

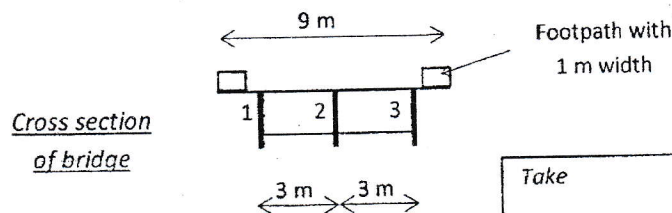
Exam.	Regular		
Level	BE	Full Marks	80
Programme	BCE	Pass Marks	32
Year / Part	IV / II	Time	3 hrs.

Subject: - Design of Bridge (Elective II) (CE76502)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ IRC codes and design graphs / charts are allowed to use.
- ✓ Assume suitable data if necessary.



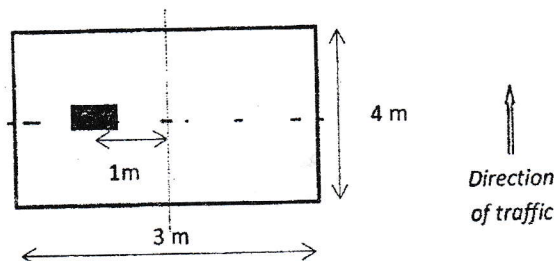
1. A. How bridge type is selected according to their spans. [6]
- B. Find the maximum reaction of girder 1 due to tracked load of Class 70R by any two methods of bridge deck analysis. Compare the results. [14]



Take

- Flexural Characterizing Parameter of deck = 0.3
- Torsionally very stiff transverse section
- Span of Bridge = 20 m

2. A. Write the design steps of the design of Composite Bridge. [8]
- B. Plan single lane Slab Bridge of effective span of 5m without footpath. Find maximum longitudinal and transverse bending moment at mid span of bridge due to dead load and live load. [12]
3. A. Describe the method of calculation of wind load in bridge deck analysis. [6]
- B. Determine bending moment and shear force in shorter direction of a fully restrained slab of Bridge, when a wheel (250mm × 500mm) of Class A load acts eccentrically on the slab as shown in fig. Thickness of wearing course and depth of slab of bridge deck are 60 mm and 230 mm respectively. [14]



4. A. List the types of bearings used in the construction of bridge. How the bearing is selected for the particular type of bridge. [6]

B Find bending moment and shear force at the base of abutment due to dead load, live load, longitudinal force due to frictional resistance of roller bearing, self weight of abutment and force due to static earth pressure for following data. [14]

- Span of bridge = 12 m
- Height of abutment = 6.5 m
- Dead load from superstructure = 1200 KN
- Live load - Class AA wheel load
- Coefficient of friction of bearing = 0.22
- Angle of internal friction of soil = 32°
- Angle of internal friction between soil and abutment = 20°
- Slope of backfill = 0°
- Unit wt. of soil = 17 KN/m^2

Plan RC abutment and assign preliminary dimension of abutment by yourself.

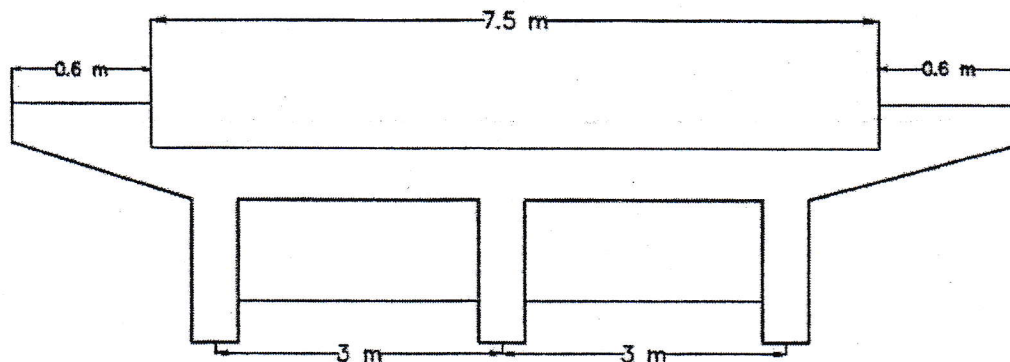
05B TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2074 Magh

Exam.	Back		
Level	BE	Full Marks	80
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Subject: - Design of Bridge (Elective II) (CE76502)

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1. Discuss Courbon's theory and derive equation of reaction factor for longitudinal girder. Discuss limitations of Courbon's theory. [2+4+2]
2. Determine maximum bending moment and shear force due to IRC Class AA wheel load at quarter span in outermost girder using Courbon's method for bridge deck having cross section as shown in figure below. Span of deck is 20m. [12]



