300807(20)

B. E. (Eighth Semester) Examination, April-May 2021

(New Scheme)

(AEI, Bio Tech., Chem., Civil, CSE, Elect., EEE, EI, ET&T, IT, Mech., Mining, Metallurgy, Mechatronics, Prod., Automobile, Agriculture, Plastics Branch)

CONSTRUCTION MANAGEMENT

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Part (a) of each question is compulsory carrying 2 marks. Attempt any two parts from (b), (c) & (d) carrying 7 marks.

Unit-I

1. (a) Explain project life cycle with the help of block diagram.   2

(b) Discuss in brief about legal and regulatory requirements of the construction project. 7

(c) Explain the duties of Project manager for any major construction project. 7

(d) What will be the challenges if you are required to construct an hospital in a short interval of time? 7

Unit-II

2. (a) Define Project Management. 2

(b) Discuss in detail the effects of motivation for project team. 7

(c) What are the effects of project risk on an organization? 7

(d) Write short notes on : 7
  (i) Turnkey operation
  (ii) Owner builder operation

Unit-III

3. (a) Define Value Engineering. 2

(b) For the design of an earthen dam, discuss geo-technical engineering investigations. 7

(c) What do you understand by innovation and technological feasibility in the design and construction process? 7

(d) Write short notes on : 7
  (i) Construction planning
  (ii) Computer Aided Engineering

Unit-IV

4. (a) Define Resource Bottlenecks. 2

(b) What is the importance of Labour relation? How a manager can assess the labour characteristics? 7

(c) Discuss various factors which can affect the selection of excavators. 7

(d) Explain inventory control techniques of material management. 7

Unit-V

5. (a) Write the names of types of construction cost estimates. 2

(b) Discuss the effect of scale on construction cost.   7

(c) Write short notes on :   7

    (i) Concept of pre and post construction cost management.

    (ii) Unit cost method of estimation.

(d) Discuss in detail the costs associated with construction facilities.   7

320812 (20)

BE (8th Semester)
Examination, April-May 2021
Branch : Civil

WATER RESOURCES ENGINEERING - II

Time Allowed : Four Hours
Maximum Marks : 80
Minimum Pass Marks : 28

Note : All questions are compulsory. In each question

there is internal choice. Use of Khosla curve and

specific energy curve is permitted.

Q. 1. (a) Define foundation gallery.   2

Attempt any one of the following :

(b) (i) Considering earthquake forces in

addition to the hydrostatic pressure

and uplift pressure, determine the base width of the elementry profile of gravity dam so that resultant passes through the outer third points.   7

(ii) What are the various modes of failure of a gravity dam? Discuss each of them.   7

(c) A concrete dam is shown in following figure. Check the stability of the section. Find the magnitude and direction of principal stresses, normal stress and shear stress at toe and heel. Analysis of dam section is to be carried out under the following conditions :

(i)   Effect of horizontal earthquake is to be

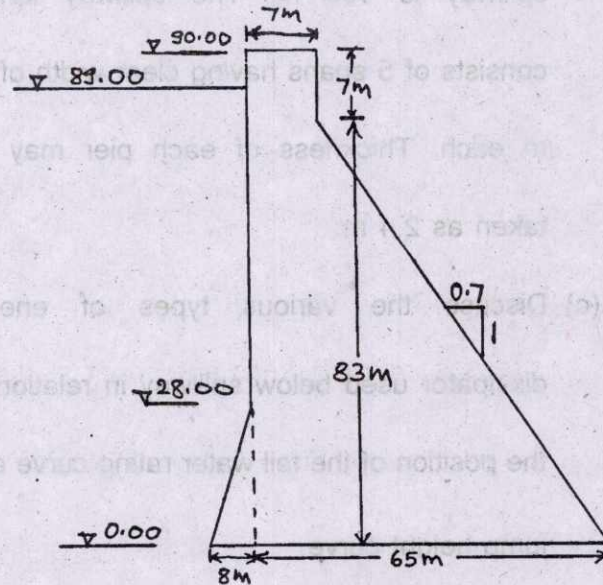considered (α = 0.1 and C_m = 0.73)

(ii) Reservoirfull

Unit weight of concrete = 2400 kg/m^3

Unit shear for concrete = 14 kg/cm^2

Uplift pressure is considered to act

over 2/3 area of section.   14

Q. 2. (a) Define stilling basin.   2

Attempt any one :

(b) Design a suitable section for the overflow portion of a concrete gravity dam having the down stream face sloping at a slope of 0.75 H : 1 V. The designed discharge for the spillway is 7500 m³/s. The height of the spillway is 100 m. The spillway length consists of 5 spans having clear width of 11 m each. Thickness of each pier may be taken as 2.4 m.   14

(c) Discuss the various types of energy dissipator used below spillway in relation to the position of the tail water rating curve and jump height curve.   14

Q. 3. (a) What is under sluice ? 2

Attempt any one :

(b) Design a vertical drop weir with the following

particulars : 14

Bligh's C = 12

Flood discharge = 289 m^3/s

Length of weir = 39.5 m

Height of weir above low water = 2 m

Height of falling shutter = 0.5 m

Top width of weir = 2.0 m

Bottom width of weir = 3.5 m

Also draw the section of the weir.

(c) A barrage is to be constructed on a river

having high flood discharge of about 8000

m^3/s, with the given data as follows :

P.T.O.

Average bed level of the river = 100.0 m

High flood level (before construction of barrage) = 105.2 m

Permissible afflux = 1.0 m

Pond level = 103.6 m

Prepare a complete hydraulic design for the other barrage bay section, for hight flood condition. A safe exit gradient of 1/6 may be assumed.   14

Q. 4.   (a) Define canal drop.   2

Attempt any one :

(b) Design a straight flumed meter glacis fall with the following data :   14

Full supply discharge of the canal = 119 m³/s

Bed level of canal $\dfrac{U/S}{D/S} = \dfrac{107.5\,m}{106.0\,m}$

Drop = 1.5 m

. FSL of canal $\dfrac{U/S}{D/S} = \dfrac{109.7 \text{ m}}{108.2 \text{ m}}$

Bed width of canal U/S and D/S = 60 m

Safe exit gradient for canal material = $\dfrac{1}{5.5}$

(c) (i) Describe the energy dissipators used in canal falls. 7

(ii) Describe the different spillway gates. 7

Q. 5. Attempt any one : 16

(a) Design a suitable cross drainage work, given the following data at the crossing of a canal and a drainage.

