

MANAGEMENT

(Paper II)

Time Allowed : Three Hours
Maximum Marks : 250

QUESTION PAPER SPECIFIC INSTRUCTIONS

(Please read each of the following instructions carefully before attempting questions)

There are EIGHT questions divided in two Sections.

Candidate has to attempt FIVE questions in all.

Question Nos. 1 and 5 are compulsory and out of the remaining, any THREE are to be attempted choosing at least ONE question from each Section.

The number of marks carried by a question/part is indicated against it.

Wherever any assumptions are made for answering a question, they must be clearly indicated.

Word limit in questions, wherever specified, should be adhered to.

Attempts of questions shall be counted in sequential order. Unless struck off, attempt of a question shall be counted even if attempted partly. Any page or portion of the page left blank in the Question-cum-Answer Booklet must be clearly struck off.

SECTION 'A'

1. Answer the following questions:

- (a) A construction company builds primarily three and four unit apartment buildings (called triplexes and quadruplexes) for investors. It is believed that the total construction time in days follows a normal distribution. The mean time to construct a triplex is 500 days and the standard deviation is 100 days. Recently the President of the company signed a contract to complete a triplex in 625 days. Failure to complete the triplex in 625 days would result in severe penalty fees of Rs. 10 lakhs for every triplex not completed within 625 days. What is the probability that the company will not have to pay penalty fees? Approximately how much penalty fee will it have to pay, if the total number of triplexes to be built is 50? 10

- (b) Consider a production process given below involving processing in four workstations S1, S2, S3, S4. The processing time for processing one unit of product in each of the workstations is given in table below. You can ignore the move time between the workstations. As shown in the figure, 2 units of S2 are available.

[Figure: Process flow – Raw Material → S1; S1 feeds two parallel S2 workstations; both S2 feed S3; S3 → S4 → Finished product]

Workstation	S1	S2	S3	S4
Processing time (in Min.)	10	16	12	6

- (i) How many units are produced in an 8 hour day? (ii) If the processing time in S3 is reduced to 8 minutes, will there be any reduction in work in process? Why? 10
- (c) A Fast Food outlet stocks frozen pizzas in a refrigerated display case. The average daily demand for the pizzas is normally distributed with a mean of 8 pizzas and a standard deviation of 2.5 pizzas. The outlet operates for 300 days in a year. A vendor for packaged food distributor checks the market's inventory of frozen foods every 10 days. The lead time to receive the order is 3 days. If the purchase cost of one pizza is Rs. 300, the cost of placing an order for pizza is Rs. 200, what will be the optimal order quantity? What will be the reorder point with a lead time of 3 days and service level of 99%? 10

- (d) "JIT is not for India. We have poor supplier reliability, country is so vast that to get some parts here in Gurgaon, I have to source it all the way from Thane down south. How can I achieve JIT in such a context? Impossible! And ... then we have a pathetic logistics system. Truck owners take you for ransom once your load is with them. I expect an item in 6 days and get it in 16 days and you suggest JIT to me ... I tried it once and my clients got their orders at least a month late." These were some words spoken to you, a JIT (Just in Time) 10

consultant by a machine tool manufacturer located in North India. Do you think, JIT is feasible in his plant? The machine tools are generally made to order and order fulfillment time is around 2-3 weeks. The assembly takes a maximum of 3 days. There are around 20 major parts for the product. What are the aspects you have to concentrate on to ensure JIT success? What structural modifications do you suggest in this case? State your assumptions clearly and prepare a proposal indicating the methodology you would adopt to implement JIT (if you decide in favour) or a proposal why JIT cannot be implemented (if you decide against it).

