike
(b) Spot
(c) Future
(d) Forward

(3) Currency that is used as a unit of account, medium of exchange and store of value not only for transactions within the country, but also for international public and private transactions, is called as _____ currency.
(a) Vehicular
(b) Home
(c) Variable
(d) Foreign

(4) BBC Global 30, S&P Global 100, S&P Global 1200 are examples of _____
(a) International Equity Benchmarks
(b) Yankee Stock Offering
(c) Cross Listing of Shares
(d) ADRs

(5) _____ is the risk of exchange rate that creates an impact on the market value of a company.
(a) Economic Risk
(b) Transaction Risk
(c) Translation Risk
(d) Liquidity Risk

(6) FOREX market facilitate the conversion of one currency into another i.e. payment between exporters & importers. This function of FOREX Market can be referred as ___
(a) Transfer of Purchasing Power
(b) Credit Function
(c) Hedging Function
(d) Risk Management Function

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(7) _____ is the process of assessing, in a structured way, the case for proceeding with a project or proposal, or the project's viability.
(a) Project Appraisal
(b) Project Management
(c) Risk Mitigation
(d) Risk Management

(8) _____ offers foreign individuals and businesses little or no tax liability in a politically and economically static environment.
(a) Tax Haven
(b) Offshore Banking Unit
(c) FOREX Market
(d) Tax Neutrals

(9) _____ involves the simultaneous buying and selling of an asset in order to profit from small differences in price.
(a) Hedging
(b) Speculation
(c) Arbitrage
(d) Investing

(10) _____ Exchange Rate is a system where the currency price is set by the forces of forex market i.e. demand and supply of currencies.
(a) Flexible
(b) Fixed
(c) Managed Float
(d) Gold

Q.1.(B) State whether the following statements are True or False (any 7): (07)

1) Unilateral Transfers are recorded under Capital Account of BOP.
2) FEMA was replaced by FERA.
3) NPV is a non-discounted technique of Capital Budgeting.
4) If the Quote is given as USD-INR 83.1550-75; This quote is called as "Direct Quote" in New York.
5) India is a Tax Haven nation.
6) There is easy entry and exit in FPI.
7) To be cross-listed, a company must comply with the requirements of all the stock exchanges in which it is listed.
8) Changes in market inflation cause changes in currency exchange rates.
9) Call option gives the right to buy an asset at a fixed date and price.
10) Under Bretton Woods system, countries could use USD as a medium of exchange for international settlements.

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Q.2.(A) Discuss the significance of International Finance in today's context. **(08)**

(B) What is Balance of Payments? How is it different from BOT? What is meant by Autonomous and Accommodating Transactions? **(07)**

OR

(P) The following quote is given in Canada: 1SGD = CAD 1.0110-85 **(08)**

1) In which country, the quote is "Direct"?
2) In which country, the quote is "Indirect"?
3) What is the Mid Rate?
4) What is Spread?
5) What is % Spread?
6) Calculate the inverse quote.

(Q) The following quotations are available in USA **(07)**

1 USD = GBP 0.8350-0.8425

1 USD = CAD 1.1125-1.1175

And the quotation available in Canada is: 1 GBP = CAD 1.5550-1.5650

- From the quotes given in USA, derive the quotation for 1 GBP in terms of CAD

Compare the derived quotation with quotation available in Canada and identify if any arbitrage opportunity exists. (Assume Capital GBP 2 Million)

Q.3.(A) What are Eurobonds? Explain different types of Eurobonds. **(08)**

(B) What are Currency futures? How are they different from Currency forwards? **(07)**

OR

(P) Consider the following information: **(08)**

Spot CAD/SEK	7.8650	-	7.8700
1 Month Forward	50	-	70
2 Month Forward	290	-	340
3 Month Forward	920	-	1020
6 Month Forward	1500	-	1600

Calculate 1 Month Forward, 2 Month Forward, 3 Month Forward and 6 Month Forward CAD/SEK Rates.

(Q) Spot USD/INR 83.1525 **(07)**

3 Month Forward USD/INR 83.2525

Calculate 3 Months AFM and interpret the results.