Canal

Full supply discharge = 31 m³/s

Full supply level = 113.5 m

Canal bed width = 20 m

Canal bed level = 112.0 m

Trapezoidal canal section with 1.5 H : 1 V

slopes

Drainage

High flood discharge   = 300 m³/s

High flood level   = 110.0 m

High flood depth   = 2.5 m

General ground level   = 112.5 m

(b) (i) Describe the different types of cross

drainage works.   8

(ii) Explain the Hind's method for the

design of channel transition.   8

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B. E. (Eighth Semester) Examination, April-May 2021

(New Scheme)

(Civil Engg. Branch)

STRUCTURAL ENGINEERING DESIGN-IV

Time Allowed : Four hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Part (a) is compulsory in each question. Attempt any one part from (b) & (c) for question having 14 marks and two where question (b), (c) and (d) which have 7 marks. Use IS 456 : 2000, IRC 6 & 21 permitted. Assume suitable data and draw neat sketch wherever required. Use M-20 and Fe-415 steel for all. Question unless otherwise stated. Right side digit indicates marks.*

Unit-I

1. (a) What is strap footing?   2

   (b) Design a combined rectangular footing for two

column A and B, carrying a load of 500 kN and 700 kN respectively. Column A is 300 mm × 300 mm in size Column B, 400 mm × 400 mm in size. The c/c spacing of the column is 3·4 m. The safe bearing capacity of soil may be taken as 150 kN/m². Use M-20 concrete and Fe-415 steel.   14

(c) Design a combined trapezoidal footing for two column A and B, spaced 5 m c/c. Column A 300 mm × 300 mm in size and carrying a load of 600 kN. Column B 400 mm × 400 mm in size and carrying a load of 900 kN. The maximum length of footing is restricted to 7 m only. The safe bearing capacity of soil as 120 kN/m². Use M-20 concrete and Fe-415 steel.   14

Unit-II

2. (a) Differentiate between active earth pressure and earth pressure.   2

(b) Design a T-shaped cantilever retaining wall to retain embankment 3 m high above ground level. The unit weight of earth is 18 kN/m³ and its angle of repose is 300. The embankment is horizontal at its top. The safe bearing capacity of soil my be taken as 100

kN/m². The coefficient of friction between soil and concrete as 0·5. Use M-20 concrete and Fe-415 steel bar.   14

(c) Design a counterfort retaining wall to retain 7 m. High embankment above ground level. The foundation is to be taken 1 m deep where the safe bearing capacity of soil may be taken as 180 kN/m². The top of the earth retained being horizontal with density of 18 kN/m³ and angle of internal friction be 30° and coefficient of internal friction found 0·5 between concrete and soil.   14

Unit-III

3. (a) Explain in brief different types of water tanks.   2

(b) Design a circular tank with flexible base for capacity 40,000 liters of water. The depth of tank is to be 4 m including a free board of 200 mm. Use M-20 grade of concrete and Fe-415 steel. Redesign the tank assuming that the joint between the wall and base is rigid.   14

(c) Write the design steps of Intze type tank. Write design steps for the following :   14

(i) Design of top dome

(ii) Top ring beam

(iii) Cylindrical side walls

(iv) Bottom ring beam connecting side walls with conical dome

(v) Design of conical dome

Unit-IV

4. (a) Name the various types of load considered during the design of RCC bridge.　　　　2

(b) Design a solid slab bridge for class A loading when the clear span is 4.5 m. Clear width of road way is 7 m, Average thickness of wearing cost is 80 mm and unit weight of concrete is 24000 N/m². Use M-20 and Fe-415.　　　14

(c) Design a cantilever slab and inner panel of a T beam bridge for class AA (tracked) vehicle loading only for following data :　　　14

Clear width of roadway : 7 m

Span center to center of bearing : 16 m

Live load one lane class AA loading track vehicle only.

Average thickness of wearing coat : 8 cm

Use M-20 concrete mix and Fe-415 steel.　　14

Unit-V

5. (a) Define prestressed concrete.　　　2

(b) What are the various losses in prestressing? Give their formula and explain them.　　　7

(c) What are different methods of prestressing? Explain in details.　　　7

(d) A pretensioned prestress concreete beam of 9 m span has cross section 400 mm × 800 mm, and is prestressed with 2400 kN at transfer. The cable has cross sectional area of 2000 mm² of steel and has a parabolic profile with max. eccentricity of 120 mm at the middle of span. Determine the loss of prestress. Given $E_s = 2 \cdot 1 \times 10^5$ N/mm². Use M-30 concrete. Assume ultimate tensile strength of prestressing steel as 1500 N/mm².　　　7

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B. E. (Eighth Semester) Examination, April-May 2021

(New Scheme)

(Civil Engg. Branch)

STRUCTURAL ENGINEERING DESIGN-IV

Time Allowed : Four hours

Maximum Marks : 80

Minimum Pass Marks : 28

*Note : Part (a) is compulsory in each question having 2 marks. Attempt any **one** part from (b) & (c) for question having 14 marks.*

Unit-I

1. (a) Define Combined Footing with neat diagram.   2

   (b) Two columns, 3·8 m, apart carrying 600 kN and 800 kN respectively bearing sizes 400 mm × 400 mm and 500 mm × 500 mm respectively. Design a

combined footing for the columns. The safe bearing capacity of the soil is 150 kN/m², Use M-20 Grade of concrete and Fe415.   14

(c) Design a combined rectangular footing for two columns 600 × 600 mm each and 5 m apart and carrying a load of 1800 kN each. The available width is restricted to 2·4 m. The safe bearing capacity of the soil is 200 kN/m², Use M-20 Grade of concrete and Fe415.   14

Unit-II

2. (a) What are the different types of retaining walls?   2

(b) Design a counterfort retaining wall to retain earth embankment 6·8 m high above ground level. The foundation is to be taken 1 m deep where the safe bearing capacity of the soil may be taken as 180 kN/m². The unit weight of earch is 18 kN/m³ and its angle of repose is 30″. The embankment is horizontal at its top. The coefficient of friction between soil and concrete as 0·55, Use M20 concrete and Fe415 steel bars.   14

(c) Design a T-shaped cantilever retaining wall for retaining 5·5 m high above ground level. Consider weight of soil = 15 kN/m³, angle of repose = 30 degree, coefficient of friction 0·55. Bearing pressure 150 kN/m². Grade M20 and Fe415.   14

Unit-III

3. (a) Write advantages of dome of water tanks.   2

(b) Design circular tank with a dome for capacity of 400 KL. The depth of water is to be 4·3 m including free board. The tank is supported on brick masonry walls all around. Use M 20 concrete and Fe 415 steel.   14

(c) Write the design steps of design of Intze type tank. Write design steps for the following :   14

Design of top dome, Top ring beam, Cylindrical side walls, Bottom ring beam connecting side walls with conical dome and design of conical dome.

