T.E. (Civil) (Part - II) (Semester-VI) Examination, November - 2019
THEORY OF STRUCTURES
Sub. Code : 66873

Day and Date : Wednesday, 13 - 11 - 2019
Time : 10.00 a.m. to 01.00 p.m.

Total Marks : 100

Instructions :
1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Use of Non-Programmable calculators is allowed.
4) Assume any suitable data, if required and missing, and state it clearly.

Q1) a) Explain the method of consistent deformation for the analysis of indeterminate structures. **[4]**

b) Find all the reactions for a propped cantilever beam, total length 5 metres and the prop provided at one end. The beam is loaded with a point load of 20 kN at 2 metres from the fixed end and also carries an uniformly distributed load of 10 kN/m from this. **[12]**
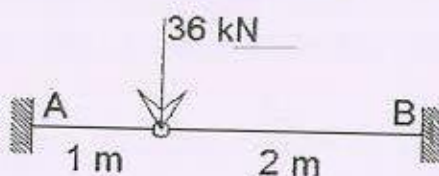
OR

c) A fixed beam AB of span 5m is subjected to uniformly distributed load of intensity 24 kN/m. The udl starts from the left end and extends 3 m towards the end B. The left support settles by 4 mm and flexural regidity for beam is 9000 kN-m². Determine the fixed moments at supports. Also draw SFD and BMD for the beam showing their maximum values. **[12]**

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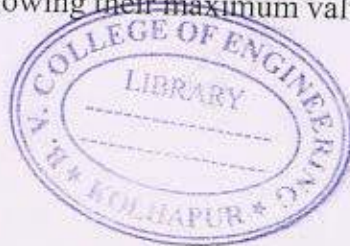
Q2) a) State Castigliano's theorems in the mathematical form and the meanings of the symbols involved in the equations. **[5]**

  b) A Simply supported beam of span 6 m carries a point load of 20 kN at each of its one-third span section. Determine the deflection of beam under any of the loads by applying castigliano's theorems. **[12]**

OR

  c) Analyse and find all member forces for the truss loaded and supported as shown in the figure. Assume the ratio (L/AE) to be constant for all the members. **[12]**
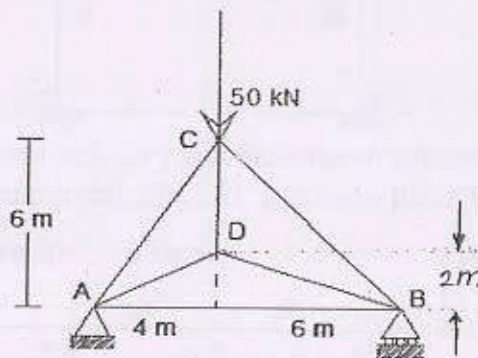
Q3) a) Discuss applicability of clapeyron's theorem for study of fixed beams. **[4]**

  b) A 2 span continuous beam ABC is hinged at A and roller supported at B and C. It is loaded by an uniformly distributed load of 24 kN/ m over the entire beam. ABC. The spans AB and BC are of 4 m and 6 m respectively. Determine the intermediate support moment by using three moment theorem. **[13]**

  Find change in the support moment due to settlements of 2 mm and 5 mm at support B and C respectively. Adopt El = 9000kN-m^2.

