FINAL EXAMINATION

GROUP III

(SYLLABUS 2012)

SUGGESTED ANSWERS TO QUESTIONS

DECEMBER 2016

Paper-15: BUSINESS STRATEGY AND STRATEGIC COST MANAGEMENT

Time Allowed: 3 Hours   **Full Marks : 100**

The figures in the margin on the right side indicate full marks

Answer Question No. 1, in Section A, which is *compulsory carrying 20 marks.*
Further, answer any 5 (five) Questions from Section B, each carrying 16 marks.

SECTION A (20 marks)

1. (a) State whether the following statements are True or false. Given reasoning for your answers. No credit will be given for answers without reasoning. If the statement is False, give the correct statement: 1 × 5=5

    (i) The "Vision" statement of a company answers the question "What it stands for" i.e., what broad products or services it intends to offer to its customers.

    (ii) 'Choice of Strategy' is influenced by factors like external constraints, time constraints, intra organizational forces and values & preferences and the managerial attitudes towards risk.

    (iii) Under the "Strategy under uncertainty", we think about "Should we stay the course or abandon and redirect our focus elsewhere"?

    (iv) The environmental appraisal is structured by the preparation of Environmental Threats and Opportunities Prospects (ETOP), which involves dividing the environment into different sectors and then analyzing the impact of each sector on the organization.

    (v) In BCG Matrix, products with low market share but high growth potential are referred to as "Dogs".

    (b) Match the statement under Column I with the appropriate statement under Column II:

                                                                                1×5=5

Column I	Column II
(A) Maturity stage of PLC (B) Lean Accounting (C) Kaizen Costing (D) Cost-Volume-Profit Analysis (E) Successful Benchmarking	(i) Provides accurate, timely and understandable information that can be used by managers, sales personnel, operational leaders and others. (ii) Based on the assumption that all other variables remain constant.

requires	(iii) Clarity of objectives.
	(iv) Improvements in manufacturing processes.
	(v) Focuses on the production process and cost reductions are derived primarily through the efficiency of the production process.

(c) Define the following terms in just one or two sentence (s):   1×5=5

    (i) Responsibility Accounting

    (ii) Business Process Re-engineering (BPR)

    (iii) Strategic Alliances

    (iv) PERT

    (v) Learning Organization

(d) In each of the case/statement given below, one of four alternatives is correct. Indicate the correct answer: 1×5=5

    (i) Addition of "Broad Band" to the existing "Telephone Services" facility by BSNL an example of

        (A) Concentratic diversification

        (B) Unrelated diversification

        (C) Merger diversification

        (D) Acquisition diversification

    (ii) 'Jio' by Reliance Jio Infocomm Limited (RJIL) provides interesting example to fit in the BCG Matrix as

        (A) Star

        (B) Question Mark

        (C) Cash Cow

        (D) Dog

    (iii) Business-level strategies detail commitments and actions taken to provide value to customers and gain competitive advantage in specific product markets by exploiting

        (A) The selection of industries in which the firm will compete.

        (B) The Core Competencies.

        (C) The selection of primary value chain activities.

        (D) The selection of particular geographic locations.

    (iv) The operation of Activity Based Cost Management system involves the use of the following terms, except

        (A) Blanket overhead recovery

        (B) Resources

        (C) Cost pools

        (D) Cost drivers

    (v) Following are included in the concept of the TQM philosophy, except

        (A) Customer focus

        (B) Static improvement

        (C) Employee empowerment

        (D) Use of quality tools

Answer: 1 (a)

    (i) **False.** The correct statement is: The **"Mission"** statement of a company answers the question "What it stands for" i.e., what broad products or services it intends to offer to its customers.

    (ii) **True:** the given statement is absolutely correct.

(iii) False. The correct statement is: Under the **"Strategy Drift"**, we ponder "Should we stay the course or abandon and redirect our forces elsewhere"?

(iv) False. The correct statement is: The environmental appraisal is structured by the preparation of Environmental Threats and Opportunities **Profile** (ETOP), which involves dividing the environment into different sectors and then analyzing the impact of each sector on the organization.

(v) False. The correct statement is: In BCG Matrix, products with low market share but **limited growth potential** are referred to as "Dogs".