Q.4.(A) What is FDI? What is FPI? How are they different from each other? **(08)**

(B) Discuss global money market instruments. **(07)**

OR

(P) Given: **(07)**

Spot AUD/JPY 99.1575

AUD Interest Rate = 0.75% p.a.

JPY Interest Rate = 1.50% p.a.

Calculate three month forward AUD/JPY rate

(Q) From the following data, find the best alternative for investing INR 5 Million for a temporary period of 3 Months. Exchange rates are against INR. **(08)**

	Currency	Spot Rate	3 months forward rate	Interest rate
1.	USD	83.5650	83.5950	5 % p.a.
2.	EUR	90.1225	90.0550	3 % p.a.
3.	GBP	102.5650	102.5750	4 % p.a.

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Q.5.(A) What are the Benefits towards Parties doing Business Internationally? **(08)**

(B) Ms. Gurneer is planning to buy a machine which would generate cash flow after taxes as follows: **(07)**

Year	0	1	2	3	4
CFAT in USD	(1,00,000)	24,000	32,000	60,000	32,000

If discounting rate is 10%, is it worth to invest in machines.

Year	1	2	3	4
Discount Factor	0.909	0.826	0.751	0.683

OR

Q.5. Write Short Notes on (any three) **(15)**

(P)
1) Fixed Vs. Flexible Exchange Rate System
2) ADRs Vs. GDRs.
3) Foreign Exchange Dealers' Association of India
4) PPP Theory
5) Eurocredit

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(2½ Hours) **Total Marks – 75**

N.B.: (1) All questions are compulsory subject to internal choice.
(2) Figures to the right indicate full marks.

Q1. Fill in the blanks (any 8)

1. _____is concerned with identifying and understanding how the MNC's manage their geographically dispersed worked force
   a. International HRM b. Staffing c. Development d. Cross Culture Training
2. Why should a company have an expatriation training program?
   a. To teach them how to implement the home countries ways of doing business in other cultures
   b. To familiarize employees with the history, culture and customs of the country they are being assigned
   c. To teach the employees to fluently speak foreign languages
   d. To communicate the company's mission statement and purpose for existence
3. In case of _____a company shifts the location of a service or production of a part to a location abroad
   a. outsources b. offshoring c. onshoring d. relocation
4. The _____is a method of international recruitment where the MNC's hire the most suitable person for the job irrespective of their Nationality.
   a. Regio Centric b. Geocentric c. Ethnocentric d. Polycentric
5. Implement a Buddy system, Offer Group Volunteer Projects, Providing Comprehensive cross culture training are ways of dealing with
   a. Dealing with culture shock b. Motivating employees
   c. Improving Productivity d. Managing under performers
6. A salient issue in international HRM is understanding and maintaining cultural _____
   a. balance b. diversity c. suitability d. adaptability
7. Personal & emotional problems results in _____
   a. expatriate b. failure repatriation c. stress d. success
8. Culture _____ is being aware that both cultural differences as well as cultural similarities exist between people and affect attitudes
   a. sensitivity b. suitability c. adaptability d. awareness
9. Unions that include workers who have a common skill are
   a. trades unions b. industry unions c. craft guilds d. craft unions
10. Ethnocentric organizations are best characterized by:
    a. Key personnel positions are held by headquarter personnel.
    b. Subsidiaries are managed by local nationals (HCN)
    c. A worldwide integrated business which nationality is ignored in favor of ability
    d. Staff may move outside their countries but only within a particular geographic region

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Q2. State whether True or False (any 7)

1. Parent country is where the firm's subsidiary is located
2. Cross-cultural adaptability has an impact on the success or failure of an international assignment
3. Domestic HRM emphasizes on HR issues related to employees belonging to multiple nationalities
4. MNCs employ expatriates to encourage diversity
5. PCN are employees whose nationalities are different from headquarters or the subsidiary office
6. Head Hunting is a source of international staffing
7. Expatriate is an employee working and living in a country of which he is a non citizen
8. Adoption of culture is relatively feasible in International HRM
9. Social institutions of different countries do not affect global cultural values
10. Networking Skills is a quality required by global managers today

2 a. Elaborate on the Polycentric Approach of staffing stating its advantages and disadvantages? (7)
b. What are the challenges faced by HR managers of Global firms? (8)

