



ARKAJAIN
University
Jharkhand

7th Semester Examination -2021-22

Subject : Design of Steel Structures -II [Elective V]
Course : B.Tech CE
Full Marks : 70

Roll No:

Time : 3 Hours.

Instructions to the Candidates:

- Read the question paper very carefully.
- Candidates are required to give their answers in their own words as far as practicable.
- 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.
- Do not write anything except your Roll No. on the question paper.
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PART A

MULTIPLE CHOICE QUESTIONS

(12x1=12)

1. The phenomena of development of internal tensile stresses in a concrete member by means of tensioning devices are called as _____
 - a. Pre-tensioning
 - b. Prestressing of concrete
 - c. Post-tensioning
 - d. Thermoelectric prestressing
2. In reinforced concrete members, the prestress commonly introduced is _____
 - a. Tensioning steel reinforcement
 - b. Tensioning rings
 - c. Tensioning wood reinforcement
 - d. Tensioning plates
3. Concrete is weak in?
 - a. Compression
 - b. Loading
 - c. Tension
 - d. Bending
4. The position of the backfill lying above the horizontal plane at the top of wall is called -
 - a. Active State
 - b. Plasticity
 - c. Surcharge
 - d. Slip Lines
5. 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
6. The phenomena of reduction of stress in steel at a constant strain are known as _____
 - a. Reduction of stress
 - b. Relaxation of stress
 - c. De bonding
 - d. Proof stress
7. A device which helps the tendons to transmit prestress to the member and maintain it for the design period is?
 - a. Cab cable
 - b. Anchorage
 - c. Tendon
 - d. Transfer

8. Which of the following type of prestress applied to concrete in which tensile stresses to a limited degree are permitted is known as _____
 a. Moderate prestressing b. Partial prestressing c. Full prestressing d. Axial prestressing
9. The structures of prestressed concrete are less liable to _____
 a. Bending b. Loading c. Placing d. Cracks
10. 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
11. The concrete members which are prestressed by providing the tensioned tendons are termed as _
 a. Externally prestressed members c. Internally prestressed members
 b. Linear prestressed members d. Circular prestressed members
12. The linear prestressing is mostly applicable for _____
 a. Bent members b. Straight members c. Cracked members d. Overloaded members

PART B

ANSWER ANY FOUR OUT OF SIX

(4x7=28)

1. Differentiate between Pre-tensioning and Post-tensioning Methods.
2. What do you understand by 'Continuous Beam'? Why are continuous Beams preferred in building construction?
3. Define Retaining Walls. When are Retaining walls constructed?
4. State the assumptions of Yield Line Theory.
5. What are the materials used in Prestressed Concrete? State the IS Code recommendations regarding the minimum mix to be used for Pre-tensioned and Post-tensioned Systems.
6. What do you mean by 'Loss of Prestress'? What are the different reasons for loss of stress in Prestressed Concrete Construction?

PART C

ANSWER ANY TWO OUT OF FOUR

(2x15=30)

1. Mention some of the advantages and disadvantages of Prestressed Concrete.
2. Write a short note on:-
 a. Gravity Retaining Wall
 b. Counterfort Retaining Wall
 c. Buttress Retaining Wall
3. Explain the Loss of Prestress caused due to Creep of Concrete. How is it measured?
4. Analyze 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.

Table 12 Bending Moment Coefficients
(Clause 22.5.1)

Type of Load	Span Moments		Support Moments	
	Near Middle of End Span	At Middle of Interior Span	At Support Next to the End Support	At Other Interior Supports
	(2)	(3)	(4)	(5)
(1) Dead load and imposed load (fixed)	$+\frac{1}{12}$	$+\frac{1}{16}$	$-\frac{1}{10}$	$-\frac{1}{12}$
Imposed load (not fixed)	$+\frac{1}{10}$	$+\frac{1}{12}$	$-\frac{1}{9}$	$-\frac{1}{9}$

NOTE — For obtaining the bending moment, the coefficient shall be multiplied by the total design load and effective span.

Table 13 Shear for Coefficients
(Clauses 22.5.1 and 22.5.2)

Type of Load	At End Support	At Support Next to the End Support		At All Other Interior Supports
		Outer Side	Inner Side	
		(3)	(4)	
(1) Dead load and imposed load (fixed)	0.4	0.6	0.55	0.5
Imposed load (not fixed)	0.45	0.6	0.6	0.6

NOTE — For obtaining the shear force, the coefficient shall be multiplied by the total design load.