3. Define shear connector and its types. Write the design procedure for shear connector. [8]
4. Determine maximum bending moment along shorter and longer span in a deck slab having spacing between longitudinal girder 3m and cross girder 5m, due to self-weight and IRC Class A loading. Consider thickness of slab 150mm and wearing coat 75mm. [14]
5. a. Describe expansion joints with its types and their suitability. [8]
b. Design an elastomeric pad bearing to carry vertical reaction 1200 kN and horizontal reaction 100 kN. Consider grade of abutment concrete M15. [12]
6. Describe incremental launching and staging method of bridge construction. [6]
7. Write procedure for loads calculation and stability analysis for gravity type abutment. [12]

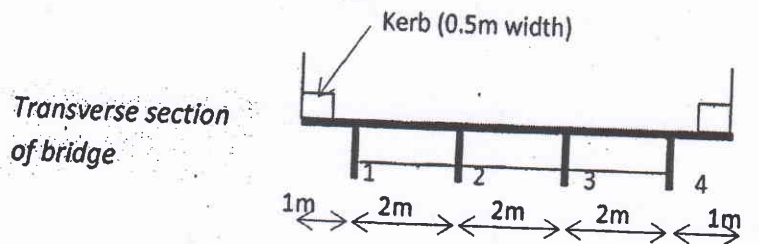
5 B TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2073 Bhadra

Exam.	Regular	
Level	BE	Full Marks 80
Programme	BCE	Pass Marks 32
Year / Part	IV / II	Time 3 hrs.

Subject: - Design of Bridge (Elective II) (CE76502)

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- ✓ Design codes, table, chart and graphs are allowed to use.
- ✓ Assume suitable data if necessary.

1. List the vehicular wheeled loads considered in IRC bridge loading. Draw the neat sketches of Class 70R loadings. Position Class A load on a bridge of span 25m at the section lying 10 m from the left support and find maximum bending moment and shear force (without lateral load distribution) at that section. [6+14]
2. Describe how the transverse bending moment in cross beam of T-Beam Bridge is found by Distribution Coefficient Method. Write in steps
Find maximum reaction on girder 3 of a bridge due to Class AA tracked load by Courbon's Method. 'EI' is same for all girders. [8+12]

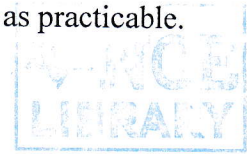


3. Plan and give preliminary dimensions of single lane composite Bridge of 40m span with footpath.
Find maximum bending moment and shear force in shorter direction of restrained slab planned due to dead and live load. [10+10]
4. Give the preliminary size of wall type RC Pier to meet the following requirements. Find the BM and SF at the bottom of pier due to water current, hydrodynamic pressure in the longitudinal direction of bridge. [8+12]
 - Height of Pier = 12 m
 - c/c distance between bearing = 100 mm
 - Bearing size = 300 mm × 400 mm
 - High flood level - 4 m from bottom of pier
 - Velocity of water current = 2 m/sec
 - Horizontal seismic acceleration coefficient = 0.12

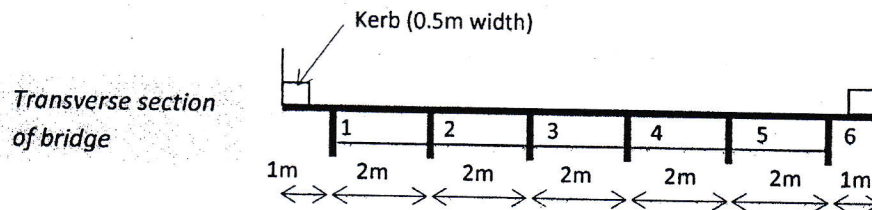
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- List the normal vehicular loads of IRC with neat sketches. Arrange class B load on a bridge of span 24m and find maximum bending moment and shear force (without lateral load distribution) at one fourth of its span. [6+14]
- Write limitation of Pigeaud's Method.
Find maximum reaction on girder 3 of a bridge due to Class AA wheeled load by Courbon's Method. 'EI' is same for all girders. [6+14]



- Plan and give preliminary dimensions of two lanes composite Bridge of 30m span with footpath
Find maximum bending moment and shear force in cantilever slab planned due to IRC live load. [10+10]
- Give the preliminary size of masonry pier to meet the following requirements. Find stresses due to water current, buoyancy and hydrodynamic pressure. [8+12]

- Height of Pier = 6 m
- c/c distance between bearing = 80 mm
- Bearing size = 300 mm × 400 mm
- High flood level - 4 m from bottom of pier
- Velocity of water current = 2 m/sec
- Horizontal seismic acceleration coefficient = 0.12