- (e) Prior to construction of a dam on a river, the organization entrusted with the task of construction of the dam performed a series of tests to measure the water flow past the proposed location of the dam. The results of the tests were used to construct data shown in Table below. Compute the mean, standard deviation and the coefficient of variation of the river flow in litres per minute. What portion of the water flow occurs at less than 5200 litres per minute? Table: Results of Test

River Flow (000s of litres/minute)	Frequency
4001–4200	7
4201–4400	21
4401–4600	32
4601–4800	49
4801–5000	58
5001–5200	41
5201–5400	27
5401–5600	11

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2. Answer the following questions:

- (a) XYZ, a real estate development firm, is considering several alternative development projects. These include building and leasing an office space, purchasing a parcel of land and constructing an office building to rent, buying and leasing a warehouse, building a shopping center, and building and selling condominiums. The financial success of these projects depends on interest rate movements in the next five years. The various development projects and their five year financial return (Rs. Crores), given that the interest rates will decline, remain stable, or increase are shown in the payoff table below. Table: Payoffs from Development Projects (Rs. Crores)

Project	Interest Rate: Decline	Interest Rate: Stable	Interest Rate: Increase
Office Park	5	17	45
Office Building	15	19	24
Warehouse	17	14	10
Shopping Center	7	24	36
Condominiums	32	15	6

Determine the best investment option using the following criteria: (i) Maximin criterion. (ii) Equal likelihood criterion. (iii) Hurwitz criterion with a coefficient of optimism = 0.3.

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- (b) You are invited as an MIS consultant to a major chain of bakeries in Bangalore. The bakery chain has a major manufacturing centre at the heart of the city and 78 exclusive franchise outlets in a 20 km radius. The outlets have no baking facility but have heating as well as refrigeration facilities. All items are supplied from the central store (attached to the central manufacturing facility) through delivery vans. The frequency depends on the usage pattern at the outlets. The items, numbering around 1500 (not all in all outlets), includes pastries, biscuits, light refreshments, frozen cutlets etc. The quality control department of bakery has an ageing schedule for each item. This could vary from 6 months for biscuits to a day for Gulab Jamun. The chain participants will destroy the items once the time is elapsed and loss is shared on 30-70 basis between bakery and the outlet. In rare instances the bakery used to transfer the items between the stores. The current information system of the company is simple. The outlets call up between 9 and 10 am to give orders. The company, if feasible,

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will deliver the items on the same day. If not backlogged and serviced on some future day. This is creating problems for the outlets. Many are not able to get connection with bakery over phone on time. Even those who placed the orders, could not get in time. This has resulted in overstating the demand and large amount of wastage. Even though contract forbids the outlets from having some other products, the managers are discreetly selling other products (mainly unbranded similar looking products from local producers). As commission from the bakery is large, the major reason (according to managers) for this unethical practice is lack of availability. Do you think a structured MIS can be of any help? Prepare a proposal for developing an MIS for the bakery chain. State your assumptions. Identify the work system(s) and clearly define the processes. Conduct a detailed analysis to make process (work system) modifications (if needed).

- (c) The M-N Plant manufactures two different products M and N. Selling prices and weekly demands are shown in the following diagram. Each product uses raw materials with costs as shown. The plant has three different machines A, B and C. Each performs different tasks and can work on only one unit of material at a time. Process times for each task are shown in the diagram. Each machine is available 2400 minutes per week. Assume zero setup and transfer times and constant demand. Operating expenses (including labour) total a constant of Rs. 12000 per week. Raw materials are not included weekly operating expenses.

[Figure: Product flow diagram – Resources A, B, C (one each); Availability: 2400 min/wk; Operating Expenses Rs 12000/wk. Product M (Rs 190/unit) is finished on C (15 min/unit), which takes inputs from A (20 min/unit, processing RM1 at Rs 60/unit) and B (15 min/unit, processing RM2 at Rs 40/unit). Product N (Rs 200/unit) is finished on C (15 min/unit), which takes inputs from the same B (15 min/unit, RM2 Rs 40/unit) and a second B operation (15 min/unit, processing RM3 at Rs 40/unit). No weekly demand figures are shown.]

- (i) Where is the constraint in this plant? (ii) What product mix produces the highest profit? (iii) What is the maximum weekly profit this plant can earn?