Q4) Analyse the beam shown below by slope deflection method and draw BMD. **[16]**
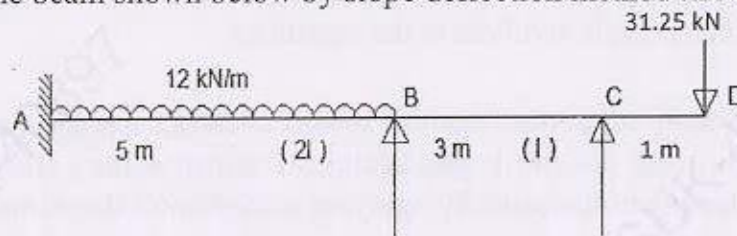
Q5) A symmetric portal frame of height 4 m and bay 5 m, is subjected to a sway force of 90 kN as shown in the figure. Analyse the frame by moment distribution method and hence or otherwise determine the horizontal reactions. **[17]**
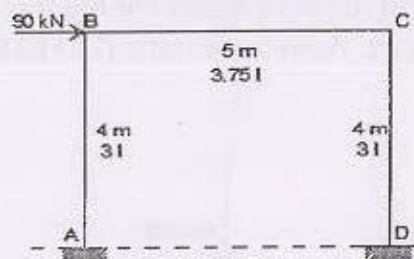
Q6) Analyse the continuous beam shown in Fig. And draw B.M.D. Also draw the S.F.D. And calculate all reactions. Use Flexibility matrix method. **[17]**
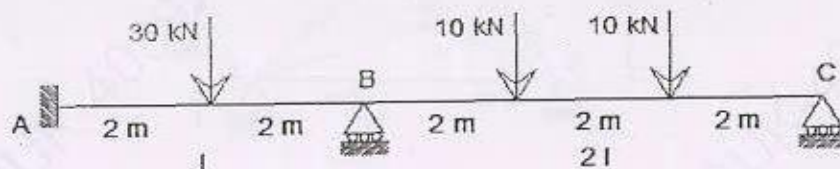
OR

Analyse the continious beam loaded and supported as shown in figure by the stiffness matrix method. Draw BMD for the beam. **[17]**

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T.E. (Civil) (Part - III) (Semester - VI)
Examination, November - 2019
ENGINEERING GEOLOGY
Sub. Code :66876
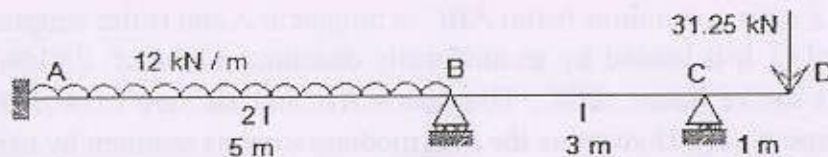
Day and Date :Tuesday, 19-11-2019   Total Marks :100
Time : 10.00 a.m.to 1.00 p.m.

Instructions :   1)All questions are compulsory
               2)Figures to the right indicate full marks.
               3)Answers to the two sections should be written in the same answer book

SECTION-I

Q1) Attempt any two of the following.   [9]

     a)   Briefly write the different processes of river erosion Explain the features that are developed due to these processes of erosion.

     b)   Define discordant intrusions. With neat sketches explain the various discordant igneous intrusions.   [9]

     c)   Distinguish between erosion and weathering. Explain the types of weathering.   [9]

Q2) Attempt any two of the following.

     a)   What are sedimentary rocks? Explain the process of formation of clastic sedimentary rocks.   [8]

     b)   Define ford. With neat sketches explain the classification of ford based on position of axial plane   [8]

     c)   What is a fault? Explain the fault terminology.   [8]
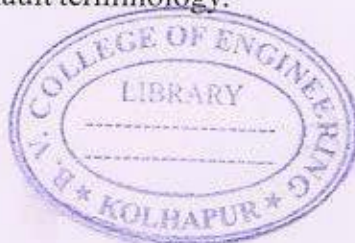
P.T.O.

Q3) Write short notes on any four of the following. [16]

    a) Residual rocks.
    b) Interior of the earth.
    c) Agents of metamorphism.
    d) Types of bedding.
    e) Dynamothermal metamorphism.
    f) Angular unconformity.

SECTION-II

Q4) Attempt any two of the following.

    a) What are seismic waves? write the different types of waves generated during an earthquake. How these waves are recorded? [9]

    b) What are the sources of groundwater? with neat sketch explain the zones of groundwater [9]

    c) Explain the types and causes of landslides. [9]

Q5) Attempt any two of the following.

    a) Explain core drilling process as a tool of geological investigation with reference to [8]
       i) Observations and precautions during drilling.
       ii) Limitations of drilling.
    b) The data obtained from a drill hole at a tunnel site is as follows.
       i) Borehole starts at R.L -190m
       ii) Borehole ends at R.L -140m
       iii) Length of each Piece of core obtained between R.L. 164 RL.161 is a follows 9,7,19,18,21,7,10,9,1,6,14,16,18,22,26,6,4,14,28,15, 16 piece lengths are in cms.

