



Knowledge Resource & Relay Centre (KRRC)

AIKTC/KRRC/SoET/ACKN/QUES/2022-23/

Date: 25/01/23

School: SoET-REV. C-SCHEME Branch: CIVIL ENGG. SEM: VIII

To,
Exam Controller,
AIKTC, New Panvel.

Dear Sir/Madam,

Received with thanks the following **Semester/Unit Test-I/Unit Test-II (Reg./ATKT)** question papers from your exam cell:

Sr. No.	Subject Name	Subject Code	Format		No. of Copies
			SC	HC	
1	Construction Management	CE-C801		✓	
2	Bridge Engineering and Design	CE-C802		✓	
3	DDRCS	CE-C803		✓	
4	Institute Optional Course-2 Project Management	CE-E804		✓	

Note: SC – Softcopy, HC - Hardcopy

(Shaheen Ansari)
Librarian, AIKTC

NB: Question No 1 is compulsory

Attempt any three questions out of remaining five questions

Figures to the right indicates full marks

Q1. Answer any four of the following (5 marks each) [20]

- A What is meant by Work Breakdown structure? Explain with example
- B Explain the term Quality assurance and quality control
- C Distinguish between resource smoothening and resource leveling?
- D Distinguish between PERT and CPM?
- E What is meant by Time Cost trade off?

Q2 Answer the following (10 marks each) [20]

- A Explain types of recruitment methods in context to human resource management
- B A PERT network comprises of 10 activities. They together with their 3 time estimate is shown in the following table: -

Activity	predecessors	to (weeks)	tm(weeks)	tp(weeks)
A	---	4	6	8
B	---	2	3	4
C	----	1	2	3
D	C	6	7	8
E	B, D	2	4	6
F	A, E	6	10	14
G	A, E	2	3	4
H	F	3	6	9
K	G	10	11	12
L	C	12	16	20
M	H, L	4	7	10

- i) Draw PERT network and find variance of each activity
- ii) Compute the expected completion time of the project
- iii) What is the probability of the work being completed in 33 weeks?
- iv) What will be the project duration corresponding to 90% probability?

Z - factor	Probability	Z - factor	Probability
+3.00	0.999	-1.00	0.159
+2.00	0.977	-2.00	0.023
+1.00	0.841	-3.00	0.001
0.00	0.500		

Q3 Answer the following (10 marks each) [20]

A The following table shows details of activities forming a work: -

Activity	A	B	C	D	E	F	G	H	J
Predecessors	----	----	----	B	B	A	D	D	F, G, E
Time in days	16	20	30	15	10	15	3	16	12

Draw network.

Find out duration of project and mark the critical path.

Find out EST, EFT, LST, LFT.

Work out the floats?

B Explain the following

i) Periodic progress report ii) Project life cycle

Q4 Answer the following (10 marks each) [20]

A Explain i) Unique features of construction industry ii) Role of inspection in quality control

B i) The following table shows data for each activity so as to complete the project. The contract includes a penalty clause of Rs 100/ day over 17 days of work. The overhead cost per day (indirect cost) is Rs 160/day. The cost of completing all activities in normal time is Rs 6500/-

Activity	i-j	Normal duration (days)	Crash duration (days)	Cost slope Rs/day	Labour per day
A	1-2	6	4	80	2
B	1-3	8	4	90	6
C	1-4	5	3	30	4
D	2-4	3	3	-	5
E	2-5	5	3	40	4
F	3-6	12	8	200	8
G	4-6	8	5	50	3
H	5-6	6	6	-	2

Find i) Critical Path, Normal Project duration and associated cost and Critical Activities.

ii) Minimum duration and corresponding cost.

iii) Optimum Time Cost Combination and plot time cost curve.

Q5 Answer the following (10 marks each) [20]

A Explain ABC analysis with the aid of graph with respect to material managements inventory control. Provide the broad policy guidelines for selective control for A, B and C items.

B Explain the following

i) Explain the process of updating with the help of flow chart.

ii) Construction Safety Measures

Q6. Answer any four of the following (5 marks each) [20]

A Acts in Construction Industry

B Causes of cost over run and time over run.