1 (b)

A -   (iv)

B -   (i)

C-   (v)

D -   (ii)

E -   (iii)

1 (c)

(i)   **Responsibility Accounting** is the collection, summarization and reporting of financial information about various decision centres throughout an organization.

(ii)   **BPR** means aims to help organizations fundamentally to re-think as how they should do their work in order to dramatically improve customer services, cut operational costs and become world-class competitors.

(iii)   **Strategic alliance** is an agreement for cooperation among two or more independent firms to work together toward common objectives. This form of cooperation lies between mergers & acquisitions and organic growth.

(iv)   **Programme, Evaluation and Review Technique (PERT)** is a technique for planning, scheduling and controlling of projects whose activities are subject to uncertainty in the performance. PERT and CPM are the two techniques of network analysis. PERT is known as a probabilistic model.

(v)   **Learning organizations** are the organizations where people continuously expand their capacity to create the results they truly desires, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where continually learning to see the whole together.

1 (d)

(i)   (A) Concentratic diversification

(ii)   (A) Star

(iii)   (B) Core Competencies

(iv)   (A) Blanket overhead recovery

(v)   (B) Static improvement

SECTION - B (80 marks)
Answer any 5 (five) questions.

2.   **(a) State the value of a firm's vision and mission.**

   (b) Change is inevitable, and those organizations who do not keep up with change will become unstable, with long-term survivability in question. Keeping this in mind what elements the organizations can change to survive?   **8+8= 16**

Answer: 2

(a) **The firm's vision** is a picture of what it wants to be and what it wants to ultimately achieve. The firm's mission is based on its vision. It specifies the business (es) in which the firm intends to compete and the customers it intends to serve. The value of having a vision and mission is that they inform the following three questions to the stakeholders:
(i)   What the firm is?
(ii)   What it seeks to accomplish?
(iii)   Who it seeks to serve?

A successful vision is inspirational. The mission is more concrete and guides employees' behavior as they achieve the firm's vision. Research shows that an effectively formed vision and mission positively impacts firm performance in terms of growth in sales, profits, employment, net worth of the organization and the development of nation as well as welfare of the society at a large extent.

(b) **The major elements** of which organizations can change in response to dynamic environments fall into the broad areas:

(i)   Mission, Vision and Strategy changes.
(ii)   Technology changes.
(iii)   Human behavioral changes.
(iv)   Task-job Design changes.
(v)   Organizational Structure changes.
(vi)   Organizational culture changes.

It is important to note that changes in one of these elements will usually have an impact on another element.

3. **(a) What are the applications of 'strategic bundling' of individual products that achieve greater profit margins through shared organizational processes?**
    (b) 'Value chain analysis' is a strategic managerial tool to assess and review the various business functions in which utility is added to the products or services. As a CMA your company wants step-wise methodology to be implemented for Value Chain Analysis. How would you break-up the company activities in sequential steps in this respect?

8+8=16

Answer: 3

(a) **Strategic integration** is a tactical approach to manage that involves high initial investments on recourse acquisition and employee training programs for accomplishment of strategic objectives and achievement of optimum performance and results. However, the process carries long-term advantages that minimize the cost of increasing business flexibility over time.

The implications of strategic bundling of individual products that achieve a greater profit margin through shared organizational processes are:
(i)   Adjusting targets, reward systems, and metrics to reflect changes in procedures and approach to production. It may be necessary to increase staff incentives while modifying metrics for tracking shared cross-functional activities.
(ii)   Creating budgetary plans and supplements to cover any extra cross-functional estimates that may arise from the integration processes.

    (iii) Automating and upgrading communication structures across functional groups and processes within the organization to achieve efficiency through effective flow and sharing of information.

    (iv) Standardizing of business processes and data versions to incorporate the interests of both internal and external stake holders.

(b) **The profitability of a firm** depends to a large extent on how effectively it manages the various activities in the value chain. The value chain framework is a handy tool for analyzing the activities in which the firm can pursue its distinctive core competencies in the form of a low cost strategy or a differentiation strategy.

The steps in Value Chain Analysis can be broken down into three sequential steps:

    (a) Break-up the organization into its key activities under each of the major headings in the model.

