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# MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

*(A constituent unit of MAHE, Manipal)*

## VII SEMESTER B.TECH (CIVIL) END SEMESTER EXAMINATIONS

## DECEMBER 2020

## SUBJECT: ESTIMATING AND CONSTRUCTION MANAGEMENT [CIE- 4101]

Date of Exam: Time of Exam: Max. Marks: **50**

**Instructions to Candidates:**

- Answer ALL the questions & missing data may be suitably assumed

| | | |
|---|---|---|
| **1A.** | What are tender documents? Describe any one tender document in detail. | **2** |
| **1B.** | Write a note on (a) Security Deposit in tender (b) Complete Estimate | **3** |
| **1C.** | A property is situated by the side of a main road on a land of 400 sqm area. The built up area of the building is 300 sqm. The age of the building is 20 years. From the recent sale instances, the present market value of the land and building is estimated at Rs. 15,000 per sqm and Rs. 7,000 per sqm respectively. Consider the life of the building as 60 years and the rate of annual sinking fund interest of 5%. Workout the present value of the property. (Use sinking fund method to calculate depreciation). | **5** |
| **2A.** | List different types of scheduling techniques. Discuss the merits and demerits of each type of scheduling technique. | **4** |
| **2B.** | Following are the relationships between different activities making up a project. Draw a **neat network** for the interrelationships mentioned and number the events using **Fulkerson's** rule.<br>1. A and B are concurrent activities.<br>2. C and J starts simultaneously and succeed B.<br>3. A is the immediate predecessor of activity D<br>4. E and F are concurrent activities which can commence only after the completion of activities B and D.<br>5. Starting of activity G depends on the completion of activities A and E.<br>6. Activity H can start only after the completion of activities C and F.<br>7. Activity I is the last activity, which follows both J, G and H. | **6** |
| **3A.** | Explain why PERT is 'probabilistic' in nature. What is the significance of various 'slacks' in PERT? | **3** |

**3B.** Draw a network and determine the slack for each event. Which path is critical? All durations are in weeks. Use tabular approach. **7**

| Activity | Predecessor | $t_o$ | $t_m$ | $t_p$ |
|---|---|---|---|---|
| A | - | 7 | 11 | 15 |
| B | - | 6 | 8 | 16 |
| C | A | 5 | 8 | 17 |
| D | A | 4 | 6 | 8 |
| E | B, D | 2 | 3 | 4 |
| F | B, D | 4 | 6 | 14 |
| G | E, C | 3 | 11 | 13 |
| H | F | 4 | 6 | 8 |

**4A.** Determine the optimum duration and minimum cost at the end of **third stage** crashing for the activities shown below. The indirect cost of the project is ₹ 500 per day. All durations are in days. Draw timescale network for every stage of crashing. **4**

| Activity | Normal duration | Normal cost (₹) | Crash duration | Crash cost (₹) |
|---|---|---|---|---|
| 1-2 | 6 | 7000 | 3 | 14500 |
| 1-3 | 8 | 4000 | 5 | 8500 |
| 2-3 | 4 | 6000 | 1 | 9000 |
| 2-4 | 5 | 8000 | 3 | 15000 |
| 3-4 | 5 | 5000 | 3 | 11000 |

**4B.** Describe the criteria specific to the companies in choosing a construction equipment. With the help of a neat sketch, explain any four limitations of Dragline. **6**

**5A.** Discuss the various ways by which overlapping of work and ineffective communication can be avoided in an organization. Cite reasons with various principles governing an organization. **4**

**5B.** A contractor intends to rent an equipment for a time period of 8 months following which he is looking to buy the equipment. As per the agreement 90% of the rent charges will be discounted from the total cost of the equipment after the said period. Calculate the probable cost of owning and operating per hour for the equipment if the investment cost is 13% of the average value. Maintenance cost is considered as 100 percent of depreciation. Details of the equipment are given below; **6**

Actual cost – ₹22,57,000, Salvage value- ₹2,22,000, Engine capacity – 160 HP, crank case capacity- 53 litre, Hours between oil change- 80 hr, Operating factor- 0.6, Useful life 5 years, Operating hours per year- 2000, rental charges per month- ₹1,96,000. Cost of fuel per litre- ₹78/litre, cost of lubricant- ₹70/litre.