ARKAJAIN University
Jharkhand

7th Semester End Term Examination: 2022-23

Subject : **Design of Steel Structures-II**
Course : **B.TECH. (CE)** **Roll No: .....**
Full Marks : **70** **Time : 3 Hours.**

Instructions to the Candidates:

- Read the question paper very carefully.
- Start writing from 2nd page onwards; Don't Write On The 1st Page Backside.
- Question Paper is divided into Three Parts -A, B & C.
- Part-A is containing 12 multiple choice questions.
- Part- B containing SIX questions out of which FOUR questions are to be answered.
- Part C containing FOUR questions out of which TWO questions are to be answered.
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PART – A

Multiple Choice Questions [12x1=12]

1. i) The phenomena of development of internal tensile stresses in a concrete member by means of tensioning devices are called as
   a) Continuous Beam b) Prestressing of Concrete
   c) Yield Line d) Surcharge

   ii) Concrete is weak in?
   a) Compression b) Tension
   c) Loading d) Bending

   iii) The length of the prestressing tendon between the end of the member and the point where the steel attains its stress is called
   a) Anchorage b) Development length
   c) De-bonding d) Transmission Length

   iv)The ratio between the creep strain and elastic strain of concrete is defined as
   a) Creep ratio b) Creep elasticity
   c) Creep coefficient d) Creep factor

v) A device which helps the tendons to transmit prestress to the member and maintain it for the design period is

a) Cap cable
b) Anchorage
c) Tendon
d) Transfer

vi). The application of prestressed concrete is done for members having.

a) Small span
b) Larger span
c) Same span
d) Equal span

vii). Which one of the following is the basic assumption involved in designing of prestressed concrete members?

a) Plane member remains plane before and after bending
b) Variation of stresses in tensile reinforcement
c) Development of principle stresses
d) Hooke's law is not valid for prestressing

viii) Linear prestressing is mostly applicable for-

a) Bent members
b) Straight members
c) Cracked members
d) Overloaded members

ix) The method of prestressing the concrete after it attains its strength is known as

a) Pre-tensioning
b) Post-tensioning
c) Chemical prestressing
d) Partial prestressing

x). In which method the prestress is developed due to the bond between the concrete and steel?

a) Pre-tensioning
b) Thermo-electric Prestressing
c) Post-tensioning
d) Partial Prestressing

xi). The high tensile steel is obtained by increasing content of

a) Aluminium in steel
b) Manganese in steel
c) Carbon in steel
d) Sulphur in steel

xii). In post tensioning, the concrete units are cast by

a) Ducts
b) Anchorages
c) Jacks
d) Wedges

PART – B

Answer any FOUR out of SIX [4x7=28]

2. Define Prestressed Concrete.

3. A pretensioned concrete beam of rectangular cross-section, 250mm wide and 400mm deep is prestressed by 7 high tensile wires of 8mm diameter located at 150mm from soffit of beam. If the wires are tensioned to a stress of 1200N/mm^2, calculate the percentage loss of stress due to elastic deformation, assuming Modulus of Elasticity of Concrete and Steel as 31.5kN/mm^2 and 210kN/mm^2.

4. What do you mean by Torsion and Torsional Stiffness?

5. Define:-

a. Backfill
b. Surcharge
c. Yield Line

6. What are the different reasons for loss of stress in Prestressed Concrete Construction?

7. What do you understand by Continuous Beam?

PART – C

Answer any TWO out of FOUR [2x15=30]

8. Mention some advantages and disadvantages of Prestressed Concrete.

9. Explain the following with proper diagram:-

a. Pre-tensioning
b. Post-tensioning

10. Analyse a rectangular beam 350mm x 200mm, continuous over 5 column supports of effective span 5m. The beam is subjected to an imposed load of 8kN/m and live load of 12kN/m.

11. Analyse a rectangular beam 500mm x 300mm, continuous over 4 column supports of effective span 6m. The beam is subjected to an imposed load of 10kN/m and live load of 15kN/m.

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7th Semester End Term Examination: DEC-2022

Subject : **Design of Hydraulic structures**
Course : **B.TECH. (CE)**
Full Marks : **70**

Roll No: .....
Time : 3 Hours.