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3. (a) Company A is a leader in creating online auctions for buyers of industrial parts, raw materials, commodities, and service around the globe. The company has created auctions for goods and services for hundreds of industrial product categories. It auctions more than Rs. 500 crores worth of purchase orders a year and saves buyers an estimated 2 to 25% of total expenses. The company operates two types of market places. First the company helps the customers purchase goods and services through its global B2B market place where reverse auctions usually take place. Second, the company helps companies improve their asset recovery results by getting timely market prices for surplus assets through the company's Asset Exchange, employing a forward auction process, as well as other selling models. The company's Onsite Auctions include: (1) asset disposal recovery and (2) sourcing (e-procurement) functions. These functions provide: Assets disposal analysis; Detailed sales offering; Targeted market outreach; Event coordination and Sales implementation. The company helped several companies make asset recoveries. For example, QR Corporation needed a channel for end of life, old models and refurbished power protection products. These were difficult to sell in regular distribution channels. Before using auctions, the company used special liquidation sales, which were not very successful. The company A deployed the auction site and helped QR determine the auction strategies (such as starting bid price and auction running length), which were facilitated by Decision Support System modeling. The site became an immediate success. (i) What makes company A different from other online B2B portal for online auction? (ii) What are the technological considerations in designing such portals? (iii) Why does company A concentrate on asset recovery and on e-procurement?

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- (b) Three models of a product, namely A, B, C are to be supplied by a manufacturing factory to a distribution center. Since the product is shipped by sea, it takes 2 months transportation time for the product to reach the distribution center from the factory. The means and standard deviations of annual demand for the three models are given in Table below. The manufacturing cost of each model in the factory is Rs. 20,000 per unit. The manufacturing cost of the generic, non customized product is also Rs. 20,000 per unit. The inventory

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carrying cost is Rs. 0.24/Re./Year. The company would like to provide a service level of 99% for each of the models at the distribution center. The company is weighing two options: Option 1: Make each model in the factory and ship to distribution center. Option 2: Build the generic product in the factory and customize the models at the distribution center to make each of the three models. (i) Calculate the safety stocks to be provided under each option and their corresponding total annual inventory carrying costs. (ii) Upto how much amount per year can the company spend in customizing the models at the distribution center? Table: Annual Demand Data for Three Models

Model	Mean Annual Demand, Units	Standard Deviation of Annual Demand, Units
A	2,000,000	200,000
B	1,000,000	150,000
C	4,000,000	200,000

- (c) XYZ Grocery sells two types of soft drinks: the brand name A1 Cola and the cheaper store brand XYZ Cola. The margin of profit on the A1 Cola is about 50 paise per bottle, whereas the XYZ Cola grosses 70 paise per bottle. On the average the store sells 500 bottles of both the Colas a day. Although A1 is a better recognized name, customers tend to buy more of the XYZ brand because it is considerably cheaper. It is estimated that the XYZ brand outsells the A1 brand by a ratio of at least 2 : 1. However XYZ Grocery sells at least 100 bottles of A1 a day. (i) How many bottles of each brand should the store carry daily to maximize the total profit? (ii) Determine the ratio of the profits per bottle of A1 and XYZ Colas that will keep the solution in (i) unchanged?

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4. (a) Vanguard's decision support system software is used by thousands of companies for enterprise decision analysis. The software makes it possible to apply decision analysis techniques throughout an organization to problems ranging from simple projects to enterprise-wide strategic plans. The Vanguard Sys. is a comprehensive business solution for improving the quality, reliability, and speed of management decisions. It does this by helping collaborate with colleagues on important plans, analyze alternatives using state-of-the-art modeling and simulation techniques, automate routine decisions using expert system technology, and improve overall management effectiveness by adding structure to a normally chaotic process. Vanguard's collaboration abilities go well beyond simple communication strategies like Web conferencing. Rather, Vanguard is based on principles of knowledge capture. The Vanguard Sys. can combine the knowledge captured by many individuals to create a Collective Intelligence that is useful for testing business plans and automating routine operations. Vanguard combines all of the most powerful and essential quantitative methods in management with features of spreadsheets, artificial intelligence tools, and math applications to produce an advanced business modeling system. Vanguard improves the speed, reliability, and quality of routine decisions by combining its business modeling capabilities with Expert System technology. Vanguard has the potential to transform business by improving management team decisions rather than simply analyzing operational data. Vanguard supports a wide variety of methods for integrating data and it can connect to virtually any business system, e.g. Support for Customizable Functions, etc. (i) Identify the main capabilities of the DSS software from the narrative. (ii) Why should DSS support data integration as mentioned? (iii) The Vanguard Sys. has been dubbed also as a KMS and an Expert System. Why do you think a DSS should also be a KMS? An Expert System?