C Bar chart and its limitation

D Matrix organization

E Occupational Health Hazard

Duration: 3 Hours

Maximum Marks: 80

- N. B.: 1. Question number 1 is compulsory; attempt any three out of the remaining five questions.
 2. Assume suitable data if required and mention it clearly.
 3. Answer and design must be in accordance with IRC and bridge rules.
 4. IRC-6 and IRC-112 are permitted in the examination.
 5. Support answers and solutions with suitable sketches.

Q1. Attempt any five.

- A State following statements as true or false. If false, rewrite the correct statement. 04
- Nose-to-tail distance between IRC Class A or IRC Class B train vehicles shall not be less than 90 m.
 - Dispersion of Live loads along the span through the wearing coat, deck slab, and filling shall be considered while calculating BM in the deck slab designed as one way slab.
 - IRC Class A loading is to be normally adopted on all roads on which timber bridges are constructed.
 - For the design of foot-over bridges the loading shall be taken as 5 kN/m^2 .
- B What investigations are to be done and what data is to be collected before the site selection of a bridge? 04
- C What is the provision to account dynamic effect of imposed load for roadway bridges? How do different factors influence it? Calculate the impact factor for the following cases. 04
- A bridge of span 8.2 m is designed to carry IRC class AA load.
 - A PSC longitudinal girder for a bridge of span 40 m is to be designed to carry an IRC class A vehicles.
- D What is a well foundation? Sketch components of well foundation. What is the permissible limit for tilt and shift of well foundation? 04
- E How does load get transferred in case of a PSC girder bridge from vehicle to earth? Support your answer with sketch. 04
- F What do you mean by economical span of a bridge? Develop equation for the same. 04
- G What are the advantages of a balanced cantilever bridge over a simply supported bridge and a continuous bridge? A 75m gap is to be bridged by a balanced cantilever bridge. Suggest spacing between supports and projections for a balanced cantilever bridge. 04

Q2 A Calculate the live load bending moment and live load shear force for the 'one-way deck slab' for the following requirements: 15

Effective span	7.0 m
Width of roadway including footpath	10.0 m
Thickness of wearing coat	100 mm
Thickness of deck slab	500 mm
Live load	IRC Class AA tracked vehicle

Also check whether the same deck slab is safe or not to resist BM due to IRC class 70R tracked vehicle, and comment on it.

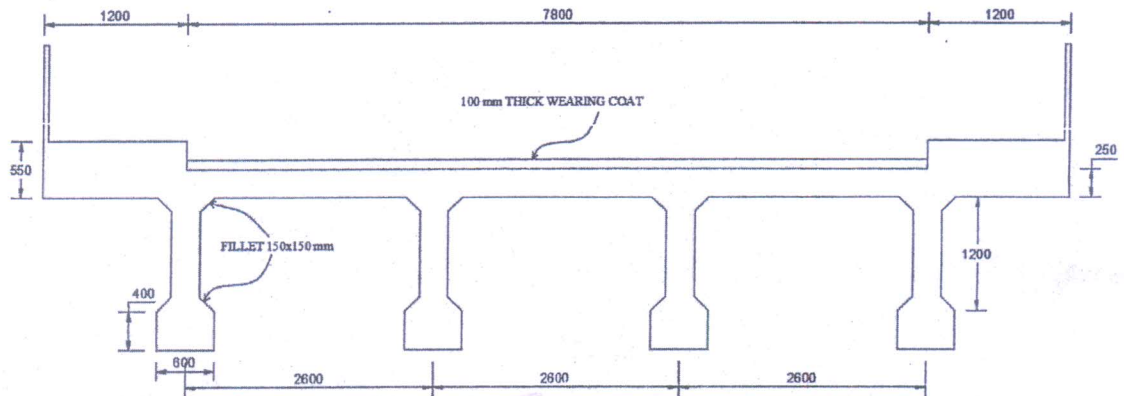
B What different factors influence the selection of a particular type of bearing? Explain Elastomeric bearing in brief. 05

Q3 A simply supported post-tensioned prestressed concrete deck slab bridge of 13.5 m effective span is designed to carry IRC-Class 70R loading. Verify its safety in the limit state of serviceability of cracking & maximum compression and limit state of collapse flexure for the following specifications. 20

Carriage width: 7.5 m;
 Footpath on either side: 1.5 m;

Wearing coat: 100mm;
 Depth of deck slab: 500 mm;
 Initial strength of concrete is 50 MPa and characteristic strength is 60 MPa
 Characteristic strength f_p of prestressing steel is 1600 MPa
 Cables are tensioned to 1200 kN initially and spaced 280 mm c/c at 100 mm from soffit of the slab at mid-span. Prestressing force in each cable accounting for all losses is 1020 kN.

