

Code : 011827

B.Tech. 8th Semester Exam., 2017

Construction Planning and Design

Time : 3 hours

Full Marks : 70

Instructions :

- (i) The marks are indicated in the right-hand margin.
 - (ii) There are NINE questions in this paper.
 - (iii) Attempt FIVE questions in all.
 - (iv) Questions No. 1 is compulsory.
1. Answer any seven questions from the following multiple choice type questions: $2 \times 7 = 14$
- (i) CPM and PERT network is
 - (a) activity oriented
 - (b) activity and event oriented
 - (c) event oriented
 - (d) resources oriented
 - (ii) Gantt chart is drawn for
 - (a) time versus activity
 - (b) activity versus time
 - (c) resources versus progress
 - (d) progress versus time

(iii) Negative slack occurs

- (a) When latest allowable time is greater than earliest expected time
 - (b) when events stick to their schedule
 - (c) when deficiency of resource exist
 - (d) none of these
- (iv) If an activity has its optimistic, most likely and pessimistic times as 2, 3 and 7 respectively, then its expected time and variance respectively are
- (a) 3.5 and 25/36
 - (b) 3.5 and 5/6
 - (c) 5 and 25/36
 - (d) 4 and 5/6
- (v) A tractor shovel has as purchase price of Rs. 4.7 lacs and could save the organisation an amount of rupee one lac per year on operating costs. The salvage value after the amortization period is 10% of the purchase price. The Capital recovery period will be
- (a) 3.7 years
 - (b) 5 years
 - (c) 7.87
 - (d) 4.23 years

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- (vi) In resource levelling
- total duration of project is reduced
 - total duration of project is increased
 - uniform demand of resources is achieved
 - cost of project is controlled
- (vii) Cost-benefit studies are essential to
- assess the total cost of the work
 - ascertain the relevant escalation in price
 - monitor the expenditure
 - evaluate the viability and worth whileness of taking up the project
- (viii) Site order book is used for recording
- instructions of the executive engineer
 - construction managements
 - requirement of plants and equipment
 - indents for materials to be ordered
- (ix) A 75 m³ scraper working on a 150 m haul is expected to give an output of approximately
- 1 m³/hr
 - 5 m³/hr
 - 10 m³/hr
 - 100 m³/hr

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- (x) The size of the power shovel is indicated by the size of
- boom
 - (b) dipper*
 - hoist line
 - cab

2. A building project consists of 12 activities. The normal duration required to perform various activities and the relationship among the activities are given below:

Activity	A	B	C	D	E	F	G	H	I	J	K	L
Predecessor	—	—	A	A	B	B	C	C	DE	F	G	H,I,J
Duration week	7	5	10	5	8	6	5	4	10	5	8	9

- Compute (i) the project completion time (ii) the critical path and (iii) the total float and free float each activity.

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3. The three time estimates of each activities of a project are given below:

Activity	1-2	1-3	2-4	3-4	4-5	3-5
t_o (days)	2	3	5	2	1	6
t_n (days)	5	12	14	5	4	15
t_p (days)	14	21	17	8	7	30

- (i) Draw the network diagram (ii) Find the expected duration and variance of each activity (iii) Calculate the

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early and late occurrence times for each event (iv)
Determine the expected duration (v) Calculate the total
float for each activity. 14

4. (a) Distinguish clearly between the following: 7
- Large block construction and Medium panel construction
 - Large panel construction and Box unit construction
- (b) Fly ash bricks are precast cost-effective building materials and are sufficient to replace the burnt bricks. Give reasons.

5. (a) Define the following terms: 6
- Injury-frequency rate
 - Injury-severity rate
 - Injury Index
- (b) What are the safety measures that can be adopted in demolition of buildings? 8

6. (a) State and explain Limit of economical haul or economical overhaul distance. 5
- (b) For the given value of data of the section of highways, draw the mass-haul curve and calculate (i) total volume of cut and total volume of fill (ii) the chainage at which the total excavated volume has been used in filling (iii) volume of fill material

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required from borrow pit to complete the earthwork and the chainage for the purpose. 9

Chainage(m)	Volume(m ³)	
	Cutting volume	Filling volume
0		
50	500	
100	1500	
150	2000	
200	1800	
250	1000	
300	200	
350		600
400		900
450		2000
500		2500
550		1800
600		1200

7. (a) What are the functions of Break Even Chart? 6
- (b) A building has been rented on an annual rent of Rs.4800. The life of the building in the present position is expected to be 12 years. If the major repairs to the building are done now, its life shall be increased by another 15 years. The major repairs

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9. (a) Describe decision-making under uncertainty. 6

(b) A firm manufactures three types of products. The fixed and variable costs are as follows :

	Fixed cost (₹)	Variable cost per unit (₹)
Product A	25,000	12
Product B	25,000	12
Product C	25,000	12

The likely demands (units) of the products are as :

Poor demand = 3000

Moderate demand = 7000

High demand = 11000

If the sale price of each type of product is ₹ 25, then prepare the payoff (profit) matrix.

