

B.E. Computer Science & Engineering
Fourth Year Second Semester Exam 2017 (old)

Industrial Management and Optimization Technique

Time: 3 Hours

Full Mark : 100

Answer **any five** questions

All questions carry equal marks

Answers must be brief and precise

1. (a) A large multinational organization having presence in various countries across the world and operating in financial sector, is contemplating diversification into software services. Since, even at present the organization has to depend heavily on software services through outsourced agencies, there is a feeling that diversification into financial services should be reasonably smooth.

Discuss critically the issues which have to be taken care of at (i) strategic management, (ii) tactical management and (iii) operational management levels to take a decision on this idea of diversification into software services.

(b) Discuss the importance of various management functions with the help of appropriate examples from organizations operating in the domain of design, development and marketing of software products. 12 + 8

2. (a) Discuss the role of leadership and delegation in the context of a very large diversified organization.

(b) Explain the terms (i) opportunity cost and (ii) debt-equity ratio – with the help of appropriate examples.

(c) Discuss various forms of organizational structures and explain their suitability in the context of appropriate organizational behavior. 8 + 6 + 6

3. (a) Consider a set of n jobs each of which has to be serviced through two machines M1 and M2 with the following conditions:

(i) Each job has to be serviced by M1 first and M2 next.

(ii) Each job requires some pre-defined specific amount of time of service in M1 and M2.

(iii) Pre-emption is not allowed – ie. Once one Machine commences servicing any particular job, it cannot disengage from that job till the servicing of that job by the machine is over.

(iv) Jobs are mutually independent – ie. Jobs may be scheduled in any order.

Suggest an algorithm which will ensure completion of this entire set of n jobs in minimal feasible time. Clearly mention any assumption you make in this context. Also, comment on the optimality and time complexity of the algorithm suggested by you.

(b) Consider the case involving the functioning of a large dealer in Fast Moving Consumer Goods (FMCG) items – like Refrigerators, AC Machines, TVs, Microwaves etc. Identify the critical issues which should dictate any methodology to take decisions concerning management of inventory.

What is "Economic Order Quantity"? How is it derived?

12 + 8

4. A project consists of the following activities with their duration in days and precedence relationship as follows:

| Activity | Precedence | Duration (in days) |
|----------|------------|--------------------|
| A | - | 5 |
| B | - | 5 |
| C | A | 4 |
| D | B | 8 |
| E | C, D | 6 |
| F | B | 5 |
| G | E, F | 7 |
| H | E, F | 7 |
| I | E, F | 4 |
| J | G | 2 |
| K | H | 5 |
| L | I | 5 |
| M | K, L | 4 |

- (i) Draw the network for the above project.
 (ii) Identify the critical path and corresponding duration of the project.
 (iii) Calculate EST, EFT, LST, LFT and Float for each activity.

6 + 6 + 8

5. (a) Discuss relative merits and demerits of the following methodologies as problem solving techniques: (i) Greedy approach, (ii) Branch-and-Bound approach, (iii) Dynamic programming.

(b) State and algorithm for finding Minimum Spanning Tree (MST) – and comment on the optimality and time-complexity of the algorithm suggested by you.

(c) How would you detect the presence (or otherwise) of a cycle in a directed graph? 6 + 10 + 4