-2-

Find out,

i) Total length of core recovered.

ii) Core Recovery.

iii) R. Q. D.

iv) Core Loss.

Q5) Explain the influence of geological structures on the stability of a dam.[8]

Q6) Write short notes on any four of the following. [16]

i) Overbreak

ii) Confined aquifer.

iii) Tunnelling in soft rocks.

iv) Suitable conditions for reservoir

v) Requirements of good building stone

vi) Dams on deccan trap basalts.

T.E. (Civil) (Part - III) (Semester - VI) (Revised) Examination, November - 2019
ENVIRONMENTAL ENGINEERING - II
Sub. Code : 66877

Day and Date : Wednesday, 20 - 11 - 2019　　　　　　　　**Total Marks : 100**
Time : 10.00 a.m. to 1.00 p.m.

Instructions :　　1)　All questions are compulsory.
　　　　　　　　　2)　Figures to the right indicate full marks.
　　　　　　　　　3)　Assume suitable data wherever necessary and mention it.

SECTION - I

Q1) a)　Enumerate the characteristics and sources of municipal wastewater. **[5]**

　　b)　Explain with neat sketches the layout patterns of sewerage system. **[5]**

　　c)　Design a sewage pumping station for a peak flow of 0.2 m³/s. Static head 20 m, Length of rising main 1000 m, friction factor = 0.01, Determine diameter of rising main, capacity of wet well and capacity of pumps.**[6]**

OR

Design a combined circular sewer for 100 hectare area with population 50000.

Water supply rate = 200 LPCD, Maximum permissible velocity = 3 m/s, Intensity of rainfall=20 mm/hr, Runoff coefficient = 0.5. **[6]**

Q2) a)　Give the design parameters of bar rack. **[5]**

　　b)　Explain the concept of trickling filter. **[5]**

　　c)　Explain the importance of following in activated sludge process. **[6]**
　　　　i)　F/M ratio,
　　　　ii)　MCRT,
　　　　iii)　HRT,
　　　　iv)　MLVSS

OR

Design a grit chamber for a flow of 2 MLD. Diameter of grit particles = 0.2 mm, Specific gravity = 2.60, Settling velocity = 0.02 m/s. Take check for Horizontal and scour velocity. **[6]**

P.T.O.

Q3) a) Explain the necessity of sludge treatment? Explain the sludge thickening methods. [6]

b) Explain the working principle of septic tank. What is the necessity of secondary treatment for septic tank effluent? [6]

c) Explain the operation and design parameters oxidation ditch. [6]

OR

Determine the volume of oxidation ditch and capacity of surface aerators for treating 7 MLD of sewage flow. Influent $BOD_5 = 300$ mg/L. Effluent $BOD_5 = 30$ mg/L, F/M = 0.12, MLSS = 3000 mg/L. [6]

SECTION - II

Q4) a) With neat sketch explain the DO Sag curve. [5]

b) Give the MPCB standard for safe disposal of sewage. [5]

c) What is continuous EIA? [6]

OR

d) Write a short note on environment Legislation. [6]

Q5) a) Explain the Solid Waste collection Methods. [5]

b) Describe the hazards waste management. [5]

c) Explain in short the method of sanitary land fill. [6]

OR

d) Explain with neat sketch incineration. [6]

Q6) Write a short note on any THREE [3 × 6 = 18]

a) Effect of air pollution on men.

b) Bag house filter.

c) Acid rain.

d) Sources of air pollution.

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Seat No.

T.E. (Civil) (Part - II) (Semester - VI)
Examination, November - 2019
ENGINEERING MANAGEMENT
Sub. Code : 66875

Day and Date : Friday, 15 - 11 - 2019
Time : 10.00 a.m. to 1.00 p.m.

Total Marks : 100

Instructions :
1) All questions are compulsory.
2) Assume suitable data if necessary.