OR

a. What is the difference between Domestic and International HRM (7)
b. Write a short note on Cross Culture Management? (8)

Q3. a. What are the sources of recruitment in IHRM (7)
b. What are the Approaches to international compensation. (8)

OR

Q3. A. What are the factors affecting International Performance of Expatriates
B. Explain Cross Culture Training

Q4. A. What is Expatriate Failure (7)
B. Elaborate on Process of Repatriation and challenges faced in repatriation (8)

OR

Q4. C. What are the challenges faced by Women in international assignments? (7)
D. What can HR mangers do to prepare an employee for an international assignment (8)

Q5. a. Elaborate on the emerging trends in IHRM (7)
b. Citing examples explain Virtual Organisations. What are its Advantages (8)

OR

Q5. Write Short notes: (Any 3)

1. Off Shoring
2. Role of family in expatriate assignment
3. Issues in International HRM
4. Culture Shock
5. Ways of Managing Diverse Teams

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Duration : 2 ½ Hrs. **Total Marks : 75**

Note : All Questions are compulsory subject to Internal choice
Each question carries equal marks.

Q1 A) Choose and Write correct answer from the options given below: (Any 8) (8)

1. OD interventions reduce unnecessary _____.
(Conflict/Competition /Work /Collaboration)
2. In expert power the power holder has _____.
(Expert Knowledge/Teams/Influence/Legal rights)
3. OD programs increase the _____ of employees.
(Motivation/Salaries /Tenure /Perks)
4. Process consultation is a _____ technique of OD intervention.
(Traditional/ Outdated/ Modern/Discontinued)
5. Sensitivity Training is also known as _____ training.
(Laboratory/On the Job /New /Theoretical)
6. In OD Good leadership results in more _____.
(Profits/turnover of employees/committed staff /payments from suppliers)
7. The process of power is connected with _____.
(Profit/Greed /Politics/Information)
8. _____ is the last phase in organizational diagnosis.
(Analysis/Feedback/Entry/Study Design)
9. _____ Strategy is also known as entrepreneur strategy.
(Reposition /Marketing/ Retrenchment/Replacement)
10. The process of OD is based on the action _____ model.
(Research/ Reaction/Analysis/Results)

Q1 B) State Whether following statement is true or false: (Any 7) (7)

1. Business Process Reengineering is not a subjective process.
2. Timing Tactics analyses both the decisions and the actions taken.
3. Organizational development is critical to product innovation.
4. Unobtrusive data are collected directly from respondents .
5. Deception is any form of unethical and will destroy trust.
6. Longitudinal evaluations in OD are often challenging to conduct.
7. The consultant acts as an advisor, who presents the suggestions and perspectives as a solution to the problem.
8. The Arbitrator is the most powerful type of intermediary.
9. The infant stage is the stage of decline.
10. The OD manager plans, develops, implements and administers HR programs for company employees.

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Q2 A) Discuss the objectives of Organizational Development. (8)

B) Explain the Participation of top management in Organizational Development. (7)

OR

C) Explain the relevance of Organizational Development for managers. (8)

D) Discuss Organizational Development in Global Setting. (7)

Q3 A) What is Organizational diagnosis? Explain its need. (8)

B) Define Organizational renewal.What are the techniques of Organizational renewal? (7)

OR

C) What do you mean by Business Process Re-engineering? Explain its Features. (8)

D) Explain the role of change agents. (7)

Q4 A) Explain the different types of Organizational Development interventions. (8)

B) Briefly the traditional techniques of Organizational Development intervention. (7)

OR

C) Explain the features of organization development intervention. (8)

D).Explain the methods of Evaluation of Organizational Development Intervention. (7)

Q5 A) Elaborate on Value Conflict and Dilemma. (8)

B) What are the ways to enhance organizational effectiveness? (7)

OR

Q5 C] Write short notes on. (Any Three) (15)

1. Organizational life Cycle.
2. OD-HRD interface
3. Ethical guideline for OD Professionals.
4. Values in OD.
5. Transactional Analysis.

……

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[Time: 2½ hours] **[Marks:75]**

Please check whether you have got the right question paper.