Instructions to the Candidates:

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PART – A

Multiple Choice Questions

[12x1=12]

1.. i) Earthen dams are _____
a. rigid dams
b. non-rigid dams
c. overflow dams
d. diversion dams

ii). A _____ dam is generally called as a weir or barrage.
a. storage dam
b. detention dam
c. diversion dam
d. rigid dam

iii) According to the Hydraulic design, the dams are classified as _____
a. diversion and detention Dams
b. storage and diversion dams
c. overflow and non-overflow dam
d. arch and buttress dam

iv) Portion of dam in contact with ground at downstream side
a.Crest
b. Toe
c. Foot
d. Heel

v) Based on the function of dam, it can be classified into
a. 5
b. 8

c. 10 d. 6

vi) . Hydroelectric Power plants at dam about ..... of world's electricity

a. 19% b. 25%
c. 42%. d. 50%

vii) Earthen dams are ..... in shape

a. Triangular b. Rectangular
c. Trapezoidal d. Circular

viii) When constructing of dam,the bottom of dam is thicker than the top dam.The necessity of having a thick bottom is result of

a. The volume of the water behind the dam b. The altitude of of the body of water behind the dam
c. The depth of water behind the dam d. The community surrounding the Dam.

ix) Fall are provided when the natural slope is

a. 90 degree b. Vertical
c. Steeper d. Horizontal

x) According to head of water available which one is not correct..

a. Low head turbine b. Medium head turbine
c. High head turbine d. very high head

xi) Surge tank is used to

a. It move Water through inlet valve b. To decrease the velocity
c.To reach the water at expectation level d.Increase the velocity

xii) The amount of water stored in river channel without any artificial storage.

a. Bank storage b. River storage
c. Valley storage d. Dead storage

PART - B

Answer any FOUR out of SIX [4x7=28]

2. Calculate the velocity of flow through a channel if the mean diameter of the soil particle is 0.5mm and discharge is 60m3/sec.

3. What are the advantages of lining of canal. Explain Briefly

4. What is Un lined canal and lined canal.

5. What are the Components of hydro powerplant

6. What do you understand by watershed management Explain

7. State and explain Laccy's regime channel

PART - C

Answer any TWO out of FOUR [2x15=30]

8. What do you understand by canal falls explain Type of fall with neat sketch diagram.

9. Design a 1.5m sarda fall for a channel having a discharge of 12 cumec with the following data a)bed level of Upstream=103 , side slope of channel 1:1 Bed level of Down Stream=101.5, full supply level upstream=104.5m bed width of u/s and d/s=1.0m Soil=Good loam Assume Bligh's Co-eff=6m, h=head of crest ,d=Height of the crest over d/s level

10. What do you understand by hydroelectric Power Plant .What are its Components.

11. Define head regulator, Cross regulator and spillway with neat sketch Diagram.

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7th Semester End Term Examination: 2022-23

Subject : **Traffic Engineering-II**
Course : **B.TECH. (CE)** **Roll No: .....**
Full Marks : **70** **Time : 3 Hours.**

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PART – A

Multiple Choice Questions [12x1=12]

1. The instrument used to study spot speed in Traffic engineering is
   a) Speedometer
   b) speed Recoder
   c) Enoscope
   d) Enometer

ii) Postcard survey may be used study
   a) Spot speed study
   b) Speed and delay study
   c) origin destination study
   d) parking studies

iii) Traffic volume is
   a) Number of vehicle per unit length of road
   b) Maximum number of vehicle passing a given road section in unit time in one direction
   c) Number of vehicle passing through a section of road in either direction in unit time
   d) none of these

iv) The instrument used to study spot speed in traffic engineering
a) Speedometer b) speed recoder
c) Enoscope d) enometer

v) Which branch of engineering deals with the improvement of traffic studies and traffic networks?
a) Traffic engineering b) Traffic management
c) Railway engineering d) Highway engineering

vi) Which of the following is the first stage in the function of the traffic engineering department?
a) Collection of data b) Planning and design
c) Finance d) Investigations

vii) Which is the first stage in traffic engineering studies?
a) Spot speed studies b) Traffic volume studies
c) Origin and destination studies d) Speed and delay studies

viii)The study of traffic engineering is divided into how many major categories?
a) Eight b)Five
c) Six d) seven

ix) What does "3-Es" of traffic engineering stand for?
a) Engineering, education and enthusiasm b) Engineering, education and enforcement
c) Engineering, education and expulsion d) Enforcement, empowerment and eradication

x) Which of the following is not a category of Traffic Studies?
a) Dynamic studies b) Economic studies
c) Adminstrartive d) Inventories

xi) Which of the following is the traffic that is prepared based on 365 days of the year?
a) Annual average daily traffic b) Average daily traffic
c) Average yearly traffic d) Yearly traffic

xii) Which of the following is the first phase of traffic regulation?
a) Traffic flow regulations b) General controls
c) Vehicle controls d) Driver controls