7th Semester Examination –2021-22

Subject : Design of Hydraulic Structures (Elective IV)
Course : B.Tech CE
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PART A

MULTIPLE CHOICE QUESTIONS

(12x1=12)

1. Earthen dams are _____
a. Rigid dams b. Non-rigid dams c. Overflow dams d. Diversion dams
2. A _____ dam is generally called as a weir or barrage.
a. Storage dam b. Detention dam c. Diversion dam d. Rigid dam
3. Gravity dam is most suitable when the foundation is _____
a. Weak b. Strong c. With heavy overburden d. Rocky but cracked
4. Which of the following type of dam is built in areas where the foundation is not strong enough to bear the weight of concrete?
a. Rock-fill dam b. Earth dam c. Gravity dam d. Arch dam
5. The temporary structures that are built to enclose certain worksite is _____
a. Storage dam b. Cofferdam c. Timber dam d. Steel dam
6. Which of the following dam is suitable for narrow valleys?
a. Arch dam b. Steel dam c. Cofferdam d. Timber dam
7. According to the Hydraulic design, the dams are classified as _____
a. Diversion and detention Dams c. Storage and diversion dams
b. Overflow and non-overflow dam d. Arch and buttress dam
8. The horizontal component of an earthquake wave producing instability in a dam is the one which acts _____
a. Towards the reservoir c. Towards the dam
b. Away from the reservoir d. Away from the dam

9. In a concrete gravity dam with a vertical upstream face the stabilizing force is provided by the _____
- a. Weight of the dam
b. Uplift pressure
c. The water supported against the upstream slope
d. Water pressure at the tail end
10. The factor of safety against overturning generally varies between _____
- a. 2 to 3
b. 1.5 to 2
c. 0.5 to 1.5
d. 1 to 2
11. What is the maximum permissible tensile stress for high concrete gravity dam under worst conditions?
- a. 500 KN/m²
b. 500 kg/cm²
c. 5 kg/m²
d. 50 KN/m²
12. Which failure occurs when the net horizontal force above any plane in the dam or at the base of the dam exceeds the frictional resistance developed at that level?
- a. Overturning
b. Crushing
c. Sliding
d. By development of tension

PART B

ANSWER ANY FOUR OUT OF SIX

(4x7=28)

1. State some of the uses of Dam.
2. Explain Zoned type Embankment with proper diagram.
3. Explain the different methods of construction of Earthen Dam.
4. Explain Diaphragm type Embankment with proper diagram.
5. Differentiate between Gravity Weir and Non – Gravity Weir
6. Why are Drainage Galleries provided in Gravity Dam?

PART C

ANSWER ANY TWO OUT OF FOUR

(2x15=30)

1. "Tension crack by itself does not fail the structure, but leads to failure by producing excessive compressive stress." Explain with proper diagram.
2. Give the detailed classification of Dams. Write in brief about each type.
3. State the advantages and disadvantages of Gravity Dam.
4. Explain with proper diagram the Elementary profile of a Gravity Dam. What are the different forces acting on it? What are the changes that need to be made in order to cater to the practical needs?



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7th Semester Examination -2021-22

Subject : Ground Improvement Technique
Course : B.Tech (Civil)
Full Marks : 70

Roll No :
Time : 3 Hours.

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PART A

MULTIPLE CHOICE QUESTIONS

(12x1=12)