SECTION - I

Q1) a) Explain the functions of management. [10]

OR

a) Explain the principles of management. [10]

b) Explain the process of decision making. [8]

Q2) a) Find IBFS for the following transportation problem by N-W corner method. [8]

Destination

		1	2	3	4	Supply
	1	25	23	21	24	14
Source	2	27	28	22	25	16
	3	24	23	26	22	5
Demand		6	10	15	4	

b) Solve the following assignment problem for optimal allocation. [8]

Machines

		1	2	3	4
	A	31	25	33	29
Jobs	B	25	24	23	21
	C	19	21	23	24
	D	38	36	34	40

OR

b) Explain the concept of 'Sensitivity Analysis'. [8]

P.T.O.

Q3) a) Explain various costs used in Break Even Analysis with a sketch. [8]

b) ABC Company requires 2500 tons of steel every year. It costs Rs. 35,000 per ton. It requires Rs. 200 to place order once. If inventory carrying cost is 15% of average inventory investment, determine the EOQ. [8]

OR

b) Explain 'A-B-C Analysis' with a sketch. [8]

SECTION - II

Q4) a) Suggest which machine should be purchased from the following data, if rate of interest is 12%. (Use EUAC method). [10]

	Machine A	Machine B
Initial Cost (Rs.)	Rs. 2,50,000	Rs. 3,50,000
Annual O & M cost (Rs.)	Rs. 90,000	Rs. 70,000
Salvage value (Rs.)	Rs. 20,000	Rs. 35,000
Life (years)	4	6

b) Explain the concept of 'Time Value of Money'? If Rs. 60,000 is invested now at 8% interest, how much amount will it accumulate in 10 years?[8]

OR

b) Explain 'Payback Period' method with a suitable example. [8]

Q5) a) Draw a site layout for construction of a bridge. [8]

b) Explain in detail 'Workmen's Compensation Act'. [8]

OR

b) Explain in detail 'Child Labour Act'. [8]

Q6) Explain any TWO. [16]

a) ISO 9000

b) Work Study

c) Value Analysis in construction industry

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Seat No.	

T.E. (Civil) (Semester - VI) (New)
Examination, November - 2019
GEOTECHNICAL ENGINEERING - II
Sub. Code : 66874

Day and Date : Thursday, 14 - 11 - 2019   **Total Marks : 100**
Time : 10.00 a.m. to 1.00 p.m.

Instructions :
1) Question 1 from section I and Question No. 5 from section II are compulsory. Attempt any two questions from the remaining in each section.
2) Figures to the right indicate full marks.
3) Make assumption wherever necessary.

SECTION - I

Q1) a) Draw the diagram of pressure meter set up test.   [6]

b) Define the following terms,
 i) Net safe bearing capacity
 ii) Gross safe bearing capacity
 iii) Allowable soil pressure   [6]

c) What are different types of shallow foundation? Explain with the help sketch?   [6]

Q2) a) Explain in brief,   [6]
 i) Auger boring
 ii) Wash boring

b) Explain various laboratory tests for the determination of the strength of rocks.   [5]

c) What are different index properties of rocks?   [5]

Q3) a) Discuss the effect of water table on the bearing of soil.   [6]

b) What are the different types of settlements which can occur in foundation? How are these estimated?   [5]

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c) A footing 2m square is laid at a depth of 1.3m below the ground surface. Determine the net ultimate bearing capacity using IS Code method. Take $\gamma = 20 KN/m^3$ $\Phi = 30°$ and c = 0. Nc = 30.14 Nq = 18.4 and $N_\gamma = 22.4$. Sc = 1.3 Sq = 1.2 and Sr = 0.8.   [5]

Q4) a) Where do you provide a combined footing? Discuss the procedure for design of the Trapezoidal combined footing.   [8]

b) A trapezoidal footing is to be produced to support two square columns of 30 cm and 50 cm sides respectively. Columns are 6m apart and the safe bearing capacity of soil is 400 KN/m². The bigger column carries 5000KN and the 3000KN. Design a suitable size of the footing so that it does not extend beyond the faces of the columns.   [8]

SECTION - II

Q5) Write a note on, (any 3)   [3×6]
 a) Negative skin friction in pile
 b) Open caisson
 c) Types of slope failures
 d) Settlement of group of piles.