N.B:
1. Figures to the right indicate full marks.
2. Draw suitable diagrams wherever necessary
3. Illustrate your answers with examples
4. Rewrite the questions for **Q1.a and b.**

Q1. a. Multiple Choice Questions (**ANY EIGHT**) **(08)**

1. _____ is not a scope of branding.(Physical goods, Services, Retail, Savy customers)
2. The tagline of Bournvita is _____.(The Taste of India, Taan ki shakti Man ki shakti, Kuch meeta ho jaye, Daag Acche Hain)
3. _____ is quantitative research technique. (Completion, Comparison, The Big Five, Brand Response)
4. _____ is discount pricing policy. (Value pricing, Cost-based pricing, Everyday-low pricing , Introductory pricing)
5. Brand Asset Valuator (BAV) model was given by _____ Global Advertising Agency. (Omnicom Group, WPP PLC, Young and Rubicam, Ogilvy, and Mather)
6. Under _____ value stage, does marketing activities like product research, design and development take place. (Program Quality Multiplier, Marketing Programme Investment, Customer Mindset, Investor Sentiment Multiplier)
7. Product mix is also known as _____. (Product assortment, Product line, Product catalogue, Product classification)
8. A ____ brand is defined as a brand that is used in more than one product category but is not necessarily the name of the company or corporation. (Range/Family, Corporate, Modifier, Individual)
9. _____ individual brand is presented to consumer as a parent company. (LUX- Unilever, Swiggy, Zomato, IKEA)
10. Managing brands for the long run involves _____. (reinforcing, rejection, accepting, enacting)

b. State whether the following statement is TRUE or FALSE (**ANY SEVEN**) **(07)**

1. Branding is a strategic point of view, not a select set of activities.
2. Brand awareness consists of brand recognition and brand recall performance.
3. Relationship marketing attempts to provide a more holistic, personalized brand experience to create stronger consumer ties.
4. Channel strategy includes the design and management of intermediaries such as wholesalers, distributors, brokers, and retailers.
5. Licensing creates contractual arrangements whereby firms can use the name, logos, characters, and so forth of other brands to market their own brands for some fixed fee.
6. Brand Personality can be defined as a set of human characteristics associated with a brand.
7. Aided recall could be gauged by asking the respondent to mention the brands in a particular product category.
8. Brand strength measures the ability of the brand to secure the delivery of expected future earnings.
9. The breath of a branding strategy describes the number and nature of different products linked to the brands sold by the firm.
10. Green marketing is the marketing of products that are presumed to be environmentally safe.

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Q2. **Answer the following**

a. Point out the difference between Brand versus Product. **(08)**

b. Infer the term Integrated Marketing Communication (IMC). Bring out the various tools of IMC used by a brand manager. **(07)**

OR

c. Construct the Brand Value Chain model in detail with example. **(08)**

d. Illustrate the Brand Product Matrix with examples. **(07)**

Q3. **Answer the following**

a. State the various criteria for choosing the brand elements, if you are appointed as a brand manager for a new product. **(08)**

b. Summarize the Brand Asset Valuator (BAV) model in brief. **(07)**

OR

c. Discuss the term cause marketing . Highlight its advantages for the companies. **(08)**

d. Describe the term Brand positioning. State its importance. **(07)**

Q4. **Answer the following**

a. Infer the term brand personality. State the big five model of brand personality. **(08)**

b. What are brand extensions? Explain its advantages and disadvantages. **(07)**

OR

c. Discuss the Customer Based Brand Equity (CBBE) model with example. **(08)**

d. Explain perceived quality and relationship marketing in product strategy. **(07)**

Q5. a. Write Short Notes on (**ANY THREE**) **(15)**

1. Importance of brand to customers.
2. Brand leveraging.
3. Brand awareness pyramid.
4. Brand hierarchy.
5. Revitalizing brand.