Unit-IV

4. (a) Name various types of bridge.   2

[4]

(b) Design a solid slab bridge for class A loading for the following data : (i) Clear span 5 m; (ii) Clear width of roadways –7·5 m; (iii) Average thickness of wearing coat = 75 mm Use M 20 concrete. Take unit weight of concrete 24000 N/m³. 14

(c) Design a slab bridge with carriageway of 12 m with kerbs only for an effective span of 6 m for IRC 70 loading. Concrete used M25 and Fe415. 14

Unit-V

5. (a) What do you mean by Post Tensioning? Discuss about classification and types of pre-stressing. 2

(b) List different types of losses induced in pre stress concrete. Explain in brief each. A post tensioning pre stress concrete beam of 30 m span is subjected to transfer pre stress force of 2500 kN at 28 days. The profile of cable is parabolic with maximum eccentricity at 200 mm at mid span. Determine the loss of pre strass and the jacking force required if jacking is done form both end of beam it has a cross section at 500 × 300 mm and is pre stressed

[5]

with 9 cables, each cable consisting at 12 wires at 5 mm dia. Take $E_s = 2 \times 10^5$, $Ec = 3.5 \times 10^4$. One cable is tensioned at a time. 14

(c) A simply supported pre-stressed concrete beam of rectangular cross section 400 mm × 600 mm is loaded with a total UDL of 256 kN over a span of 6 m. Sketch the distribution of stresses at the mid-span and end sections if the pre-stressing force is 1920 kN and the tendon is : (i) concentric; (ii) eccentric, located at 200 mm above the bottom fibre. 14

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B. E. (Eighth Semester) Examination, April-May 2021

(New Scheme)

(Civil Engg. Branch)

WATER RESOURCES ENGINEERING-II

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

*Note : All questions are compulsory. Part (a) of each question is compulsory and attempt any **one** parts from (b), (c). Assume suitable data wherever necessary. Use of Khosla curve and Specific Energy curve are permitted.*

1. (a) Explain how silt pressure is estimated in case of gravity dam stability analysis?   2

    (b) Design the practical profile of a gravity dam made of

stone masonary given the following data :

R.L. of base of Dam = 198 m

R.L. of MWL of reservoir = 238 m

Specific gravity of masonary = 2·4

Safe compressive stress in masonary = 1200 kN/m². 14

(c) Figure 1.0 shows the section of a gravity dam built of concrete. Calculate : 14
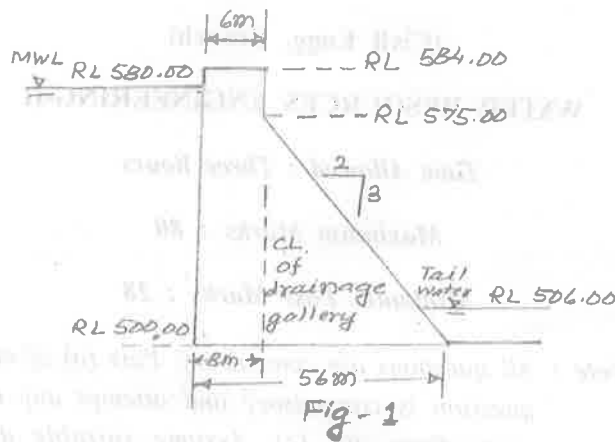
Fig - 1

(i) The maximum vertical stresses at the heel and toe of the dam.

(ii) The major principal stress at the toe of the dam.

(iii) The intensity of shear stress on a horizontal plane near the toe.

Assume weight of concrete = 24 kN/m³.

Neglect earthquake effects.

2. (a) Explain how syphon spillway works. 2

(b) Design a suitable section for the overflow section of a concrete gravity dam having the distance sloping at a slope of 0·7 H : IV. The design discharge for the spillway is 6000 cumecs. The height of the spillway above the river bed is 60 m. The effective length of spillway may be taken as 50 m. 14

(c) (i) Discuss briefly the various types of energy dissipators that are used for energy dissipation below overflow spillway, under different relative position of TWC and y_2 curve. 7

(ii) An overflow ogee spillway of height 20 m is discharging water with a head of 2 m over the crest. A reverse curvature of radius 5 m, subtending an angle of 60° at the centre is provided at the spillway bottom as shown in fig.-2. Assuming discharge coefficient as 2.2 determine the Froude No. at the toe of spillway and provide a suitable stilling basin with all auxilliary devices. Draw the detailed diagram also. 7
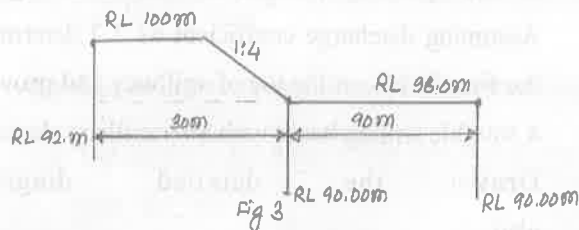
Fig - 2
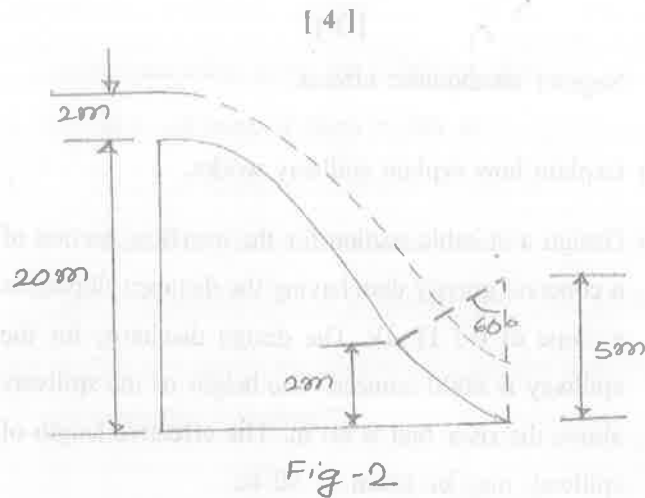
3. (a) Differentiate between : 2

(i) Pond level and afflux

(ii) Weir proper and under sluice

(b) Use Khosla's curves to calculate the percentage uplift pressures at the three cutoffs for a barrage foundation profile shown in fig.-3, applying corrections as applicable. (Given slope correction for 1 in 4 slope is 3·3%. 14

Fig 3

Having determined the percentage uplift pressure,

explain how the foundation floor thicknesses are determined corresponding to a known specific gravity of the material of the floor.

(c) Design a vertical drop weir for the following particulars : 14

- Nature of bed : Coarse sand with the value of Bligh coefficient $C = 11$
- Flood discharge : 320 cumecs
- Length of weir : 38 m
- Height of weir above low water : 1·9 m
- Height of falling Shutter : 0·6 m
- Top width of weir : 2·0 m
- Bottom width of weir : 3·5 m

Draw the detailed cross section of weir also.

