ARKA JAIN University
Jharkhand

5th Semester Examination –2021-22

Subject	**: Irrigation Engineering**	**Roll No**	**:**
Course	**: Poly CE**		
Full Marks	**: 70**	**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.**
- **Possession of Mobile Phones or any kind of Written Material, Arguments with the Invigilator or Discussing with Co-Student will comes under Unfair Means and will Result in the Cancellation of the Papers.**

PART A

MULTIPLE CHOICE QUESTIONS (12x1=12)

1. Which of the following is a type of Non-Rigid Dam?
   a. Steel Dam b. Concrete Dam c. Earthen Dam d. All the above

2. To cover the upstream face of Earthen Dam in order to prevent erosion or wash by waves _____ are provided.
   a. Slope Protection b. Shell c. Transition Filter d. Toe Drain

3. A Dam designed in such a way that its own weight resist the external forces is named –
   a. Non-Gravity Dam b. Earthen Dam c. Spillway d. Gravity Dam

4. What is the quality of a good Irrigation Method?
   a. Leached Fertilizers b. Increased Yield c. Drainage Troubles d. Soil Erosion

5. Which type of Irrigation can be used for both flat lands and relatively steep lands?
   a. Free Flooding b. Basin Flooding c. Furrow Irrigation d. Check Irrigation

6. Duty is expressed in –
   a. Meters b. Centimeters c. Hectare-meters d. Hectares/cumec

7. Name of Duty in Direct Irrigation is –
   a. Flow Duty b. Irrigation Duty c. Direct Duty d. Quantity Duty

8. Delta is expressed as –

a. Depth of water b. Volume of water c. Yield of crop d. Area of land irrigated

9. In what type of area, crop is not sown for a particular season –

a. Gross Command Area
b. Culturable Uncultivated Area
c. Culturable Cultivated Area
d. None of these.

10. Which of the following is an example of Overlapping or Annual Crop?

a. Rice b. Wheat c. Bajra d. Sugarcane

11. A rainfall with intensity of 4mm/hr is classified as

a. Light rain' b. Moderate rain c. Heavy rain d. Intense Rain

12. Runoff is affected by –

a. Intensity and duration of rainfall
b. Direction of prevailing storm
c. Type and Form of precipitation
d. All the above.

PART B

ANSWER ANY FOUR OUT OF SIX **(4x7=28)**

1. Derive the relationship between Duty and Delta.
2. Differentiate between (any 2)
   a. Crop Period and Base Period
   b. Duty and Delta of Crop
   c. Gross Command Area and Culturable Command Area
3. What are the different ways in which Rainfall is disposed off ?
4. Write a short note on the Methods of Construction of Earthen Dam.
5. Define Hydrologic Cycle with proper diagram.
6. Classify the different types of Rain gauges. What are the standard settings adopted for setting a Rain gauge?

PART C

ANSWER ANY TWO OUT OF FOUR **(2x15=30)**

1. Give the detailed classification of various types of Irrigation. Explain any 5.
2. State the advantages and disadvantages of Irrigation.
3. Classify Dams based on following categories and explain each type:
   a. Based on use
   b. Based on Hydraulic Design
   c. Based on Materials
4. What do you understand by Elementary Profile of a Gravity Dam? What are the changes made in this profile to cater to the practical needs? Explain with proper diagram.

ARKAJAIN University
Jharkhand

5th Semester Examination –2021-22

Subject	: Transportation Engineering - II	Roll No	:
Course	: Poly CE		
Full Marks	: 70	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.
- Possession of Mobile Phones or any kind of Written Material, Arguments with the Invigilator or Discussing with Co-Student with comes under Unfair Means and will Result in the Cancellation of the Papers.

PART A

MULTIPLE CHOICE QUESTIONS (12x1=12)

1. First Railway Line in India was opened between –
   a. Bombay and Pune b. Bombay and Thane c. Thane and Nagpur d. Bombay and Nagpur

2. Marking the position of center line on the ground is known as –
   a. Gauge b. Cant c. Gradient d. Alignment

3. Gauge distance adopted in case of Broad Gauge (BG) tracks is –
   a. 762mm b.812mm c. 1000mm d. 1676mm

4. The type of rails standardized for adoption on Indian Railways is –
   a. Bull-headed Rails b. Double-headed Rails c. Flat-footed Rails d.Double-footed Rails

5. Standard Rail Lengths used in Indian Railways for BG Tracks are –
   a. 14m b. 13m c. 10m d. 17m

6. Number of sleepers per rail length refers to –
   a. Sleeper Volume b. Sleeper Number c. Sleeper Density d. Sleeper Area

7. Rail section is designated by its –
   a. Weight b. Length c. Weight per unit length d. Cross-section

8. In railways terminology, what do obligatory points mean?
a. Points through which the railway line must pass
b. Points through which the railway line should not pass
c. Points where railway signals must be placed
d. Points where rail crossings are provided

9. Where should the center of gravity of the rail section be located?
a. Near to the bottom of the rail
b. Close to the mid height
b. Close to the upper portion
d. Can be anywhere between the section

10. Why the foot is made wide?
a. To avoid corrosion
b. For making it cost efficient
c. To avoid overturning
d. For easy manufacturing

11. What does 'M' represent in the sleeper density formula M + x?
a. Length of rail in meters b. Axle load c. Length of sleepers d. Type of route

12. Which track element transfers its load directly to the Ballast?
a. Sleepers b. Wheels c. Locomotive d. Formation

PART B

ANSWER ANY FOUR OUT OF SIX **(4x7=28)**

1. What do you understand by 'Rails'? State the functions of Rails.
2. What are the measures that can be taken to reduce Creep?
3. What are the benefits of Ungauged Policy?
4. State the functions of Sleepers.
5. What are the requirements that an Ideal Sleeper must fulfill?
6. State the causes of Derailment in a (any 2)
    a. Straight Track
    b. Curved track
    c. Turnout and Crossing

PART C

ANSWER ANY TWO OUT OF FOUR **(2x15=30)**

1. State the advantages and disadvantages of Wooden Sleepers.
2. What is a Rail Joint? State the characteristics that an ideal Rail Joint should possess.
3. State and explain the factors affecting choice of Gauges.
4. What are the different types of Rails? Explain any 2.