    (b) Assess the potential for adding value via cost advantages or differentiation or identity current activities where a business appears to be at a competitive advantage.

    (c) Determine strategies built around focusing on activities where competitive advantages can be sustained.

4. (a) 'Choice of Strategy' is a decision making process of comparing the impact of the possible strategic of the firm and it implies trade-off between courses of action considering the selection factors. What are the factors which are influenced by choice of strategy?

    (b) What do you mean by 'strategic leadership'? State the two basic approaches to strategic leadership.   **8+(2+6) = 16**

Answer: 4

(a) **Choice of strategy** is a decision making process of choice from among alternative strategies. It is the process of comparing the impact of the possible strategies on the firm and it implies trade-off between courses of action. This decision involves focusing on a few alternatives, considering the selection factors, evaluating the alternatives, and making the actual choice.

Choice of strategy is influenced by the following factors:

    (i)   External constraints (i.e. owners, customers, suppliers, government and others).

    (ii) Intra-organizational forces (i.e. different interest groups and the degree of uncertainty).

    (iii) Personal values (i.e. truth knowledge etc.), preferences, and managerial attitudes towards project risk.

    (iv) Impact of past strategy, (i.e. the decision makers are involved in past strategy as a starting point of choice of strategy).

    (v) Time constraint and dimension (i.e. whether it will be short-term or long-term, whether it has immediate action or not).

(b) **Strategic leadership** is the ability of influencing others to voluntarily make decisions that enhance prospects for the organization's long-term success while maintaining short-term financial stability. It includes determining the firm's strategic direction, aligning the firm's strategy with its culture, modeling and communicating high ethical standards, and initiating changes in the firm's strategy when necessary. Strategic leadership sets the firm's decisions by developing and communicating a vision of future and inspires organization members to move in that direction. Unlike strategic leadership, managerial leadership is generally concerned with the short- term and day-to-day activities.

Two basic approaches to strategic leadership can be:

    (i)   Transformational strategic leadership style, and

(ii)   Transactional strategic leadership style.

Transformational strategic leadership style use charisma and enthusiasm to inspire people to exert them for the good of the organization. This leadership style may be appropriate in turbulent environments, in business at every start or end of their lifecycles, in poorly performing organizations when there is a need to inspire a company to embrace major changes. Transformational strategic leaders offer excitement, vision, intellectual stimulation and personal satisfaction.

Transactional Strategic Leadership style focus more on designing systems and controlling the organization's activities and are more likely to be associated with improving the current situation. This type of leaders tries to build on the existing culture and enhance current practices. They use the authority of its office to exchange rewards, such as pay and status. They prefer more formalized approaches to motivating, setting clear goals with explicit rewards or penalties for achievement or non achievement. This approach may be appropriate in settled environment, in growing or mature industries, and in organizations that are performing well. The style is better suited in persuading people to work efficiently and run operations smoothly.

5.   (a)   **Define 'global industries'. State the four drivers which determine an industry's globalization potential.**

(b)   **An electronic firm is undecided as to the most profitable mix for its products. The products which are manufactured now are Transistors, Resistors and Carbon Tubes with a profit (per 100 units) of ₹10, ₹6 and ₹4 respectively. To produce a shipment of Transistors (containing 100 units) requires 1 hour of engineering, 10 hours of direct labours and 2 hours of administration services. To produce a shipment of Resistors (containing 100 units) requires 1 hour, 4 hours and 2 hours of engineering, direct labour and administration services respectively. To produce a shipment of Carbon Tubes (containing 100 units) requires 1 hour engineering, 5 hours of direct labour and 6 hours of administration services. There are 100 hours of engineering services, 600 hours of direct labour and 300 hours of administration services available.**
Formulate the LPP model.

Find out the product mix to maximize profit.   **(2+6)+8 = 16**

Answer: 5

(a)   A Global Industry can be defined as:

- An industry in which firms must compete in the world market in that product in order to survive.
- An industry in which a firm's competitive advantage depends on economies of scale and the scope of gained across the world market.

Some industries are more suited for globalization than are others. The following drivers determines on industry's globalization potential:

(i)   Cost drivers: It includes the following –
   a)   location strategic resources,
   b)   Differences in country costs,
   c)   Potential of economies of scale (i.e. production, R&D, etc.),
   d)   Transportation costs (i.e. value/bulk or value/weight ratio).