Q6) a) In a 16 pile group the pile diameter is 45 cm and centre to centre spacing of the square group is 1.5 m. If c = 50 KN/m². Determine whether the failure would occur with the pile acting individually or as a group? Neglect bearing at the tip of the pile. All piles are 10m long. Take m = 0.7 for shear mobilization around each pile.   [6]

b) A reinforced concrete pile weighing 30 KN (inclusive of helmet and dolly) is driven by drop hammer weighing 40 KN and having an effective fall of 0.8 m. the average set per blow is 1.4 cm. The total temporary elastic compression is 1.8 cm. Assuming the coefficient of restitution as 0.25 and a factor of safety of 2. Determine the ultimate bearing capacity and the allowable load for the pile.   [5]

c) Draw the figure of under reamed pile foundation?   [5]

Q7) a) Discuss the forces acting on a well foundation? [6]

b) Write detail note on shift and tilt in well sinking? [10]

OR

Explain with sketches arrangements involved in three different types of sheet piles and circumstance under which each is used? [10]

Q8) a) Write the concept of friction circle method in stability of slopes? [6]

b) What are the application of geosynthetics in civil engineering? [5]

c) Discuss the classification of type of slope? [5]

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Seat
No.

**T.E. (Civil Engineering) (Part - I) (Semester - V) (New)
Examination, April - 2019
WATER RESOURCES ENGINEERING - I
Sub. Code: 66235**

Day and Date : Thursday, 25 - 04 - 2019

Total Marks : 100

Time : 2.30 p.m. to 5.30 p.m.

Instructions :
1) Attempt any three questions from each section.
2) Figures to the right indicate full marks.
3) Draw neat sketches wherever necessary.
4) Use of non-programmable calculator is allowed.
5) Assume any other suitable data, if required.

SECTION - I

Q1) a) Hydrology is an interdisciplinary science. Justify this statement. Also enlist various Civil Engineering projects where hydrological studies are important. **[4]**

b) Enlist different types of rain gauges. Explain the working of any one type of rain gauge with a neat sketch. **[6]**

c) Briefly explain the process of evaporation. Explain various factors that affect rate of evaporation. **[8]**

Q2) a) Explain the two infiltration indices often used in hydrology. Explain their importance. **[4]**

b) A 6-hr. storm produced rainfall intensities of 7, 18, 25, 12, 10 and 3 mm/hr., in successive 1 hr. intervals over a basin of 800 km². The resulting runoff is observed to be 2640 ha-m. Determine $\emptyset$-index for the basin. Draw an explanatory sketch showing hectograph and the index. **[6]**

c) What is runoff? Explain the various factors that affect runoff. **[6]**

P.T.O.

3) a) Define a unit Hydrography? Explain the two important assumptions of unit hydrograph theory. [4]

b) Draw the neat sketch of a storm hydrograph resulting from an isolated storm. Name its various components. Explain any two methods used for separation of base flow and direct runoff in a storm hydrograph. [6]

c) Given below are the ordinates of a 6-hr unit hydrograph for a catchment. Calculate the `ordinates of the direct runoff hydrograph due to a rainfall excess of 3.5 cm. Occurring in 6 hours. Draw an explanatory sketch showing both unit hydrograph and direct runoff hydrograph. [6]

Time (h)	0	3	6	9	12	15	18	24	30	36	42	48	54	60	66
UH Ordinate (m^3/s)	0	25	50	85	125	160	185	160	110	60	36	25	16	8	0

4) a) Explain briefly various types of floats used to measure flow velocity in stream. [4]

a) Explain in detail the area velocity method used to measure the stream discharge. [6]

c) Explain the following terms: [6]

i) Design flood

ii) Standard project flood.

iii) Maximum probable flood.

SECTION - II

25) a) Derive a relation to find discharge from a well penetrating a confined aquifer under steady state condition. [8]

b) Explain the terms: [8]

i) Artificial recharge.

ii) Recupation test.

