Mr. Kaushal

Roll No.....

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- MAY-2019

M.Tech IInd/IVth/B.Tech VIIIth Semester

COURSE CODE: 11M1WCE133 MAX. MARKS: 35

COURSE NAME: Bridge Engineering

COURSE CREDITS: 3 MAX. TIME: 2 Hrs

Note: (i) Carrying of mobile phone during examinations will be treated as case of unfair means.
(ii) IRC-6 is allowed also 1 page one sided hand written note is allowed.

Q1. What are the various types of piers? What are the various forces considered in the design of piers? **[3 Marks]**

Q2. Why Box culvert bridges are economical? What are different conditions of loading in box culvert, which are treated critical? **[3 Marks]**

Q3. What is the function of bearings in bridges? What are basis of selection of bearings? **[3 Marks]**

Q4. Explain pigeaud's theory. **[3 Marks]**

Q5. Write short notes on "IRC class A-A loading (wheeled)". **[3 Marks]**

Q6. Verify the stability of the abutment for the following data:

- Top width – 1.5 m
- Height – 4.0 m
- Back batter – 1 in 6
- Front face abutment is vertical
- Type of material – Stone masonry($\gamma = 24$ KN/m^3
- Unit wt. of soil - 18 KN/m^3
- Angle of repose – 30^o
- Superstructure – T-beam bridge of span 15.0 m
- Loading – IRC class A-A (tracked)

Assume suitable dimensions for components of the superstructure. **[8 Marks]**

Q7. Design an elastomeric bearing for following data:

- Dead load reaction per bearing = 230 KN
- Live load reaction per bearing = 480 KN
- Longitudinal force = 38 KN
- Effective span of bridge = 16.0 m
- Total estimated shear strain due to creep, shrinkage and temp. = 6×10^{-4}
- Estimated rotation at bearing of the girder due to dead load and live loads = 0.002
- Concrete for T-beam and bed block = M20 **[6 Marks]**

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Q8. A well foundation is to be designed for an abutment of 10 x 5 m base dimensions. The well is founded on sandy soil, the following data is

- Height of bearing above maximum scour level = 28 m
- Permissible horizontal displacement of the bearing level = 50 mm
- Height of abutment = 6.0 m
- Total vertical load including weight of abutment and well = 20,000 KN
- Total Lateral load at scour level = 400 KN
- Submerged unit weight of soil = 10 KN/m^3

Design the well and verifying stresses in the steining. Also sketch the reinforcement details.

[6 Marks]

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