(ii)   Customer drivers: It includes the following -
   a)   Common customer needs favour globalization,
   b)   If a firm's customers are other global business, globalization may be required to reach these customers in all their markets. Furthermore, global customers often

required globally standardized products/services.

    c) Global channels require a globally coordinated marketing programme,

    d) Transferable marketing's i.e. whether marketing elements such as brand names and advertising require little local adoption. World brands with non-dictionary names may be developed in order to benefit from a single global advertising campaign.

(iii) Competitive drivers: it includes the following –

    a) Global competitors, i.e. the existence of many global competitors indicate that the industry is ripe for globalization. Global competitors will have cost advantage over local competitors.

    b) When competitors begin leveraging their global position through cross-subsidization, an industry is ripe for globalization.

(iv) Government drivers: it includes the following -

    (a) Trade policies.

    (b) Technical standards.

    (c) Regulations.

(b) Let us tabulate data in a convenient manner:

	Products (Units)			Availability (Hrs.)
	Transistors	Resistors	Carbon Tubes	
Engineering	1	1	1	100
Labour	10	4	5	600
Administration	2	2	6	300
Profit (per 100 units)	₹10	₹6	₹4	

Symbolically, the LPP would be as: $Z_{max} = 10x + 6y + 4z$

Here, x, y, and z represents units of Transistors, Resistors and Carbon Tubes (in 100 units).

Subject to $x + y + z \leq 100$

                $10x + 4y + 5z \leq 600$

                $2x + 2y + 6z \leq 300$

                $x \geq 0, y \geq 0,$ and $z \geq 0$

Introducing slack variables, S_1, S_2, and S_3

Maximize, $Z = 10x + 6y + 4z + 0S_1 + 0S_2 + 0S_3$

Subject to, $x + y + z + S_1 = 100$

                $10x + 4y + 5z + S_2 = 600$

                $2x + 2y + 6z + S_3 = 300$

                $x \geq 0, y \geq 0, z \geq 0, S_1 \geq 0, S_2 \geq 0,$ and $S_3 \geq 0$

Simplex tableau 1

	Cj			10	6	4	0	0	0	Replacement Ratio
Fixed Ratio	Basic Variables	C_B	Value of basic variables $b = (X_B)$	x	y	z	S_1	S_2	S_3	
1/10	S_1	0	100	1	1	1	1	0	0	100
	S_2	0	600	**10**	4	5	0	1	0	← 60

1/5	S$_3$	0	300	2	2	6	0	0	1	150
	Z$_J$ = Σ C$_{BI}$ X$_J$			0	0	0	0	0	0	
	C$_J$ - Z$_J$			10 ↑	6	4	0	0	0	

Simplex tableau 2

	Cj			10	6	4	0	0	0	Replacement Ratio
Fixed Ratio	Basic Variables	C$_B$	Value of basic variables b = (X$_B$)	x	y	z	S$_1$	S$_2$	S$_3$	
	S$_1$	0	40	0	**6/10**	5/10	1	-1/10	0	← 400/6 = 67
2/3	x	10	60	1	4/10	5/10	0	1/10	0	600/4 = 150
2	S$_3$	0	180	0	12/10	5	0	-2/10	1	150
	Z$_J$ = Σ C$_{BI}$ X$_J$			10	4	5	0	1	0	
	C$_J$ - Z$_J$			0	2↑	-1	0	-1	0	

Simplex tableau 3

	Cj			10	6	4	0	0	0	Replacement Ratio
Fixed Ratio	Basic Variables	C$_B$	Value of basic variables b = (X$_B$)	x	y	z	S$_1$	S$_2$	S$_3$	
	y	6	400/6	0	1	5/6	10/6	-1/6	0	
	x	10	100/3	1	0	1/6	-2/3	0	0	
	S$_3$	0	100	0	0	4	-2	0	-1	
	Z$_J$ = Σ C$_{BI}$ X$_J$			10	6	20/3	10/3	+2/3	0	
	C$_J$ - Z$_J$			0	0	-8/3	-10/3	-2/3	0	

C$_j$ - Z$_j$ since all entries in index row (C$_j$ - Z$_j$) are - ve or zero. Current solution is optimum.