26) a) What are different types of irrigation systems? Discuss each of these briefly. [8]

b) The base period, intensity of irrigation and duty of various crops under a canal system are given below. Find reservoir capacity if the canal losses are 18% and reservoir losses are 10%. [8]

Crop	Base Period Days	Duty at the Field Hectors / cumec	Area under crop hectors
Wheat	120	1800	5000
Sugarcane	360	800	6000
Cotton	200	1400	2500
Rice	120	900	3000
Vegetable	120	700	1500

c) What are effects and causes of water logging. [8]

27) a) Write a note on percolation tank, with reference to following points. [8]

i) Site selection.

ii) Construction details.

iii) Advantages and disadvantages. Draw neat sketch.

b) What do you understand by water harvesting? Explain a typical rainwater harvesting scheme on roofs and terraces. [8]

Q8) Write short notes on any three. [18]

a) Darcy's Law and its validity.

b) Lift irrigation.

c) Blane-Criddle method of estimation of Evapo-transpiration.

d) Constructional features of tube well.

e) K.T. Weir.

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T.E. (Civil Engineering) (Semester - V) (New)
Examination, November - 2019
DESIGN OF STEEL STRUCTURES
Sub. Code : 66236

Day and Date : Monday, 25 - 11 - 2019   Total Marks : 100

Time : 2.30 p.m. to 5.30 p.m.

Instructions :   1)   Attempt all questions from section I and section II.

               2)   Figures to the right indicates full marks.

               3)   Assume any suitable data wherever necessary.

               4)   Use of non-programmable calculator and relevant I.S. 800:2007 and steel table is allowed.

SECTION - I

Q1) a)   Write the advantages and disadvantages of the Bolted connection.   **[4]**

     b)   Write a note on High Strength Friction Grip Bolts.   **[4]**

     c)   A 80mm × 8mm plate is to be connected to a 120mm × 8mm plate in a lap joint to transmit a factored tensile force of 125kN. Providing 6mm site welds design the connections.   **[8]**

Q2) a)   Explain various modes of failure of tension member with sketch.   **[6]**

     b)   Determine the design strength of single angle tension member consisting of 90mm × 60 × 8mm. The longer leg of the angle is connected to the gusset plate by 5mm weld as shown in fig. 1 Take $f_y = 250$ N/mm² and $f_u = 410$ N/mm².   **[12]**
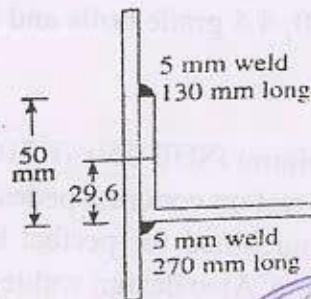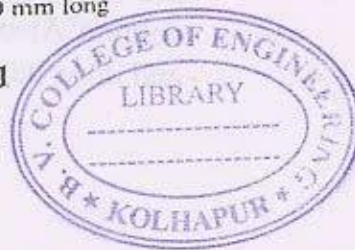

fig.1

OR

b) Design an angle section to carry a factored tensile force of 200kN. The members connected to gusset plate by 20mm diameter bolts. Take $f_y = 250N/mm^2$ and $f_u = 410N/mm^2$. The design strength of 20mm diameter bolt is 45.3kN. [12]

3) a) Explain the following term with reference to compression member [6]

i) Buckling class of cross section

ii) Effective length of struts

b) Design a single unequal angle strut 3m long between intersections for a factored compressive load of 50kN. The member is to be connecte at each end to 10mm thick gusset plate with 20mm diameter bolts of 4.6 grade. Take steel of grade Fe 410 and $f_y = 250N/mm^2$. [10]

SECTION - II

14) a) Define terms : [4]

i) Slenderness ratio

ii) Radius of Gyration

b) A 8 m long built up and laced column has to carry a factored axial load of 1250kN. The column is restrained in position but not in direction at each end. Design the column with single lacing system. Connections are to be made with 16mm diameter bolts. The column shall consists o. .wo channels placed back to back at a suitable spacing. Assume steel grade Fe410, 4.6 grade bolts and $f_y = 250$ mpa. [14]

OR

b) A column ISHB 350 @ 710.24 N/m carries an axial load 1000 kN. The base rest on concrete pedestal of grade M20. If the ends of columns are not machined for perfect bearing. Design a suitable slab base for the column. Also design welded connection to connect column to base plate and draw neat sketch. [14]