PART – B

Answer any FOUR out of SIX [4x7=28]

2. Explain the fundamental diagram of traffic flow and derive a relationship between flow speed and density
3. Explain the webster 's approach for design of a fixed of a fixed time traffic signal.
4. What are the various traffic island used .Explain the use of each.
5. Explain briefly the factor affecting the practical capacity.
6. Write notes on 85th percentile speed,Thirteen highest hourly traffic volume, Desire line.
7. State the components of traffic engineering. Explain.

PART – C

Answer any TWO out of FOUR [2x15=30]

8. The 15-minute traffic counts on cross roads 1 and 2 during peak hour are observed as 178 and 142 vehicle per lane respectively approach the intersection in the direction of heavier traffic. If the amber times required are 3 and 2 seconds respectively for the two loads based on approach speeds design the signal timing by trial cycle method assume average time headway as 2.5 seconds during green phase .

9. The average normal flow of traffic on cross roads A and B During design period are 400 and 250 PCU per hour the saturation flow value for these roads are estimated as 1250 and 1000 PCU per hour respectively. The all-read time required for pedestrian crossing is 12 sec. Design two phase traffic signal with pedestrian crossing by webeste's method.

10. What are the various factors affecting the characteristics of road users.

11. Explain the fundamental diagram for traffic flow and derive relationship between flow speed and density.

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7th Semester End Term Examination: 2022-23

Subject : **Ground Water Improvement Techniques**
Course : **B.TECH. (CE)** **Roll No: .....**
Full Marks : **70** **Time : 3 Hours.**

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PART – A

Multiple Choice Questions [12x1=12]

1. i)Study of soil formation is called
   a) Botany b) Ornithology
   c) Palaentology d) Pedogenesis

   ii)Due to chemical weathering of rock, mineral constituent of the soil_____ change.
   a) Does not b) Does

   iii)_____ soil is highly organic almost consisting of vegetative matter in different stages of decomposition.
   a) Loess b) Gumbo
   c) Peat d) Marl

   iv) Which of the following is NOT a general method of Ground Improvement?
   a) Grouting b) Deep Mixing
   c) Removal & Replacement of Soil d) Pre-compression

   v) Vibroflotation is effective upto a depth of -
   a) 20m b) 40m

c) 30m
d) 50m

vi). Which of the following is NOT a Ground Improvement Technique used on Cohesive soil:
a) Sand Drain
b) Pre-compression
c) Terra Probe
d) Stone Columns

vii) Alluvial soil is a type of soil that is deposited from suspension in
a) Sea water
b) Running water
c) Still water of lakes
d) Ice/Glacier

viii). Glacial deposits are transported by -
a) Sea water
b) Running water
c) Still water of lakes
d) Ice/Glacier

ix) Cumulose soil is -
a) Peat and Marl
b) Muck and Gumbo
c) Peat and Muck
d) Muck and Marl

x). Soil that has been transported from its place of origin by any of the physical agents of weathering is called -
a) Alluvial Soil
b) Clayey Soil
c) Residual Soil
d) Transported Soil

xi). A mixture of very fine particled, inorganic soil and black, decomposed organic matter, usually found accumulated in conditions of imperfect drainage or is deposited by overflowing rivers is termed as -
a) Peat
b) Muck
c) Marl
d) Gumbo

xii). The position of Cumulose soil results mainly due to the effect of -
a) wind force
b) water force
c) force of gravity
d) frictional force

PART - B

Answer any FOUR out of SIX **[4x7=28]**

2. What do you understand by 'Expansive soil'?
3. What are the 5 different types of soil?
4. What do you understand by Ground Improvement Techniques?
5. Why is Ground Improvement needed?
6. State the benefits of Ground Improvement.
7. What do you understand by 'Reclaimed soil'?

PART - C

Answer any TWO out of FOUR **[2x15=30]**

8. Explain the process of formation of soil.
9. Name the different methods of Ground Improvement done on Cohesive soils? Write in brief about any 2.
10. Classify soils based on place of formation and presence.
11. Name the different methods of Ground Improvement done on Cohesion-less soils? Write in brief about any 2.