4. (a) What is meant by canal regulation? 2

(b) Design a cross regulator for a distributary channel taking off from the parent channel, for the following data : 14

Discharge of parent channel = 100 cumes

Discharge of distributary = 15 cumes

FSL of parent channel U/s = 208.10 m

d/s = 207.90 m

Bed width of parent channel U/s = 42 m

d/s = 38 m

Full supply water depth in parent channel

U/s = 2·5 m

d/s = 2·5 m

Permissible Khosla's safe exit gradient

= 1/6

(c) (i) Write down the design steps for Sharda type canal fall. 7

(ii) Write down the design steps for distributary head regulator. 7

5. (a) Explain Type-II Aqueduct. 2

(b) Design and give a dimensional sketch of an aqueduct to carry water of an earth canal over a drainage with the following data : 14

RL of bed of drainage = 520·0 m

HFL of drainage = 523·0 m

Bed width of drainage = 50·0 m

Side slope of drainage at crossing = 1/2 : 1

RL of ground = 525 m

RL of bed of canal = 524.50 m

Discharge of canal = 30 cumecs

Depth of water in canal = 1·7 m

Bed width of canal = 22·0 m

(c) Give neat sketch of suitable designs of aqueducts for each of the following crossing :

(i) A major canal over a small drainage

(ii) A canal carrying low discharge over a large a drainage

(iii) A major canal over a large drainage.

Explain the methods of design of fluming required in crossing at (iii) above. 14

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B. E. (Eighth Semester) Examination, April-May 2021

(New Scheme)

(Civil Branch)

WATER RESOURCES ENGINEERING-II

Time Allowed : Three hours

*Maximum Marks : 80*

Minimum Pass Marks : 28

*Note : All questions are compulsory. Part (a) of each question is compulsory and attempt any **one** part from (b) and (c). Use of Khosla curves and specific energy curves are permitted.*

1. (a) Define Foundation Gallery.   2

    (b) (i) What are the various modes of failure of a gravity dam? Explain each of them.   7

(ii) Determine the base width of an elementary profile of a gravity dam. 7

(c) Following figure shows the section of a gravity dam built of concrete. 14
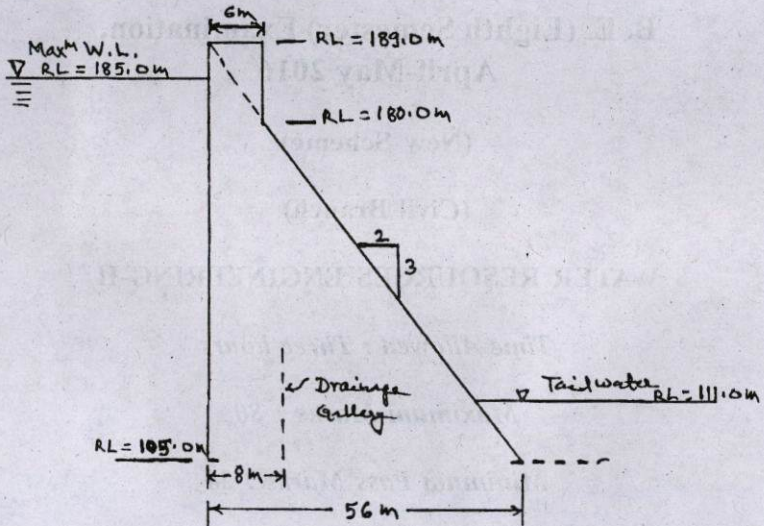
Calculate the following :

(i) The maximum vertical stresses at the heel and toe of the dam.

(ii) The major principal stress at the toe of the dam.

(iii) The shear stress on a horizontal plane near the toe.

(Assume weight of concrete = 23·5 kN/m^3).

2. (a) Define Stilling basin. 2

   (b) Design a suitable section for the overflow portion of a concrete gravity dam having the downstream face sloping at a slope of 0·7 H : 1 V. The design discharge for the spillway is 8000 m^3/s. The height of the spillway crest is 104 m above the river bed level. The spillway length consists of 6 spans having a clear width of 10 m each. Thickness of each pier may be taken to be 2·5 m. Assume $K_p = 0·01$ and $K_a = 0·1$. 14

   (c) Describe the different methods of energy dissipation below overflow spillways. 14

3. (a) Define Diversion Headworks. 2

   (b) (i) Describe the causes of failure of hydraulic structures founded on previous foundation. 7

      (ii) Explain Bligh's creep theory and Lane's weighted creep theory. 7

   (c) A barrage is to be constructed on a river having a high flood discharge of about 8100 m^3/s, with the given data as follows :

Average bed level of the river = 157·0 m

High flood level before construction of barrage = 162·2 m

Permissible afflux = 1·0 m

Pond level = 160·6 m

Prepare a complete hydraulic design for the undersluice section for high flood condition. A safe exit gradient of 1/6 may be assumed.   14

4. (a) Define Regulation work.   2

   (b) Design a 1·5 m Sarda type fall for a canal carrying a discharge of 40 cumecs with the following data :   14

   Bed level u/s = 205·0 m

   Bed level d/s = 203·5 m

   Side slope of channel = 1:1

   Full supply level u/s = 206·8 m

   Full supply level d/s = 205·3 m

   Bed width u/s and d/s = 30 m

   Safe exist gradient = 1/5

   (c) (i) Explain the functions of head regulator and cross regulator.   7

(ii) Describe the design steps of cross regulator and hard regulator. 7

5. (a) Define Cross-Drainage works. 2

(b) Design a suitable cross-drainage work, given the following data at the crossing of a canal and a drainage. 14

Canal :

Full supply discharge = 32 cumecs

Full supply level = 113·5 m

Canal bed level = 112·0 m

Canal bed width = 20 m

Trapezoidal canal section with 1½ H : 1 V.

Drainage :

High flood discharge = 300 cumec

High flood level = 110·0 m

High flood depth = 2·5 m

(c) Explain the different methods for designing the channel transition. 14

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B. E. (Eighth Semester) Examination, April-May 2021

(New Scheme)

(Civil Engg. Branch)

STRUCTURAL ANALYSIS-III

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Attempt all questions. Part (a) of each question is compulsory. Attempt any* ***one*** *question part from (b) and (c) of each question.*

Unit-I

1. (a) Write assumptions of portal method.   2

(b) Determine the reactions at the base of the columns for the frame shown in fig. below by portal method.
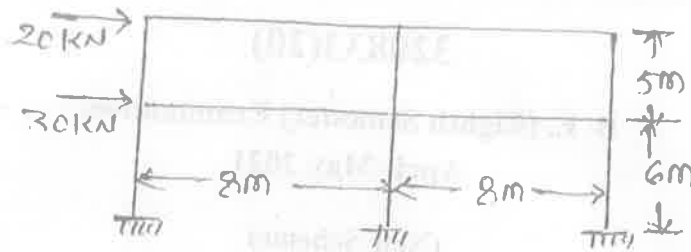
Fig.-1

(c) Solve the same frames as in prob. 1 (b) using cantilever method.

Unit-II

2. (a) Explain the term "flexibility" what are the properties of a flexibility matrix.

(b) Analysis the continuous beam as shown below for constant flexural rigidity "EI" by flexibility matrix method.
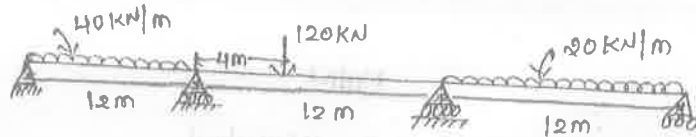

Fig.-2

(c) Develop flexibility matrix for a simply supported beam AB with reference to coordinates shown in fig.