Hence, the most profitable mix is y = 400/6 Resistors, x = 100/3 Transistors and z = 0 Carbon tube.
The Maximum Profit is 6 × 400/6 + 10 × 100/3 = ₹733.33

6. (a) (i) **Define the term 'Vertical integration'. Give a suitable example with explanation.**

 (ii) **State the drawbacks of 'vertical integration'.**

 (b) **State the important issues which are to be considered in making decisions associated with vertical integration.** (2+2+4)+8 = 16

Answer: 6 (a)

 (i) Vertical integration is the process in which several steps in the production and/or distribution of a product or services are controlled by a single company or entity, in order to increase that company's or entity's power in the market place. This integration represents an expansion or extension of the firm by integrating preceding or successive productive process.
 Simply said, every single product/service that you can think of has big life cycle. While you might recognize the product/service with a brand name printed on it, many

companies are involved in developing that product/service. These companies necessarily not part of the brand you see.

Example: the vertically integrated giants of computer industry, firms like IBM, Digital and Burrougs, were felled like young saplings when at the end of the 1970s Apple formed a network of independent specialists that produced machines for more efficiently than the do-it-all giants.

(ii) Vertical integration potentially has the following drawbacks:
   a) Capacity balancing issues.
   b) Potentially higher costs due to low efficiencies resulting from lack of supplier competition.
   c) Decreased flexibility due to previous upstream or downstream investments.
   d) Decreased ability to increase producer variety if significant in-house development is required.
   e) Developing new core competencies may compromise existing competencies.
   f) Increased bureaucratic costs.

(b) In making decisions associated with vertical integration, the following four important issues should be considered:

(a) Is the company satisfied with the quality of the value that its present suppliers and distributors are providing? If the performance of organizations in vertical chain - both suppliers and distributors - is satisfactory, it may not, in general, be appropriate for a company to perform these activities themselves.

(b) Are their activities in the industry value chain presently being outsourced or performed
independently by others that are a valuable source of future profits? Even if a firm is outsourcing value chain activities to companies that are doing credible job, it may be missing out on substantial profit opportunities.

(c) Is there a high level of stability in the demand for the organization's products? High demand or sales volatility would not be conducive to a vertical integration strategy.

(d) How high is the proportion of additional production capacity actually absorbed by existing products or by the prospects on new one and similar products? The smaller the proportion of production capacity to be absorbed by existing or future products, the lower is the potential for achieving scale economies associated with the increased capacity - either in terms of backward integration (towards the supply of raw materials) or forward integration (toward the end user). Alternatively, if there is excess capacity in the near term, the strategy of vertical integration may be viable if there is the anticipation of future expansion of products.

7. **(a) As the head of marketing department, how can you advise company CEO on product policy? What are the important dimensions would you present to CEO?**

   (b) (i) For any given product there are at least five strategic choices by the firm regarding its underlying economic structure that drive cost position. Enlist them.

   (ii) Write the key ideas of structural cost drivers.

   (c) Mumbai based Hero Electronics manufactures a component for RCom Mobile in batches of 2,000 each. Each component is tested before being sent to the RCom for sales. Each component can be tested at the factory at a cost of ₹25. If any component is found to be defective, it can be rectified by spending ₹200. In view of the large demand for the components and the sophisticated system of manufacture, a proposal came up that the practice of pre-testing of the components is to be dispensed with to save costs. In that

event, any defective component is received back from the customer under warranty, the cost of rectification and re-dispatch will be ₹400 per component.

State at what percentage of manufacture of components, the Hero Electronics will find it cheaper to pre-test of each component? 5+6+5=16

Answer: 7

(a) As head of the marketing department I will present the company product policy in the following dimensions:

(I) Individual product decision: It includes the following –
  (i) Product attributes.
  (ii) Product branding.
  (iii) Product packaging.
  (iv) Product labeling.
  (v) Product support services.

(II) Product line decision: it includes the following –
  (i) Line stretching.
  (ii) Line filling.

(III) Product mix decision.

(IV) Product positioning decision.