- Q4** Design an interior slab panel of PSC girder bridge for flexure and shear which has to carry IRC class A vehicle. Cross girders are provided at 5 m c/c and longitudinal girders are provided at 2.5 m c/c. Thickness of wearing coat is 90 mm. Use M 30 and Fe 415, refer Pigeaud's Curve. 20
- Q5** Determine design bending moment and shear force on longitudinal girder of a 27 m span bridge, due to IRC Class AA tracked vehicle and self-weight of the bridge superstructure. Clear carriage width is 7.8 m, footpath on either side is 1.2 m and cross girders are provided at 4.5 m c/c. Thickness of deck slab is 250 mm thickness of wearing coat is 100 mm. Area of cross girder is 70% of the area of a longitudinal girder. 20

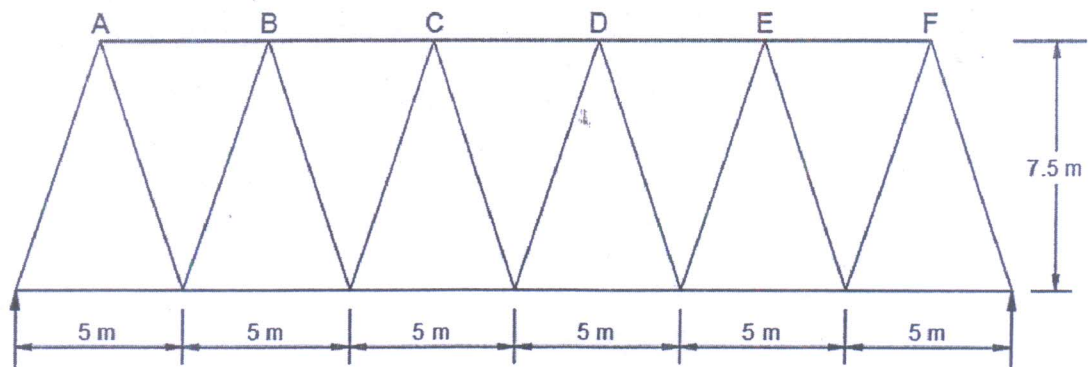


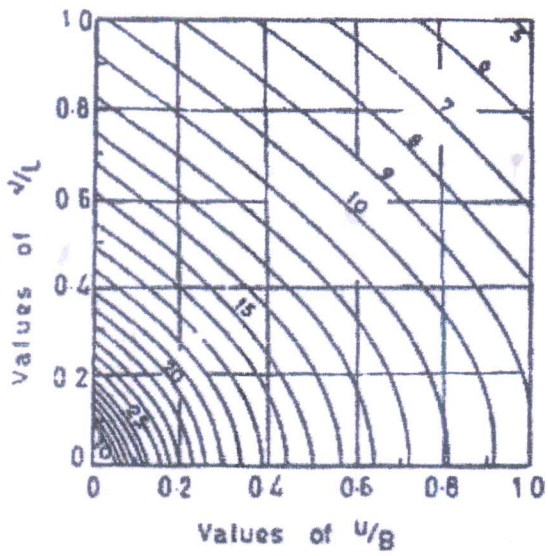
- Q6** Determine design forces due to dead and live load in Top Chord member AF of a lattice girder bridge of 30 m span as shown below. 20
- Consider self-weight of different elements like Stringers, Stock rails, Guard rails, Cross beams & bracings, Sleepers & Fasteners etc. as 24 kN/m per track and the self-weight of each girder due to the top chord, bottom chord, diagonals, and vertical members as 20 kN/m.