Fig.-3

Unit-III

3. (a) Write stiffness matrix for a beam.

(b) Fig. shows a jib crane carrying vertical load of 10 k N at A. Find the displacement of joint A. Calculate forces in members AB & AC. The numbers in parentheses are the Cross-sectional area of the member in mm^2. Take $E = 200$ kN/mm^2.
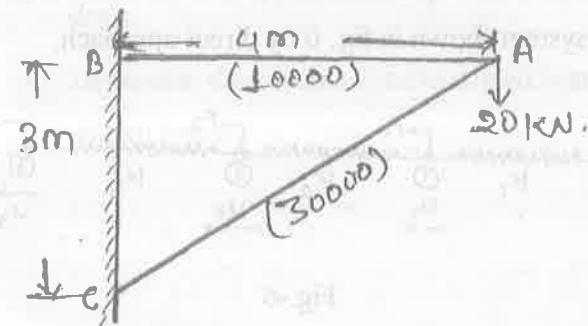

Fig.-4

(c) Analysis the frame shown in fig. by stiffness matrix method.
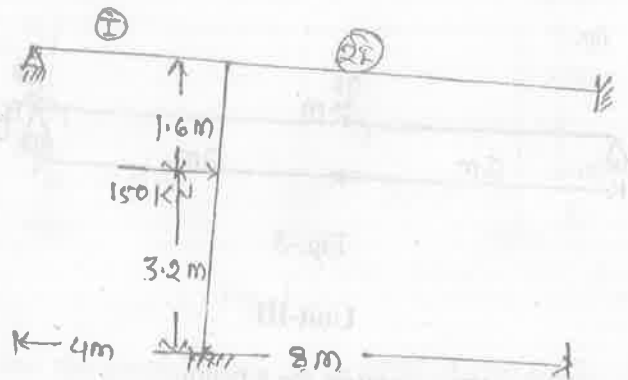

Fig.-5

Unit-IV

4. (a) What is shape function?

(b) Assemble equations of equilibrium for the spring system shown in fig. 6 by direct approach.
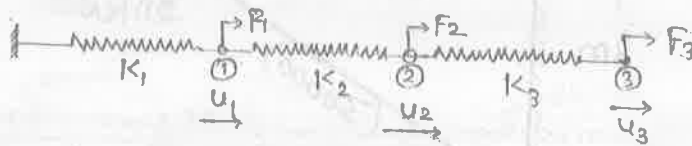

Fig.-6

(c) Analysis the beam as shown in fig. using FEM techniques. Determine the rotations at the supports. Given $E = 200$ GPa and $I = 5 \times 10^6$ mm^4.
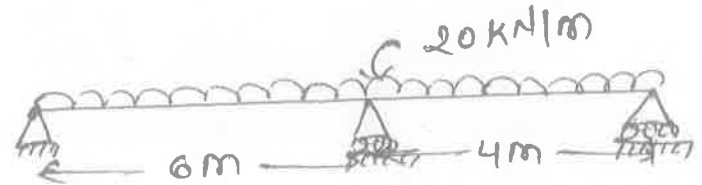

Fig.-7

Unit-V

5. (a) State upper bound theorem.

(b) Prove that the zone of yielding due to flexure is one third of span of a simply supported beam?

(c) (i) Show that plastic hinge is equal to one third of span.

(ii) Determine the collapse load in a fixed beam as shown below.

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B. E. (Eighth Semester) Examination, April-May 2021

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(Civil Engg. Branch)

STRUCTURAL ANALYSIS-III

Time Allowed : Three hours
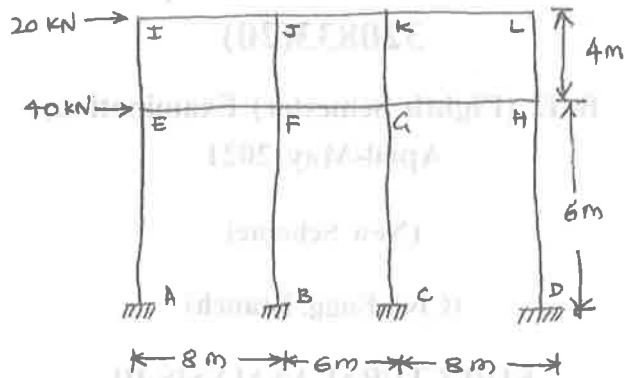
Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Attempt all questions. Part (a) of each question is compulsory worth 2 marks. Attempt any **one** question part from (b) and (c) of each question worth 14 marks.*

Unit-I

1. (a) Write assumptions made for Cantilever method of Approximate Analysis.   2
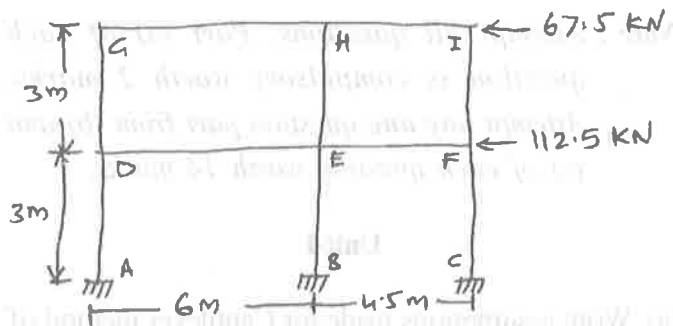
(b) Analyze the frame as shown in figure using portal method of approximate analysis. 14

Figure

(c) Analyze the frame as shown in figure using cantilever method of approximate analysis. 14

Figure

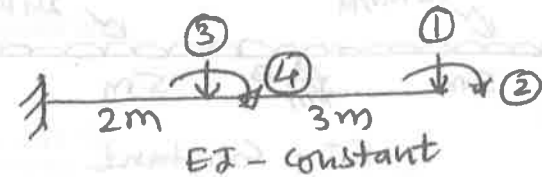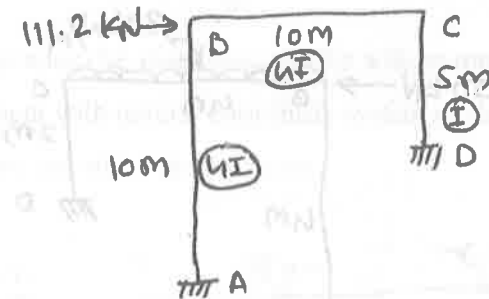**Unit-II**

2. (a) Write any four properties of flexibility matrix. 2

(b) Develop the flexibility matrix for the beam shown in figure with reference to the coordinates indicated on the figure. 14

Figure

(c) Analyze the portal frame as shown in figure using flexibility method or force method. 14

Figure

Unit-III

3. (a) Write stiffness matrix for a truss element. 2

(b) Analyze the continuous beam using stiffness method of displacement method. 14