ARKAJAIN University
Jharkhand

5TH Semester Examination –2021-22

Subject : Theory Of Structure
Course : Polytechnic (CIVIL)
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.**
- **Possession of Mobile Phones or any kind of Written Material, Arguments with the Invigilator or Discussing with Co-Student will comes under Unfair Means and will Result in the Cancellation of the Papers.**

PART A

MULTIPLE CHOICE QUESTIONS **(12x1=12)**

1. For a simply supported beam of length 'l', when a concentrated load W is applied in the center of the beam, the maximum deflection is

a. $5WL^3/384EI$ b. $WL^3/384EI$ c. $WL^3/348EI$ d. $WL^3/48EI$

2. For a beam, as shown in the below figure, when the load W is applied in the center of the beam, the maximum deflection is

a. $Wl^3/48EI$ b. $5Wl^3/384EI$ c. $Wl^3/392EI$ d. $Wl^3/384EI$

3. The relation between Young's modulus (E), shear modulus (C) and bulk modulus (K) is given by

a. $E = 3K.C/(3K + C)$ b. $E = 6K.C/(3K + C)$

c. $E = 9K.C/(3K + C)$ d. $E = 12K.C/(3K + C)$

4. Which of the following method is used to determine the slope and deflection at a point?

a. Arithmetic increase method b. Mathematical curve setting

c. Macaulay's method d. Lacey's method

5. In cantilever beams, the deflection is zero at _____

a. Free end b. Fixed end c. At supports d. Through-out

6. In simply supported beams, deflection is zero at _____

a. Mid span b. Supports c. Through-outd. d. Point of action of load

7. Slope in the beam at any point is measured in _____

a. Degrees b. Minutes c. Radians d. Metric tonnes

8. Which of the following method is used for determining slope and deflection at a point?

a. Moment distribution method b. Double integration method

c. Conjugate beam method d. Mohr's circle method

9. In a simply supported beam with a central point load, deflection is maximum at _____

a. Both ends b. Through-out c. Supports d. At point of loading

10. Deflection of a simply supported beam when subjected to central point load is given as

a. (Wl /16 EI) b. (Wl2 /16 EI) c. (Wl3 /48 EI) d. (5Wl4 / 384EI)

11. What is the formula for stress?

a. Shear resistance/shear area b. Force/unit area

c. Bending strain/area d. Shear stress/length

12. In Bending stress in beam the section modulus (Z) is given by

a. I/Y b. IY c. Y/I d. M/I

PART B

ANSWER ANY FOUR OUT OF SIX **(4x7=28)**

1. A wooden beam 140mm wide and 240 mm deep has a span of 4m. Determine the load that can be placed at its center to cause the beam a deflection of 10mm. Take E as 6GPa.
2. A steel joist, simply supported over a span of 6m carries a point load of 50kN at 1.2m from the left hand support. Find the position and magnitude of the maximum deflection. Take EI = $14x10^{12}$ N-mm^2.
3. A simply supported beam of span 6m is subjected to a uniformly distributed load over the entire span. If the deflection at the center of the beam is not to exceed 4mm, find the value of the load. Take E = 200GPa and I = $300x10^6$ mm^4..
4. A beam of span *l* is fixed at both its ends. It carries two concentrated loads of W each at a distance of *l/3* from both the ends. Find the fixing moments and draw the bending moment diagram.
5. An encastre beam AB 4m long.is subjected to uniformly distributed load of 3kN/m over the entire length. Determine the values of maximum negative and positive bending moments. Also calculate the maximum deflection of the beam. Tale flexural rigidity of the beam as 10MN-m^2.
6. A continuous beam ABC 10m long rests on three supports A, B and C at the same level. Span AB has a point load of 3kN at a distance of 2m from A. Spam BC has a udl of 1kN/m over the entire span. Determine the fixing moments of the beam.

PART C

ANSWER ANY TWO OUT OF FOUR **(2x15=30)**

1. In a tension specimen 30mm in diameter the line of pull is parallel to the axis of the specimen bus is displaced form it. Determine the distance of the line of pull from the axis, when the maximum stress is 15% greater than the mean stress on a section normal to the axis.

2. A hollow rectangular masonry pier is 1.2mx0.8m wide and 150mm thick. A vertical load of 2MN is transmitted in the vertical plane bisecting 1.2m side and at an eccentricity of 100mm from geometric axis of the section. Calculate the maximum and minimum stress intensities in the section, and draw the stress distribution diagram.

3. A hollow circular column having external and internal diameter of 300mm and 250mm respectively carries a vertical load of 100kN at the outer edge of column. Calculate the maximum and minimum intensity of stress in the section and draw the stress distribution diagram.

4. A simply supported beam AB of span 5m is carrying a point load of 30kN at a distance of 3.75m from the left end A. Calculate the slope at A and B and deflection under the load. Take EI = 26×10^{12} N/mm^2.