A bridge is to be designed to carry a single-track Broad-Gauge Loading-2008 as under;

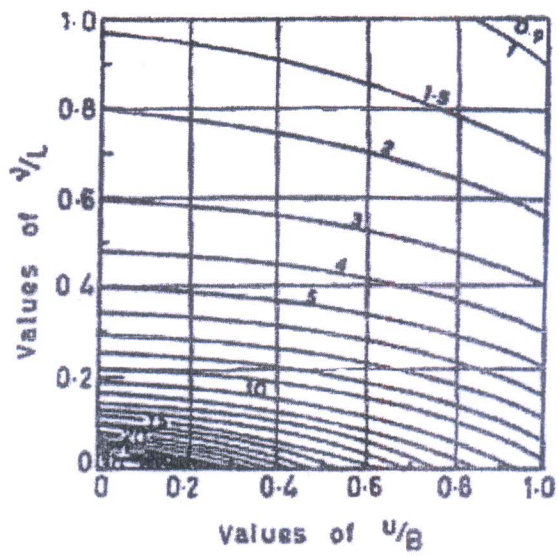
Span (m)	5	10	15	20	25	30
Loading*	745.56	1108.53	1631.60	2065.50	2488.40	2897.38

Loading* = Total live load (kN) per track; Take CDA = $[0.15+8/(6+L)]$

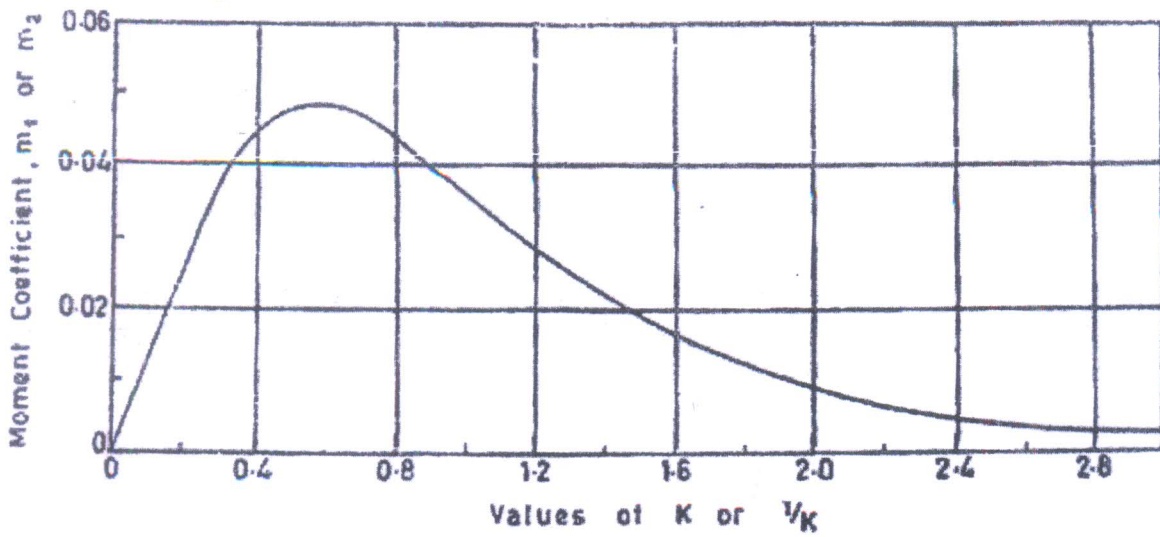




(a) Coefficient $m_1 \times 100$



(b) Coefficient $m_2 \times 100$



Moment coefficients for slabs completely loaded with uniformly distributed load, coefficient is m_1 for K and m_2 for $1/K$

Instructions:

1. Question No. 1 is **Compulsory**.
2. Answer **any Three** Questions from the **remaining**.
3. Each **full question** carries **20 marks**.
4. **Assume** suitable data, if needed and **state** it clearly.
5. Use of **relevant IS codes** is **permitted**.

Q. 1 Answer any four.

- a) Explain the conditions for which an underground water tank is designed. 05
- b) Draw neat sketches showing the behavior of vertical stem wall and heel slab of counterfort retaining wall. What is the reason of providing vertical and horizontal ties in counterfort part? 05
- c) Write a note on open well staircase with a neat sketch. 05
- d) State various factors governing the seismic design. Explain any one factor. 05
- e) What are the advantages of pre-stressed concrete? 05

Q. 2 Design (4 m x 6 m) interior panel of a two-way continuous slab for a live load of 3000 N/m². Use M20 concrete and Fe415 steel. Draw neat sketch showing reinforcement details. Use limit state method. 20