OR

b. **Case Study**

The Body Shop is a British skincare, perfume, and cosmetics company and has a range of 1000 products and sells over 3000 plus franchised and owned stores. The brand believes in cruelty-free products where no animals are harmed while making the products. It uses fresh and sustainable ingredients and has found alternative technologies for testing on animals. Today consumers are looking forward to maintaining a healthy lifestyle and use organic products on their skin. The Body Shop has been positioned strategically to meet these requirements. They meet the customer's need for a healthy lifestyle by using all natural and organic ingredients like seaweed, sugarcane, aloe vera, honey, tea tree, etc. The brand puts forward the environmental concern and campaigns against animal testing of the products. It is one of the very few cosmetic companies that promote health more than glamour and does not use conventional advertising to promote the brand.

Questions

a. What is the basis of brand positioning? Which positioning has body shop used to create a global brand image? Give reason. **(08)**

b. As a part of the brand management team, suggest **any four** Integrated Marketing Communication (IMC) tools for Body Shop. **(07)**

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Time: 2 ½ Hours **Max Marks: 75**

Instructions: All questions are compulsory and carry 15 marks each.

Q1.A Choose the right answer (**Any eight**) **8**

1 _____ means maintaining basic required stocks to fulfil consumer demands.
i. Inventory management. ii. Store management
iii. Category management iv. Retail management

2 Electronic retailing permits _____
i. Touch and feel factor ii. Reduction in set up cost
iii. Point of sale terminal. iv. Visual merchandising

3 _____ is not a customer retention approach.
i. Frequent shopper programs ii. Personalization iii. Loyalty cards iv. HRM

4 _____ has parallel vertical lines that can be read by scanners.
i. Electronic article surveillance ii.Bar code iii. RFD iv. Stock keeping unit

5 _____ is a process to identify &determine in detail the particular job duties and requirements.
i. Interview ii. job analysis iii. Training iv. Selection

6 A _____ store is located without any competitor store around it.
i. Part of a business district ii. Freestanding
iii. Shopping centre iv. Hypermarket

7 _____ is a blueprint that states the arrangement of a store.
i. Store lay out ii. Planogram iii. Space iv. Store aisle

8 _____products enjoy popularity and generate lot of sales in a short span of time
i. Fad ii. Seasonal iii. Variety iv. Assortment

9 In a retail store, _____ inform the customers about the products, offers and price
i. Managers ii. Fixtures iii. Mannequins iv. Signage

10 Mostly, it's the _____of the store that draws the customer's attention to the store.
i. Layout ii. Exterior iii. Interior iv. Display

Q.1.B State whether the following statements are True or False (**Any Seven**) **7**

1 Retailer is the last point in the distribution channel.
2 Multi-channel retailing is use of more than one channel to reach customers
3 A department store stocks a particular type of merchandise
4 Online fraud is a limitation of e-tailing.
5 Shopping mall is an example of Destination location
6 Loss Leaders are sold below the cost.
7 Generic brands target price sensitive segment by offering no frills product at a discounted price.
8 Visual Merchandising is also termed as Silent Salesmen.

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9 Government of India has allowed FDI in retail sector

10 Customer Loyalty means that customers are committed to shopping at retailer's locations.

Q2

a	Explain the functions performed by retailers	**8**
b	What do you mean by electronic labels? Discuss the significance of the same	**7**
	(OR)	
c	Describe the different types of franchising	**8**
d	Explain the advantages of E-Tailing	**7**

Q3

a	Explain the factors to be considered before finalizing the store location	**8**
b	Discuss Any four customer retention approaches	**7**
	(OR)	
c	Explain the objectives of CRM in retail	**8**
d	Explain market research as a tool for understanding retail shoppers	**7**

Q4

a	Explain Buying Cycle in Retail, Lifestyle merchandising & Category Captain	**8**
b	Explain the principles of merchandising	**7**
	(OR)	
c	Explain the various pricing strategies that can be adopted by the retailer	**8**
d	Explain the need of private label brands in India	**7**

Q.5. a	Discuss the 5 S's of Retail Operations	**8**
b	Explain the Role of Store Manager in a Retail Store	**7**
	(OR)	
c	**Short Notes** (Any three)	**15**
i	Store Design	
ii	Airport Retailing	
iii	Store Atmospherics	
iv	Career options in retail	
v	Mall management	

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Time: 2 ½ Hours **Marks: 75**

Note : l. All questions are compulsory. (Subject to internal Choice)
2. Figures to the right indicate full marks.
3. Use non--programmable calculator is allowed
4. The normal distribution table is printed on the last page for reference.
5. Support your answers with diagrams/illustrations, wherever necessary.
6. Graph papers will be supplied on request.