1. In blasting technique, the weight of the charge is computed from one of the following equations
a. $W=163 CR^3$ b. $W= 170 CR^3$ c. $W=164 CR^3$ d. All
2. Compaction does not depend on:
a. Moisture Content b. Compaction Energy c. Method of Soil d. Surcharge Load
3. Relative Density Test of a soil is performed as per:
a. IS 2720: Part-7 b. IS 2720: Part-8 c. IS 2720: Part-14 d. IS 1498
4. The maximum and minimum dry unit weight of sand was determined in lab to be 16.5 kN/m³ and 14.6 kN/m³ respectively. In the field, if Relative compaction of same sand is 70%. What is the RC in lab?
a. 96.3% b. 76% c. 89.5% d. 69.56%
5. Which of the following types of rollers gives 100% coverage area?
a. Pneumatic Tyre Roller c. Smooth Wheeled Roller
b. Sheep Foot Roller d. Vibratory Roller
6. Correct order of increasing Ground Contact Pressure is:
a. Sheep Foot Roller>Pneumatic Tyre Roller>Smooth Wheeled Rolled
b. Pneumatic Tyre Roller>Smooth Wheeled Rolled> Sheep Foot Roller
c. Pneumatic Tyre Roller> Sheep Foot Roller>Smooth Wheeled Rolled
d. Smooth Wheeled Rolled>Pneumatic Tyre Roller> Sheep Foot Roller
7. Rammed Area and Depth of treatment in meters in case of Heavy Drop Hammer weighing 50-70kN dropped from a height of 6-8m is:
a. 2.1m and 1.0-1.5m b. 2.1m and 1.2-1.4m c. 1.6m and 1.6-2.2m d. 2.2-3.1m and 2.7-3.5m
8. In which of the ground improvement technique, compaction occurs because of liquefaction followed by settlement due to rapid drainage in cohesion less soil?



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7th Semester Examination -2021-22

Subject : Traffic Engineering-II
Course : B.Tech Civil
Full Marks : 70

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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 recorder c. Endoscope d. Entoleter
2. Postcard survey may be used to study
a. Spot speed study c. Speed and delay study
b. Origin destination study d. Parking studies
3. Traffic volume is
a. Number of vehicles per unit length of road
b. Maximum number of vehicles passing a given road section in unit time in one direction
c. Number of vehicles passing through a section of road in either direction in unit time.
d. None of the above
4. In which of the following interview study traffic is disrupted?
a. Parking survey c. Destination-based interview
b. Roadside interview d. Comprehensive home interview
5. For designing highways, IRC recommends the coefficient of friction as
a. 0.15 b. 0.18 c. 3. 0.21 d. 0.24
6. Volume of traffic which is due to improvement carried out in adjacent area, is known as
a. Development traffic c. Generated traffic
b. Normal traffic growth d. Current traffic

7. The load secured and reserved for development of road is called
 a. Right of way b. Road area c. Road Way d. Road zone
8. Traffic surveys are carried out
 a. To know the type of traffic c. To determine the facilities to traffic regulations
 b. To design proper drainage system d. All the above
9. Which is the first stage in traffic engineering studies?
 a. Spot speed studies c. Traffic volume studies
 b. Origin and destination studies d. Speed and delay studies
10. Which of the following is not a category of Traffic Studies?
 a. Dynamic studies b. Inventories c. Economic studies d. Administrative studies
11. Which is the most important objective of traffic engineering?
 a. To provide a high speed road without any other priority
 b. To increase the traffic
 c. To reduce the accidents
 d. To consider pedestrians as obstruction
12. The branch of engineering that deals with improvement of traffic performance, traffic studies and traffic network is called _____
 a. Traffic engineering c. Traffic management
 b. Railway engineering d. Highway engineering

PART B

ANSWER ANY FOUR OUT OF SIX

(4x7=28)

1. Explain the fundamental diagram of traffic flow and derive a relationship between flow, speed and density.
2. What are the various factors affecting the characteristics of road users?
3. Explain the Webster's approach for the design of a fixed time traffic signal.
4. State the component of traffic engineering
5. What are the various types of traffic island used? Explain the use of each.
6. Explain the factors which affects the practical capacity.

PART C

ANSWER ANY TWO OUT OF FOUR

(2x15=30)

1. Write short notes on-
 a. 85th percentile speed b. thirteen highest hourly traffic Volume c. Desire lines
2. The average normal flow of traffic on cross road A and B during design period are 400 and 250 PCU per hour, the saturation flow values on these roads are estimated as 1250 and 1000 PCU per hour respectively. The all-red time required for pedestrian crossing is 12 sec. Design two phase traffic signal with pedestrian crossing by Webster method.
3. The 15min traffic counts on cross roads 1 and 2 during peak hour are observed as 178 and 142 vehicles per lane respectively approaching the intersection in the direction of heavier traffic flow. If the amber times required are 3 and 2 sec respectively for the two road based on approach speeds, design the signal timings by trial cycle method. Assume the time headway as 2.5 sec during green phase.
4. What is need for design of Parking Facility? Describes types of parking.