EI - Constant
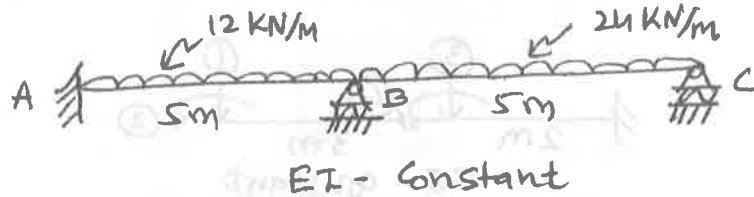
Figure

(c) Analyze the portal frame as shown in figure using stiffness a displacement method. 14
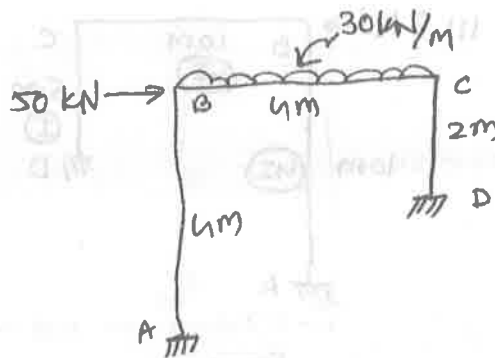
Figure

Unit-IV

4. (a) Write four advantages of PEM over classic method. 2

(b) Determine the displacements of nodes 1 and 2 in the spring system shown in figure using minimum of potential energy principle to assemble equations of equilibrium. 14
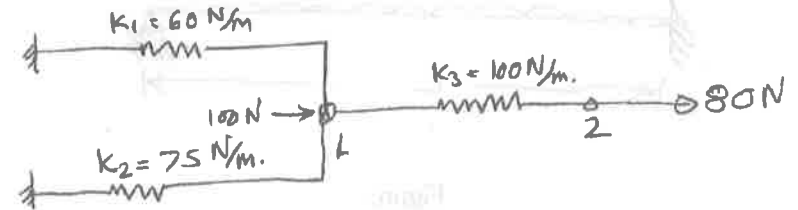
Figure

(c) Determine the shape function for a three model bar element with natural coordinate system as shown in figure and show its variations. 14
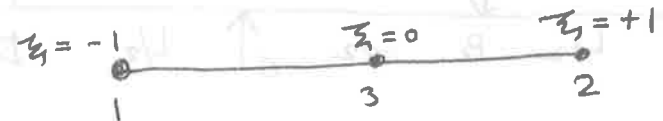
Figure

Unit-V

5. (a) Draw neat sketches the variation of bending stress distribution in elastic and plastic stage. 2

   (b) Find out the collapse load for a propped cantilever subjected to a u.d.l. w/unit length as shown in figure. 14
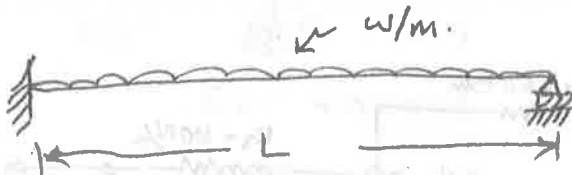
Figure

   (c) A propped cantilever ABCD is loaded as shown in figure. Find the collapse load if the beam is of uniform cross section. 14
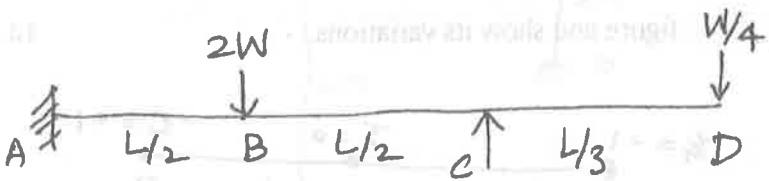
Figure

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B. E. (Eighth Semester) Examination, April-May 2021

(New Scheme)

(Civil Engg. Branch)

INDUSTRIAL WASTE TREATMENT

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Part (a) of each question is compulsory carrying 2 marks. Attempt any two parts from (b), (c) & (d) carrying 7 marks.

Unit-I

1. (a) What do you mean by T.D.S.?   2

(b) Explain industrial uses of water and their effects on water quality.   7

(c) Write the quality parameter of water as per indian standard. 7

(d) Define Sampling and describe various types of sampling. 7

Unit-II

2. (a) Define Sedimentation. 2

(b) Explain flow process of waste water treatment. 7

(c) Compare between slow and rapid sand filter. 7

(d) Write short notes on : (any **two**) 7

(i) Removal of Fe & Mn from water

(ii) Sludge treatment & handling

(iii) Water pollution control techniques

(iv) Organic waste treatment

Unit-III

3. (a) What is Equalization process in industry? 2

(b) Explain flow and concentration equalization. 7

(c) Enlist various treatment methods of Industrial waste describe trickling filter process. 7

(d) Write the procedure for treatment of industrial waste along with town waste. 7

Unit-IV

4. (a) Define Alkalinity. 2

(b) Explain D.O. sag cure for a stream. 7

(c) Describe methods of waste water treatment for following contamination : (any **two**) 7

(i) Oil and grease

(ii) Metal ion removal

(iii) Removal of organic substance

Unit-V

5. (a) Define Pulp. 2

(b) Write the various waste generated in pulp and paper industries. 7

(c) Describe waste management of Sugar Mill in brief. 7

(d) Discuss case study of waste management in a fertilize industries on following basis :   7

(i) Handling

(ii) Methods of treatment

(iii) Precautions

(iv) Difficulties during treatment

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B. E. (Eighth Semester) Examination, April-May 2021

(New Scheme)

(Civil Engg. Branch)

ADVANCED ENVIRONMENTAL ENGINEERING

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Attempt all questions. Part (a) from each question is compulsory. Attempt any two parts from part (b), (c) and (d) of each question.

Unit-I

1. (a) Define the "International Institutions" of "Environmental Management".   2

(b) Describe the importance of drinking water quality. Give in detail the physical, chemical and bacterio-logical drinking water quality parameters. 7

(c) Describe the development of environmental pollution control technologies. 7

(d) Differentiate beween natural ecosystem and man made ecosystem.