Q1 (A) Multiple choice questions (Attempt Any 8) **(8)**

1. A BFS of a LPP is said to be ---------- if at least one of the basic variables is zero
   a) Degenerated b) Non-degenerated c) Infeasible d) Feasible
2. For solving an assignment problem, which method is used?
   a) Hungarian b) American c) German d) Italian
3. A feasible solution is called a basic feasible solution if the number of non-negative allocations is equal to ----------
   a) m-n+1 b) m+n-1 c) m-n-1 d) m+n+1
4. Which method is an iterative procedure for solving LPP in a finite number of steps
   a) Simplex algorithm b) Simplex method c) slack method d) M-method
5. An objective function is maximized when it is a ---------- function.
   a) Profit b) passive c) cost d) time
6. In an assignment problem involving 5 workers & 5 jobs, the total number of assignments possible is ----------.
   a) 15 b) 10 c) 5 d) 20
7. _____is known as the time by which activity completion time can be delayed without affecting the start of succeeding activities,
   a) Total float b) interfering float c) independent float d) Free float
8. The probability of a normal curve is _____
   a) 60% b) 70% c) 50% d) 55%
9. What is the probability of project completing in 55 days if the expected project completion time is 47 days & table value is :(+0.4890)
   a) 98.90% b) 99% c) 90% d)98%
10. What is the total idle time if jobs are processed on 2 machines and idle time on machine A is 11 and on machine B is 15.
    a) 25 b) 26 c) 23 d) 24

Q1 (B) True or false (Attempt Any 7) **(7)**

i. Is concerned with using scientific approach i.e. logical reasoning to solve problems for the management by ensuring optimum utilization of resources
ii. Any change in the constraint inequalities will have a proportional change in the objective function
iii. In graphical method, infeasibility happens we cannot find feasible region.
iv. Graphical method can be used when the number of decision variable at two
v. An artificial variable is a fictitious variable in LPP problems.
vi. Surplus variables represent an excess amount of resources utilize
vii. When the number of lines is not equal to size of matrix the solution is optimum.
viii. There are two types of techniques available to find the initial basic feasible solution.
ix. The network can have one or more start node and end node.
x. Pessimistic time is the shortest time period expected to complete the activity.

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Q.2 A) A Company manufactures two products A and B. To manufacture one unit of A, 1.5 machine hours and 2.5 labour hours are required. To manufacture product B, 2.5 machine hours and 1.5 labour hours are required. In a month, 300 machine hours and 240 labour hours are available. Profit per unit, for A is Rs. 50 and for B is Rs. 40.
Formulate as LPP **(8)**

Q.2 B) Solve following LPP by Simplex method . **(7)**

Maximize $Z = 50 x_1 + 20 x_2$

Subject to Constraints

$20x_1+10x_2 \leq 500$

$50x_1 + 50x_2 \leq 300$

$x_1 , x_2 \geq 0$

OR

Q.2 C) Solve following LPP by Graphical method. **(7)**

Maximize $Z = 2x_1 + 10 x_2$

Subject to Constraints

$2x_1+5x_2 \leq 16$

$6x_1 \leq 30$

$x_1 , x_2 \geq 0$

Q.2 D) A Sales manager has to assign salesmen to four territories. He has four candidates of varying experience and capabilities. The manager assesses the possible profit for each salesman in each territory as given below

Salesman	**Territory**			
	T1	**T2**	**T3**	**T4**
S1	35	27	28	37
S2	28	34	29	40
S3	35	24	32	33
S4	24	32	25	28

Find the assignment of salesmen to the territories so that total profit is Maximum. **(8)**

Q.3 A) From the Following details of the project

i. Draw the network diagram and identify critical path **(3)**

ii. Find out Earliest Start and Finish Time, Latest Start and Finish Time of Each activity **(5)**

Activity	**Node**	**Duration (Days)**
A	1-2	4
B	1-3	6
C	1-5	13
D	2-3	5
E	2-4	20
F	4-6	10
G	3-6	6
H	5-6	16

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Q.3 B) A company is transporting its units from three factories F_1, F_2 , F_3 with the production capacities od 11,13 and 19 units (in thousands). It has four warehouses W_1, W_2, W_3 and W_4. With demands of 6, 10, 12 and 15 units (in thousands)

units cost of transportation is given from each factory to each warehouse.