Q. 3 Design a dog legged staircase for floor-to-floor height of 3.1 m subjected to live load of 3 kN/m² and floor finish of 1 kN/m². Available room size is (3.2 m x 5 m). Draw reinforcement details for both the flights. Use M20 grade of concrete and Fe415 steel. Use limit state method. 20

Q. 4 Design a RCC cantilever type retaining wall having a 5 m tall stem. The wall retains soil level with its top. The soil weighs 18000 N/m³ and has angle of repose of 30°. The safe bearing capacity of soil is 200 kN/m². Coefficient of friction between soil and concrete is 0.55. Use M20 concrete and Fe415 steel. Draw the reinforcement details. Use limit state method. 20

Q. 5 Answer the following

- a) Design a circular water tank resting on firm ground for the following particulars 10
 Diameter of tank = 3.50 m
 Depth of water – 3.00 m
 Wall and base slab are not monolithic with each other
 Specific weight of water = 9810 N/m³
 Use M25 concrete and Fe415 steel. Use working stress method.
- b) What is the importance of ductile design and detailing in earthquake resisting structures? Discuss in detail. 10

Q. 6 Answer the following

- a) What are different types of losses in pre-stressed concrete? Explain loss due to creep of concrete. 10
- b) Write a short note on various joints in water tank. 10

CE - Sem - VIII - KT - CBCS

(3 Hours)

(80 marks)

- N.B.: (1) Q. No. 1 is compulsory
 (2) Answer any THREE questions from the remaining questions.
 (3) Figures to the right indicate full marks.
 (4) Illustrate answers with neat sketches where ever required.

1. Write short note on. (Any Four) 20
- Triple constraints
 - Work Breakdown structure (WBS)
 - Scope creep
 - GANTT chart
 - Goldratt's critical chain
 - Lessons learned analysis

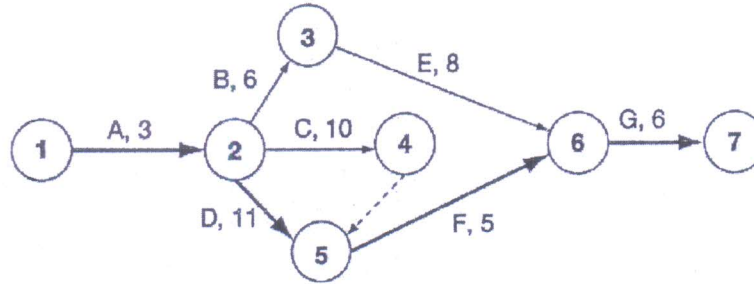
2. (a) Describe PM knowledge areas as per Project Management Institute (PMI) 10
 in brief.
 (b) Explain process for Project portfolio and Project Charter. 10

3. (a) The time estimates in weeks for the activities of a PERT network are given 10
 in Table below:

Activity	Optimistic time (to)	Most likely time (tm)	Pessimistic time (tp)
A-B	1	1	7
A-C	2	5	8
A-D	2	2	8
C-E	3	6	15
D-E	1	4	7
E-F	2	5	14
B-F	2	5	8

- Draw the network diagram.
 - Calculate the earliest start (ES) and latest start (LS) for all the activities.
 - Determine the project completion time.
 - Calculate the standard deviation and variance of the project.
- (b) Explicate the Top down and bottoms up budgeting approach for a large project. 10

4. (a) Tabulate with example, the Risk response strategies for positive and negative risks in project management. 10
- (b) The total normal direct cost of a project is Rs 450 and its indirect cost is Rs 400. By crashing the activities, the indirect cost decreases by Rs 50 per day. The normal and crash costs with time are given in Table and the network diagram in Figure given below. Find the optimum project duration. 10



Activity	Normal		Crash	
	Time	Cost	Time	Cost
A	3	50	2	70
B	6	80	4	160
C	10	60	9	90
D	11	50	7	150
E	8	100	6	160
F	5	40	4	70
G	6	70	6	70

5. (a) Explicate Earned Value Management techniques for measuring value of work completed in the concerned project. 10
- (b) How ethics in projects are looked upon for successful government's project completion? Illustrate with suitable example. 10
6. (a) What are the four stages for team development and growth? Enlist the barriers for effective team management. 10
- (b) Discuss the reasons of project termination. Describe Process of project termination. 10