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- (b) The Director of continuing education at SUV University has just approved the planning of a sales seminar. His administrative assistant has identified various activities and their relationships to each other. In view of the uncertainty involved in planning the seminar, the assistant has provided three time estimates (in days) for each activity, namely: pessimistic time (b), optimistic time (a) and most likely time (m). Three activities—1. Design brochure and course announcement (5, 7, 8); 2. Identify prospective teachers (6, 8, 12); 3. Prepare

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detailed outline (3, 4, 5) can start without any other activity being completed. Activity 4. Send brochure and student applications (11, 17, 25) can start after activity 1 has been completed. Activity 5. Send teacher applications (8, 10, 12) depends on the completion of activity 2. Activity 6. Select teacher for the seminar (3, 4, 5) can start after activities 3 and 5 are complete. Activity 7. Accept students (4, 8, 9) depends on the completion of Activity 4. Activity 8. Select text (5, 7, 9) depends on completion of Activity 6. Activity 9. Order and receive texts (8, 11, 17) can start after activities 7 and 8 have been completed. Activity 10. Prepare room for the class (4, 4, 4) can start after Activity 7 is completed. (Figures in brackets give the values of a, m, b in days for each respective activity) (i) Draw the network diagram for the project. (ii) What is the expected duration and standard deviation of the duration of the project? (iii) The Director wants to conduct the seminar in 47 working days. What is the probability of doing this?

- (c) A pharmaceuticals company is reviewing its employee healthcare program. Currently the company pays a fixed fee of Rs. 1500 per month for each employee, regardless of the number of rupee amount of medical claims filed to healthcare insurer A. Another healthcare provider B has offered to charge the company a fixed fee of Rs. 500 per month per employee and Rs. 150 per claim filed. A third health insurer C charges Rs. 1000 per month per employee and Rs. 50 per claim filed. (i) How will the average number of claims per employee per month affect the decision to choose the healthcare program? (ii) When will it be best to go for option provided by C? (iii) When will it be best to go for option provided by B?

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SECTION 'B'

5. Answer the following questions:

- (a) How does the product-life-cycle theory explain firm's preferences for and timing of foreign direct investment (FDI)? 10
- (b) What are public-private partnerships (PPPs)? What have been the experiences to date with effectiveness of PPPs across different segments of infrastructure sector? 10
- (c) What are the principal means of payment in foreign trade? What are the main documents used in financing foreign trade? 10
- (d) Distinguish between "strategic alliance" and "joint venture". What factors should be considered in choosing an alliance partner? 10
- (e) How can innovative business practices, environment risk management and environment audit help contain harmful impacts of environmental damage? 10

6. Answer the following questions:

- (a) On a cold wintry night of 2nd/3rd December, 1984 when the residents of Bhopal went to their beds, they had no inkling that many of them were doing so for the last time. Not far from them in the factory of Union Carbide (India) Ltd., a chemical reaction had already started to that end. At around midnight, this chemical reaction culminated in the leakage of deadly Methyl Isocyanate (MIC) gas from one of the tanks of the factory. A cloud of gas started enveloping the city in its lethal folds. The tragedy took an immediate toll of about 3000 lives and left thousands of citizens physically impaired. Livestock were killed, injured and affected. Businesses were interrupted. Environment was polluted and ecology was affected with flora and fauna disturbed. Settlement of compensation still continues to be problematic. Besides, health care safety and rehabilitation instruments were found inadequate. (i) What should be the strategy for environment protection? (ii) What should be the compensation policy in such cases? (iii) Explain the role of NGOs in the mitigation of pains of such an environmental damage. (iv) In what manner can such unthinkable events be incorporated in the enterprise risk management programmes? 20