(b) **(i) Structural cost drivers,** drawing upon the industrial organization literature (Scherer, 1980). From this perspective there are at least five strategic choices by the firm regarding its underlying economic structure that drive cost position for any given product group:

(a) Scale: How big an investment to make in manufacturing, in R&D, and in Marketing Resources?

(b) Scope: Degree of vertical integration, Horizontal integration is more related to scale.

(c) Experience: How many times in the past the firm has already done what it is doing again?

(d) Technology: What process technologies are used at each step of the firm's value chain? Technology choices are such a thorny topic area that it is not surprising that management accountants have pretty much ignored it.

(e) Complexity: How wide a line of products or services to offer to the customers? Complexity, as a structural variable, has received the most attention among accountants recently.

Each structural cost drivers involves choices by the firm that drive product cost. Of the structural drivers, scope, scale and experience have received a large amount of attention from economists and strategists over the years. Of these three only the experience has drawn much interest from management accountant.

(ii) Whatever cost drivers are on the list, the key ideas are as follows:
  ➢ For strategic analysis, volume is usually is not the most useful way to explain cost behavior.

  ➢ In a strategic sense, it is more useful to explain cost position in terms of the structural choices and exceptional skills that shape the firm competitive position.

  ➢ Not all the strategic drivers are equally important all the time.

  ➢ For each cost driver there is a particular cost analysis framework that is critical to understanding the positioning of the firm.

(c) Let the defectives be D.
To set (2,000 × 25) + 200D

If defectives are rectified after return from customers the cost = 400D

At cost indifference point:

(2,000 × 25) + 200D = 400D

Or, 200D = 50,000

Or, D = 250

Therefore, percentage of defective to total components = (250 ÷ 2,000) × 100 = 12.5%

Recommendation: If defectives are more than 12.5%, then pre-testing is advised Hero Electronics.

8. (a) (i) How Critical Path Analysis (CPA) helps an organization?

   (ii) If a project is delayed due to any of the activities on the critical path, what steps are to be taken by an organization?

   (b) ABC Machinery Company has been offered a contract to build and deliver nine extruding presses to PQR Boating Company. The contract price negotiated is contingent upon meeting a specified delivery time, with a bonus offered for every delivery. The marketing department has established the following cost and time information:

Activity	Normal time (weeks)			Normal cost (₹)	Crash time (weeks)	Crash Cost (₹)
	t_o	t_p	t_m			
1-2	1	5	3	5,000	1	9,000
2-3	1	7	4	8,000	3	14,000
2-4	1	5	3	4,000	2	6,000
2-5	5	11	8	5,000	7	6,000
3-6	2	6	4	3,000	2	5,000
4-6	5	7	6	2,000	4	3,600
5-7	4	6	5	10,000	4	14,000
6-7	1	5	3	7,000	1	10,600

Normal delivery time is 16 weeks for a contract price of ₹62,000.

On the basis of the calculated profitability for each delivery time specified in the following table, what delivery schedule do you recommend that the company may implement?

Contract Delivery Time (weeks)	Contract Amount (₹)
15	62,500
14	65,000
13	70,000
12	72,500

(Here, t_o = Optimistic time, t_p = Pessimistic time, t_m = Most likely time)   (3+5)+8 =16

Answer: 8

(a) **1st part:**

Critical Path Analysis and PERT are powerful project management tools that help the organization to schedule and manage the complex projects. They were developed in the 1950s to control large defense projects and have been used routinely since then.

As with Gantt Charts, CPA helps the organization to plan all tasks that must be completed as part of a project. They act as the basis both for preparation of a schedule and of

resource planning. During management of project, they allow to monitor achievement of project goals. They help the organization to identify where remedial actions are to be taken to get a project back on course.

A further benefit of CPA is that it helps the organization to identify the minimum length of time needed for completing the project.

2nd part:

If there is any delay in any of the activities on the critical path the whole project will be delayed unless the firm makes other changes to bring the project back on track. In this type of project delayed situation the company can follow the following steps:

(I) If there is float elsewhere, it might be possible to switch over the staff from one activity to another activity to help catch up the delayed activity.

(II) Most projects can be brought back on track by using extra labour - either by hiring additional people or arranging overtime to the existing labour. There will be using an extra cost. Alternative suppliers can usually be found - but again, it might cost more to get urgent help.