)5) a) Write a note on 'Curtailment of flange plates'. [4]

b) Design a simply supported beam of span 5 m carrying a reinforced concrete floor capable of providing lateral restrained to the top compression flange. The uniformly distributed load is made up of 20 kN/m imposed load and 20kN/m dead load (section is stiff against bearing). Assume Fe 410 grade steel. Check the section for shear and deflection. [12]

)6) A gantry girder to be used in an industrial shed carrying a electrically operated Crane for following data, calculate the design forces. [16]

* Crane capacity - 100kN

* Weight of crane girder - 90kN

* Weight of crab, motor, hook - 20kN

* Weight of gantry girder - 8kN

* Self-weight of rail section - 0.3kN/m

* Span of crane girder - 20m

* Span of gantry girder - 5.5m

* Minimum hook Approach - 1.1 m

* Wheel base - 2.5m

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T.E. (Civil Engineering) (Part - III) (Semester - V) (New) Examination, November - 2019
WATER RESOURCES ENGINEERING - I
Sub. Code : 66235

Day and Date : Friday, 22 - 11 - 2019
Time : 2.30 p.m. to 5.30 p.m.

Total Marks : 100

Instructions :
1) Attempt any three questions from each section.
2) Figures to the right indicate full marks.
3) Draw neat sketches wherever necessary.
4) Use of non-programmable calculator is allowed.
5) Assume any other suitable data, if required.

SECTION - I

Q1) a) Describe with a neat sketch, US weather bureau Class A Land Pan and its use in measuring the evaporation rate at a place. Also explain the importance of pan coefficient in estimating the evaporation rate. **[6]**

b) Explain what do you understand by infiltration capacity rate. How does it vary as per type of soil and it's antecedent moisture conditions. Also explain how a simple tube type infiltrometer is used to measure infiltration at a place. **[6]**

c) Explain the following: **[6]**
   i) Orographic precipitation
   ii) Convective precipitation
   iii) Frontal precipitation

Q2) a) Explain how you calculate the average rainfall over a catchment by following methods. **[8]**
   i) Arithmetic average method
   ii) Thiessen Polygon method
   iii) Isohyetal method

b) A catchment has six numbers of rain gauges installed for measurement of rainfall. The annual rainfall values recorded by these rain gauges are given below. Considering an error of 10% as acceptable in the estimation of mean rainfall, calculate optimum number of rain gauges required for the basin and check if the present network is sufficient. [8]

Rain gauge	A	B	C	D	E	F
Annual rainfall (cm.)	110.30	82.60	98.80	136.70	180.30	102.90

Q3) a) The ordinates of a 2-hr unit hydrograph are given below. Determine the ordinates of a 6-hr unit hydrograph using either method of superposition or method of s - curve. [8]

Time (hrs.)	0	2	4	6	8	10	12	14	16	18	20	22
Ordinate (m³/s)	0	25	100	160	190	170	110	70	30	20	6	0

b) i) Write a detailed note on the slope area method used to measure discharge in a stream. [8]

OR

ii) Write a detailed note on the area velocity method used to measure discharge in a stream. [8]

Q4) Write short notes on any four of following: [16]

a) Tropical cyclones.

b) Tipping Bucket Rain gauge.

c) Intensity duration frequency curves.

d) Empirical equations to determine yield of catchment.

e) Infiltration indices.

f) Rational method.

SECTION - II

Q5) a) Define and explain the terms [8]
i) Aquifer   ii) Aquiclude
iii) Aquifuge   iv) Aquitard.

b) Derive an expression for discharge from a well in the unconfined aquifer. The well fully penetrates it. [8]

Q6) a) Discuss in brief benefits and ill effects of irrigation. [8]

b) Explain the concept of Duty, Delta and Base period. Derive the relation between them. How to improve Duty of crop. [8]

Q7) a) Briefly explain components of watershade management program. [8]

b) Write short note on Bandhara irrigation systems. [8]

Q8) Write short notes on any three. [18]

a) Estimation of Evapotranspiration

b) K.T. wier

c) Soil conservation

d) Land drainage arrangements

e) Open well constructional features

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