- (b) What are various entry modes by which firms can enter foreign markets? What are their advantages and disadvantages? 15
- (c) What do you understand by the term “Strategy”? Distinguish between “Business Strategy”, “Corporate Strategy” and “Product Strategy”. 15
7. (a) A small Asian firm has developed some valuable new medical products using its unique biotechnology know how. It is trying to decide how best to serve the European Union. Its choices are given below. The cost of investment in manufacturing facilities will be a major one for the Asian firm, but it is not outside its reach. If these are the firm’s only options, which one would you advise it to choose? Why? (i) Manufacture the product at home and let foreign sales agents handle marketing. (ii) Manufacture the product at home and set up a wholly owned subsidiary in Europe to handle marketing. (iii) Enter into an alliance with a large European Pharmaceutical firm. The product would be manufactured in Europe by the 50/50 joint venture and marketed by the European firm. 20
- (b) What are the main objectives of price and distribution controls of essential commodities in India? What problems do “controls” cause? What steps have been taken to strengthen and revamp public distribution system? 20
- (c) Press reports have constant flow of tales of political instability. Not surprisingly, managers consistently rank political stability as a major factor in evaluating the business and investment climate in a given country. Despite the fact that managers overwhelmingly believe that “political risk” is a major factor to be considered, a few multinational enterprises (MNEs) have internal assessment mechanism or have sophisticated teams that can evaluate the usefulness of assessments provided by consultants. (i) Is it correct to assume that political instability in a country equals political risk? If not, why? (ii) How would you factor in political risk in evaluating foreign investment proposal? 10
8. (a) Jean L, a global jeans manufacturing company reached its peak sales in 1996 and then found its sales suddenly declining and within 5 years, the sales were down by 40%. A combination of good design, pursuit of new trends and savvy marketing helped competitors take share from Jean L. Jean L had focussed on jeans for men and company’s products were found to be outdated, expensive and rather unresponsive to changing market preferences. Jean L did not move its manufacturing base to low cost producing centres. The company then responded to the declining share by three steps. First, the company closed most of its plants in its home base, laid off over 6500 employees and moved manufacturing to low cost countries. Second, it attempted to stay ahead in fashion trends rather than follow them, paying much more attention to women, with a series of new designs such as “superlow” line of jeans meant to be feminine, mass marketing the jeans within three months of testing. Third, the company announced its original Spin Programme to supply custom made jeans for individual customers, using web based technology and computer controlled production equipment to implement mass customization. Today, a full stocked Jean L store carries 130 pairs of ready to wear jeans and with original Spin Programme, the choices available can leap upto 750. Jean L charged premium of 20% for this service which helped redefine its relationship with the customers, by becoming customer’s personal ‘Jean Adviser’. The company installed a device to scan the entire body of the customer to generate custom patterns that are instantly transmitted to the production plant to manufacture jeans, shirts or any type of clothing. (i) What strategy did Jean L pursue originally? Why did the strategy fail? How do you evaluate the strategic change implemented by the company? (ii) What are the generic competitive strategies that companies can adopt? Is it in the interest of a nation to allow shifting of production to low cost countries? Examine in the context of income and employment generation. 20
- (b) What is “Intellectual Property”? What are the international mechanisms that help harmonize intellectual property protection across different nations? What are the methods used for valuation of intellectual property? 10

- (c) (i) What is the role of government as: (1.1) Regulator (1.2) Promoter (1.3) Entrepreneur? (ii) What is “Whistle blowing”? What steps have been taken to protect Whistle blowers in India?

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