(III) Nodes are numbered to identify each one and show the Earliest Start Time (EST) of the activities that immediately followed the node, and the Latest Finish Time (LFT) of the immediately preceding activities.

(IV) The CPA must begin and end in one node.

(V) There must

(VI) be no crossing activities in the CPA.

(b)

Activity	Normal Time (Weeks)			Expected Duration (Weeks)	Normal Cost (₹)	Crash Time (Weeks)	Crash Cost (₹)	Cost Slope (₹)
	t_0	t_p	t_m					
1-2	1	5	3	3	5,000	1	9,000	2,000
2-3	1	7	4	4	8,000	3	14,000	6,000
2-4	1	5	3	3	4,000	2	6,000	2,000
2-5	5	11	8	8	5,000	7	6,000	1,000
3-6	2	6	4	4	3,000	2	5,000	1,000
4-6	5	7	6	6	2,000	4	3,600	800
5-7	4	6	5	5	10,000	4	14,000	4,000
6-7	1	5	3	3	7,000	1	10,600	1,800
Total					44,000			

The Network for the given problem is below:
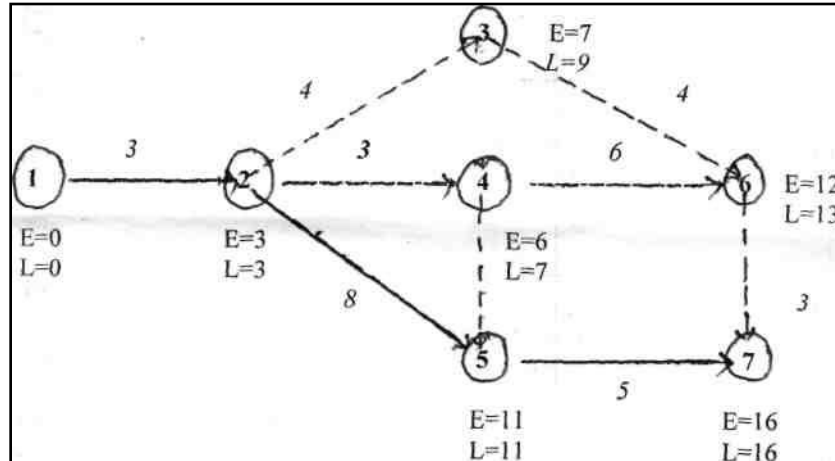
The Critical Path is 1 - 2 - 5 - 7.

Total Duration is 16 Weeks.

Cost of all activities is ₹ 44,000.

Contract Price is ₹ 62,000 for normal delivery time of 16 weeks.

Hence, the Profit is ₹ 18,000.

Step 1: The critical activity 2-5 has the least cost Slope ₹ 1,000, so we crash this activity by 1 week.

Crashing cost is ₹ 1,000. The contract for delivery time of 15 weeks is ₹ 62,500.

Then, profit = ₹ 62,500 - (44,000 + 1,000) = ₹ 17,500.

Step 2: Now there are two Critical Path viz. **1 - 2 - 4 - 6 - 7** and **1 - 2 - 5 - 7** with duration of 15

weeks. So we crash activity 1 - 2 by one week at crash cost of ₹ 2,000. Project duration is

14 weeks

Then, profit = ₹ 65,000 - (45,000 + 2,000) = ₹ 18,000

Step 3: We again crash activity 1 — 2 by 1 week. So the project duration is 13 weeks.

Then, profit is ₹ 70,000 - (47,000 + 2,000) = ₹21,000.

Step 4: Now crash activity of 4 - 6 for path 1 - 2 - 4 - 6 - 7 at crash cost of ₹800 and activity 5-7 for

path 1-2-5-7 at crash cost of ₹4,000. The project duration is now 12 weeks.

Then, profit is ₹72,500 - (49,000 + 4,000 + 800) = ₹ 18,700.

No further crashing is possible.

From step 3 it can be seen the profit is maximum when the project duration is 13 weeks.
Hence, the company should implement the **delivery schedule of 13   weeks** at a
contract amount of ₹70,000 to **gain maximum profit of ₹21,000.**