Unit-II

2. (a) Define adiabatic lapse rate. 2

(b) Explain the methods of agglomeration and coagulation. Give in detail the particle ranges that are most affected by these processes. 7

(c) Explain the sources and effects of air pollutants like CO and Nitrogen dioxide. 7

(d) What are the advantages and disadvantages of electrostatic precipitators? 7

Unit-III

3. (a) List the factors affecting self-purification of streams. 2

(b) Discuss in detail the suitability of oxidation ponds for the treatment of liquid waste in tropical countries. Also discuss the algal-bacterial symbiosis. 7

(c) With a neat sketch, explain the working of a trickling filter for waste water treatment, its advantages and operational difficulties. 7

(d) Explain in brief Sludge Age and Sludge volume index (SVI). 7

Unit-IV

4. (a) State the limitations of Box Model. 2

(b) What are the major pollutant emitted from the tail pipe of an automobile? What is the relevance of each pollutant with respect to human health? Name one control method or device used on present-day automobiles to control each of them. 7

(c) Write short notes on : 7

(i) Effects of any three primary air pollutants on human health

(ii) Monitoring of Air pollutants

(d) Enlist the different types of air pollution models. Describe any one model in brief.   7

Unit-V

5. (a) Name three gass causing global warming.   2

    (b) Explain the various Indoor Air Pollution control measures.   7

    (c) Explain in detail the radioactive waste management techniques.   7

    (d) What is green house effect? Explain the working of green house and sources of green house effect.   7

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B. E. (Eighth Semester) Examination, April-May 2021

(New Scheme)

(Civil Engg. Branch)

ENVIRONMENTAL POLLUTION and MANAGEMENT

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Attempt all questions. Part (a) is compulsory and answer any two question from (b), (c) and (d).*

Unit-I

1. (a) Define environmental management.   2

    (b) Name various types of environmental pollution and
        its control.   7

(c) Write short notes on :   7

    (i) Wildlife (Protection) Act, 1972

    (ii) Forest (Conservation) Act, 1980

(d) What is ISO14000? Discuss the environmental policies and legislation in detail.   7

Unit-II

2. (a) Define the term meta-population.   2

(b) Explain how overcrowding affects ecology and economy?   7

(c) Write short notes on :   7

    (i) World population growth

    (ii) Environment and human health

(d) Explain exponential growth. Explain exponential growth model with the help of neat sketch.   7

Unit-III

3. (a) Explain the term "municipal solid waste".   2

(b) Describe soil and air pollution resulting from toxic commissions and heavy metals from minning.   7

(c) Write short notes on :   7

    (i) Environmental research methodology

    (ii) Fate of pollutants in air

(d) Describe the method of data collection. Explain primary data and secondary data.   7

Unit-IV

4. (a) Explain environmental audit.   2

(b) Discuss the objective and methodology of environmental audit.   7

(c) Write short notes on :   7

    (i) Pyrolysis

    (ii) Hydropulping

(d) What are the major differences between incineration and composting? Discuss this two methods and suggest which one is best method and more eco-friendly.   7

Unit-V

5. (a) Describe sustainable development. 2

(b) What do you mean by EIA? Describe EIA process with the help of flow chart. 7

(c) Write short notes on : 7
   (i) Technology used for sustainable development
   (ii) Environmental inventory

(d) What are the limitations of EIA? 7

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B. E. (Eighth Semester) Examination, April-May 2021

(New Scheme)

(Civil Engg. Branch)

AIR POLLUTION and CONTROL MEASURES

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Attempt all questions. Part (a) is compulsory in each question. Attempt any *two* parts from (b), (c) and (d) part of each question.

Unit-I

1. (a) Define Air Pollution.   2

   (b) What are the four principal sources of air pollution? What are the major types of pollutants provided by each source.   7

(c) Describe the procedure for suspended particulate matter sampling. 7

(d) By neat sketches, explain the principle of 7

    (i) Piezoelectric monitor

    (ii) Beta attenuation monitor.

Unit-II

2. (a) Define wind profile. 2

(b) A factory uses 2,00,000 litres of furnace oil (specific density = 0.97) per month. If for one million litre of oil used per year, the particulate matter emitted is 3 tonnes/year, SO_2 emitted is 59.7 tonnes/year, NO_x emitted is 7.5 tonnes/year, hydrocarbons emittedare 0.37 tonnes/year and carbon monoxide emitted is 0.52 tonnes/year. Calculate the height of chimney required to be provided for safe dispersion of the pollutants. 7

(c) Write short notes on : 7

    (i) Adiabatic lapse rate

    (ii) Inversion

(d) Describe the meterological condition responsible for dispersion of air pollutants. 7

Unit-III

3. (a) How many times an average man breathe. 2

(b) Briefly explain the causes and effects of 'episodes' of notable air pollution disasters in the world. 7

(c) Write a note on the effects of exposure of animals to ionizing radiation. 7

(d) Explain various effects of SO_x on human animal health, plants and on material. 7

Unit-IV

4. (a) Give the name of special disease caused by air pollution. 2

(b) Write in brief various mechanism of deterioration in polluted atmosphere. 7

(c) Explain the effects of photochemical smog on plants. 7

(d) What are the air-borne allergens? With examples, explain their origin. 7

Unit-V

5. (a) What was the purpose of clean air act?   2

   (b) What is ozone layer depletion? Explain its mechanism and sources.   7

   (c) Write short notes on :   7

      (i) Effect of acid rain

      (ii) Green house effect

   (d) With a neat sketch, explain the principle, construction and working of electrostatic precipitator.   7

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B. E. (Eighth Semester) Examination, April-May 2021

(New Scheme)

(Civil Engg. Branch)

AIR POLLUTION and CONTROL MEASURES

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Part (a) in each unit of 2 marks and is compulsory. Select any two from (b), (c) and (d) from each unit. All questions carry equal marks.

Unit-I

1. (a) Define air pollution.   2

   (b) Describe classification and source of air pollution.   7

(c) Explain characteristics of primary and secondary pollutants with examples.   7

(d) Describe the procedure to measure particulate matter.   7

Unit-II

2. (a) What is plum?   2

(b) Explain with sketch : lofting, looping, Neutral of plum behaviour.   7

(c) Write short notes on laps rate and wind rose diagram.   7

(d) How is inversion responsible for air pollution? Explain with example.   7

Unit-III

3. (a) What is flyash?   2

(b) Explain effects of 60_x on human, animals and plants.   7

(c) Explain effects of NO_x on human, animals and plants.   7

(d) Write the short notes on natural and anthropogenic sources of SO_x and NO_x pollutants.   7

Unit-IV

4. (a) Give name of two disease cause by air pollution.   2

(b) Describe the effects of air pollution on Taj Mahal.   7

(c) Discuss the chronic effects of lead and fluorine on plants and animals.   7

(d) Write short note on Bhopal gas tragedy.   7

Unit-V

5. (a) Define acid rain.   2

(b) What is green house effect? What are major gases responsible for it? Explain it's mechanism? Discuss the adverse effects of it on plants and animals.   7

(c) Write short notes on :   7

   (i) Ozon layer depletion

   (ii) Indian ambient air quality standards for residential, industrial and sensitive area (SO_2, NO_2, TSPM only)

(d) Compare function of central pollution control board with function of state pollution control board in area of air pollution control.   7

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320845(20)

B. E. (Eighth Semester) Examination, April-May 2021

(Old Scheme)

(Civil Engg.)