	W1	**W2**	**W3**	**W4**
F1	42	32	50	26
F2	34	36	28	46
F3	64	54	36	82

Construct a Transportation table and Find Initial feasible solution by Least Cost Method (LCM) (7)

OR

Q.3 C) From the data given below

i. Draw a diagram (2)
ii. Find Critical path (2)
iii. Crash systematically the activities and determine optimal project duration (4)

Activity	**Normal Duration (Days)**	**Crash Cost per day(Rs)**	**Maximum possible Crash Time**
1-2	6	80	2
1-3	8	90	4
1-4	5	30	2
2-4	3	-	0
2-5	5	40	2
3-6	12	200	4
4-6	8	50	3
5-6	6	-	0

Cost of completing eight activities in normal time is Rs. 6500 indirect cost Rs. 160 per day.

Q. 3 D) Five jobs I,II,III,IV and V are to be processed on two machine A and B in order AB

Jobs	Processing Time (Min)	
	Machine A	Machine B
I	90	70
II	40	80
III	40	50
IV	30	10
V	25	35

1) Find the sequence that minimizes the total elapsed time (2)
2) Calculate the total elapsed time (3)
3) Idle time on for each Machine (3)

Q.4 A) There are Six jobs (namely 1,2,3,4 ,5 and 6), each of which must go through machinesA, B and C in the order ABC. Processing Time (in hours) are given below:

Jobs	1	2	3	4	5	6
Machine A	12	8	7	11	10	5
Machine B	3	4	2	5	2	4
Machine C	7	10	9	6	11	4

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(i) Find the sequence that minimizes the total elapsed time required to complete the job (2)
(ii) Calculate the total elapsed time (3)
(iii) Idle time on Machine A, Machine B and Machine C. (3)

Q.4 B) you are given the Pay-off (Profit in Rs.) matrix in respect of Two-Person-Zero – Sum Game as follows

		Player B			
		B1	B2	B3	B4
Player A	A1	500	260	200	210
	A2	-50	-100	-40	240
	A3	200	400	160	-20
	A4	250	300	100	50

(i) Find the Maximin Strategy. (3)
(ii) Find the Minimax Strategy. (3)
(iii) What is the value of the Game? (1)

OR

Q.4 C) A company is transporting its units from three factories F_1, F_2, F_3 to four warehouses W_1, W_2, W_3 and W_4. The supply and demand of units with transportation cost per unit (in Rs.) are given below with feasible solution (The numbers which are in circle indicates number of units transported from Factory to warehouse).

Plants	Warehouses				Supply in Units
	W_1	W_2	W_3	W_4	
F_1	10	11 (16)	7	4 (24)	40
F_2	7	13 (15)	6 (16)	11	31
F_3	4 (25)	9 (4)	8	10	13
Demand in Units	25	35	16	24	100

(i) Test the solution for optimality (3)
(ii) If solution is not optimal find optimal solution. (5)

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Q,4 D) A small project consist of seven activities. Optimistic, most likely and pessimistic time estimated in days are given below

Activity	Preceding Activity	Optimistic Time	Most likely Time	Pessimistic
A	-	2	5	8
B	-	2	5	14
C	A	4	6	14
D	A	5	7	15
E	B,C	2	3	10
F	D	3	3	3
G	E	1	2	3

i) Construct the network diagram of PERT network and find expected completion time of the project. (3)

iii) Determine the probability of completing the project in 21 days. (4)

Q.5 A) Define operation Research and What are the Characteristics of Operation research techniques? (8)

B) Explain Objective of Project Crashing of Network analysis (7)

OR

Q.5 C) Write a Short notes on Any Three (15)

i) Degeneracy in transportation
ii) Dummy activity in network analysis
iii) Three time estimates in PERT
iv) Project crashing
v) Assumption in LPP