PRESTRESSED CONCRETE STRUCTURES

(Elective-III)

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

*Note : Attempt all questions and all question carry equal marks. Part (a) is compulsory and attempt any **one** parts from rest two parts (b) and (c).*

Unit-I

1. (a) What is prestressed concrete? 2

(b) Describe the advantages of prestressed concrete and differentiate between full prestressing and partial prestressing. 14

(c) Describe with suitable sketches either the freyssinet system or magnel blaton system for construction of post-tensioned prestressed concrete beams. 14

Unit-II

2. (a) Define pressure line. 2

(b) Explain concept of load balancing in prestressed concrete members and also define eccentric tendon. 14

(c) A rectangular prestressed beam 150 mm wide and 300 mm deep is used oven an effective span of 10 m. The cable with zero eccentricity at the supports and linearly varying to 50 mm at the centre, carries an effective prestressing force of 500 kN, find the magnitude of the concentrated load Q located at the centre of the span for the following conditions at the centre of span section : 14

(i) If the load counteracts the bending effect of the prestressing force (Neglecting self weight of beam)

(ii) If the pressure line passes through the upper kern of the section under the action of the external load, self weight and prestress.

Unit-III

3. (a) What is creep of concrete? 2

(b) (i) List various types of loss of prestress in pretensioning and post tensioning. 4

(ii) A pretensioned concrete beam of rectangular cross section 150 mm wide and 300 mm deep is prestressed by eight high tensile wires of 7 mm diameter located at 100 mm from the soffit of the beam. If the wires are tensioned to a stress of 1100 N/mm², calculate the percentage loss of stress due to elastic deformation assuming the modulus of elasticity of concrete and steel as 31·5 and 210 kN/mm². 10

(c) A prestress concrete beam with a rectangular section 120 mm wide by 300 mm deep supports a uniformly distributed load of 4 kN/m, which includes the self weight of the beam. The effective span of the beam is 6 m. The beam is concentrically prestressed by a

cable carrying a force of 180 kN. Locate the position of the pressure line in the beam. 14

Unit-IV

4. (a) Name different types of composite construction. 2

(b) A composite T-beam is made up of a pretensioned rib 100 mm wide and 200 mm deep and a cast insitu slab 400 mm wide and 40 mm thick having a modulus of elasticity of 28 kN/mm^2. If the differential shrinkage is 100×10^{-6} units, determine the shrinkage stresses developed in the precast and cast insitu units. 14

(c) A composite bridge deck is made up of a pretensioned rectangular beam having a width of 300 mm and depth of 600 mm. The cast insitu slab is 500 mm wide by 150 mm thick. The ultimate shear force at the support section is 392 kN. 14

(i) Estimate the horizontal shear stress at the junction of precast and in situ slab.

(ii) Neglecting the shear resistance between the surface design suitable verti reinforcements to resist the shear force at support section. Using Fe-415 HYSD bars.

Unit-V

5. (a) Define limit state method. 2

(b) (i) Write some important criteria. concerning prestressed concrete. 4

(ii) What are the advantages of limit state method over working stress method. 10

(c) A prestressed concrete pipe is to be designed to withstand a fluid pressure of 1.6 N/mm^2. The diameter of the pipe is 1200 mm and shell thickness is 100 mm. The maximum compressive stress in concrete at transfer is 16 N/mm^2. A residual compression of 1 N/mm^2 is expected to be maintained at service loads. Loss ratio is 0.8 high tensile wires of 5 mm dia initially stressed to 1 kN/mm^2 are available for use, determine : 14

(i) The no. of turns of wire per meter length

(ii) The pitch of wire winding

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B. E. (Eighth Semester) Examination, April-May 2021

(New Scheme)

(Civil Engg. Branch)

WATER SHED MANAGEMENT

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Part (a) is compulsory from each unit and solve any two out of (b), (c) and (d).*

Unit-I

1. (a) Define Watershed Management.   2

(b) What are the various necessary conditions for plant growth in watershed? 7

(c) Explain watershed hydrology and describe various problems related with it in watershed. 7

(d) Describe in detail various characteristics of a watershed. 7

Unit-II

2. (a) Define land capability rating. 2

(b) Explain the following terms : 7

   (i) Broad Beds

   (ii) Contour Bund

   (iii) Bench Terracing

   (iv) Percolation Pond

(c) What are the various fundamental surveys required for rationalizing land use in a watershed? 7

(d) What do you mean by land capability classes in a watershed? 7

Unit-III

3. (a) Define Mulching. 2

(b) What are various principles of water harvesting and conservation? 7

(c) Define following terms : 7

(i) Splash erosion

(ii) Sheet erosion

(iii) Rill erosion

(iv) Tunnel erosion

(d) What are the various soil conservation strategies? 7

Unit-IV

4. (a) Define conservation farming. 2

(b) Explain in detail socio economic surveying. 7

(c) What are the various steps for watershed management planning? 7

(d) Explain the role of GIS in watershed management. 7

Unit-V

5. (a) Define mass wasting.　　　　　　　　　　　　　2

(b) What do you mean by bad lands? How are they formed?　　　　　　　　　　　　　　　　7

(c) Explain various types of hill slope processes.　　7

(d) What are the various types of hill slope failures?　7

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B. E. (Eighth Semester) Examination, April-May 2021

WATER RESOURCES ENGINEERING

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

*Note : Attempt all questions. Part (a) of each question is compulsory and attempt any **two** parts from (b), (c) and (d).*

Unit-I

1. (a) What are the needs for irrigation?   2

   (b) Explain the terms :   7

      (i)   flow irrigation

      (ii) lift irrigation

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(iii) inundation irrigation

(iv) perennial irrigation   7

(c) What are the factors affecting duty of water?   7

(d) The root zone of a certain soil has a field capacity of 30% and permanent wilting percentage is 10% :   7

   (i) What is the depth of moisture in the root zone at field capacity and permanent wilting point?

   (ii) How much water is available if the root zone depth is 1·2 m. The dry weight of the soil is 13·73 kN/m^3.

Unit-II

2. (a) What are inundation canals?   2

   (b) Discuss in detail various causes of losses of water in channels.   7

   (c) Sketch a typical cross section of a canal which is partly in cutting and partly in filling.   7

   (d) A canal has a bed width of 8 m, full supply depth 2·5 m, bank width 3 m, cutting slope 1 : 1, filling slop 1·5 : 1 and free board 0·5 m. Calculate balancing depth.   7

Unit-III

3. (a) What are the causes of waterlogging?   2

   (b) Explain the method of design of a lined canal.   7

   (c) What are modular, non-modular and semi-modular outlets?   7

   (d) Design a trapezoidal shaped concrete lined channel to carry a discharge of 200 cumec at a slope of 30 cm/km. the side slopes of the channel are 1·5 : 1. The value of N may be taken as 0·017. Assume limiting velocity in channel as 2 m/s.   7

Unit-IV

4. (a) Explain Design flood.   2

   (b) Describe the use of levees as flood control measure. 7

   (c) Explain the types of rivers.   7

   (d) What are cutoffs and pitched islands?   7

Unit-V

5. (a) How are reservoirs classified?   2

   (b) Define the the terms trap efficiency and density currents.   7

(c) Describe the various measures taken to reduce loss of water due to evaporation in reservoirs.   7

(d) What is flood routing? Explain in detail any one method of flood routing.   7