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NORMAL DISTRIBUTION TABLE

Area Under the Standard Normal Distribution

Z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.0000	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239	0.0279	0.0319	0.0359
0.1	0.0398	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636	0.0675	0.0714	0.0753
0.2	0.0793	0.0832	0.0871	0.0910	0.0948	0.0987	0.1026	0.1064	0.1103	0.1141
0.3	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1443	0.1480	0.1517
0.4	0.1554	0.1591	0.1628	0.1664	0.1700	0.1736	0.1772	0.1808	0.1844	0.1879
0.5	0.1915	0.1950	0.1985	0.2019	0.2054	0.2088	0.2123	0.2157	0.2190	0.224
0.6	0.2257	0.2291	0.2324	0.2357	0.2389	0.2422	0.2454	0.2486	0.2518	0.2549
0.7	0.2580	0.2612	0.2642	0.2673	0.2705	0.2734	0.2764	0.2797	0.2823	0.2852
0.8	0.2881	0.2910	0.2939	0.2967	0.2995	0.3023	0.3051	0.3078	0.3106	0.3133
0.9	0.3159	0.3186	0.3212	0.3238	0.3264	0.3289	0.3315	0.3340	0.3365	0.3389
1.0	0.3413	0.3438	0.3461	0.3485	0.3508	0.3531	0.3554	0.3577	0.3599	0.3621
1.1	0.3643	0.3665	0.3686	0.3708	0.3729	0.3749	0.3770	0.3790	0.3810	0.3830
1.2	0.3849	0.3869	0.3888	0.3907	0.3925	0.3944	0.3962	0.3980	0.3997	0.4015
1.3	0.4032	0.4049	0.4066	0.4082	0.4099	0.4115	0.4131	0.4147	0.4162	0.4177
1.4	0.4192	0.4207	0.4222	0.4236	0.4251	0.4265	0.4279	0.4292	0.4306	0.4319
1.5	0.4332	0.4345	0.4357	0.4370	0.4382	0.4394	0.4406	0.4418	0.4429	0.4441
1.6	0.4452	0.4463	0.4474	0.4484	0.4495	0.4505	0.4515	0.4525	0.4535	0.4545
1.7	0.4554	0.4464	0.4573	0.4582	0.4591	0.4599	0.4608	0.4616	0.4625	0.4633
1.8	0.4641	0.4649	0.4656	0.4664	0.4671	0.4678	0.4686	0.4693	0.4699	0.4706
1.9	0.4713	0.4719	0.4726	0.4732	0.4738	0.4744	0.4750	0.4756	0.4761	0.4767
2.0	0.4772	0.4778	0.4783	0.4788	0.4793	0.4798	0.4803	0.4808	0.4812	0.4817
2.1	0.4821	0.4826	0.4830	0.4938	0.4838	0.4842	0.4846	0.4850	0.4854	0.4857
2.2	0.4861	0.4846	0.4868	0.4871	0.4875	0.4878	0.4881	0.4884	0.4887	0.4890
2.3	0.7893	0.4896	0.4898	0.4901	0.4904	0.4906	0.4909	0.4911	0.4913	0.4916
2.4	0.4918	0.4820	0.4922	0.4925	0.4927	0.4931	0.4931	0.4932	0.4934	0.4936
2.5	0.4938	0.4940	0.4941	0.4943	0.4945	0.4946	0.4948	0.4949	0.4951	0.4952
2.6	0.4953	0.4955	0.4956	0.4958	0.4959	0.4960	0.4961	0.4962	0.4963	0.4964
2.7	0.4965	0.4966	0.4967	0.4968	0.4969	0.4970	0.4971	0.4972	0.4973	0.4974
2.8	0.4974	0.4975	0.4976	0.4977	0.4977	0.4978	0.4979	0.4979	0.4980	0.4981
2.9	0.4981	0.4982	0.4982	0.4983	0.4984	0.4984	0.4985	0.4985	0.4988	0.4986
3.0	0.49865	0.4987	0.4987	0.4988	0.4988	0.4989	0.4989	0.4989	0.4990	0.4996
4.0	0.49968									

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