R13

SET - 1

III B. Tech II Semester Regular Examinations, April - 2015
DESIGN AND DRAWING OF STEEL STRUCTURES
(Civil Engineering)

Time: 3 hours   Max. Marks: 70

Answer any ONE Question from Part – A and any THREE Questions from Part – B
Use of IS:800:2007; IS 875:1987(PART-3); IS 1384:1985; Steel tables is allowed.
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PART –A

1   Design a simply supported plate girder of span 15 m carrying a factred u.d.l. of 48 kN/m, using only end stiffeners. Assume compression flange is laterally supported. Draw to scale the cross section and longitudinal section.   [28M]

2   Design a gantry girder to carry an overhead electrically operated crane for the following data: Span of gantry girder=6.0m, span of crane girder =18m, crane capacity =200kN, self weight crane girder=180kN, self weight of trolley=75 kN, Minimum hook approach=1.0 m, Distance between wheels=3.5m, self weight of rails=0.3kN/m, Draw to scale the cross section and longitudinal section.   [28M]

PART -B

3   A tie member consisting of an ISA 80x50x8 section of Fe410 grade steel is welded to a 12mm thick gusset plate at site. Design welds to transmit load equal to the design strength of the member.   [14M]

4   Determine the design bending strength of ISLB 350at 486N/m considering the beam to be laterally unsupported. The design shear force is less than the design shear strength. The unsupported length of the beam is 3.0m. Assume steel of grade Fe410.   [14M]

5   Determine the design loads on the purlins of an industrial building near visakhapatnam, given : Class of building: General with life of 50 years, Terrain category 2. Maximum dimension =40m, width of building=15m, Height at eve's level=10m, Topography= θ less than 3^0, permeability= medium, span of truss = 16 m, pitch=1 in 5, sheeting = A.C. sheets, spacing of purlins= 1.35m, spacing of truss=4m.   [14M]

6   Design a built up column of the effective length of 5m to carry an axial load of 900kN using lacing. Design the connections using fillet welds. The grade of the steel is E250.   [14M]

7   Design a slab base for a built up column consisting of 2 MC 250 placed back to back separated by a distance of 160mm. The factored axial load on the column is 1200kN.   [14M]

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III B. Tech II Semester Regular Examinations, April – 2016
DESIGN AND DRAWING OF STEEL STRUCTURES
(Civil Engineering)

Time: 3 hours   Max. Marks: 70

Answer any ONE Question from Part – A and any THREE Questions from Part – B
Use of IS:800:2007; IS 875:1987(PART-3); IS 1384:1985; Steel tables is allowed.
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PART –A

1   A column is made of one ISHB 300 @ 58.8 kg/m one plate 400mm × 12mm   [28M]
     symmetrically placed on each flange. The column thus measures   324mm × 400mm
     overall dimensions. The column carries an axial load of 1800kN. The column is to be
     provided with a gusseted base resting on concrete base. Design the gusseted base
     giving full details of the connections. Take safe compressive stress on concrete as
     30MPa. Draw to scale Plan and Elevation.

2   Design a gantry girder for an industrial building to carry an hand operated traveling   [28M]
     crane with the following data. Crane capacity is 300 kN. Weight of crane excluding
     crab is 250 kN. Weight of crab is 6 kN. Span of crane between rails is18 m. Minimum
     hook approach is1.0 m. Wheel base is 3.0 m. Span of gantry girder is 9 m. Weight of
     rail section is 30 kg/m. Height of rail section is 75mm. Check the suggested section
     for bending stresses. Draw to scale the cross section and side view of the girder.

PART-B

3 a) Classify welds according to the following   [7M]
          i) According to position   ii) According to type
         iii) According to type of joint. Explain with neat diagrams.
   b) Explain various types of butt welds. Describe procedure for designing a butt weld.   [7M]

4   Design a suitable section for a beam of effective span 6m and carrying a   [14M]
     superimposed load of 30kN/m including its self weight. Assume that the compression
     flange is fully restrained against lateral buckling. Apply necessary checks.

5 a) Explain Euler's formula for buckling of column. Define ideal column. Differentiate   [7M]
       columns based on their buckling load for different edge conditions.
   b) What is a column splice? Give various arrangements of providing column splicing.   [7M]
       Discuss the design procedure of column splice.

6   Design the stiffener at 3m from the end of a plate girder of 15m span. It carries a dead   [14M]
     load of 35 kN per meter run and a moving load of 50kN per meter run longer than the
     span. The web is 160cm × 1.2cm in section. Neglect impact.

7   Explain importance of purlins in a roof truss. List out various types of purlins and   [14M]
     details of the loads acting on purlins and design procedure.

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$\boxed{\textbf{R13}}$

$\boxed{\textbf{SET - 3}}$

III B. Tech II Semester Regular Examinations, April - 2016
DESIGN AND DRAWING OF STEEL STRUCTURES
(Civil Engineering)

Time: 3 hours   Max. Marks: 70

Answer any ONE Question from Part – A and any THREE Questions from Part – B
Use of IS:800:2007; IS 875:1987(PART-3); IS 1384:1985; Steel tables is allowed.
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PART –A

1 Design a suitable section for a simply supported gantry girder for the following data. Spacing of columns = 4m. Crane capacity = 160kN. Weight of the crane excluding the crab = 250kN. Weight of the crab = 60kN. Minimum clearance of cross travel = 0.8m. Wheel base = 4.2m. Centre to centre distance between gantry girders = 20m. Height of the rail = 105mm. Expected number of stress cycles = 2×10^6. Grade of the steel = E250. Draw neat sketch of elevation of gantry girder with loads, cross section of gantry girder. [28M]

2 Design a welded simply supported plate girder for a span of 28m. The girder is loaded with a uniformly distributed load of the intensity 40kN/m due to dead and live loads. Consider the steel grade as E250. Draw cross section of plate girder and end portions of the plate girder. [28M]

PART –B

3 A tie member consists of two ISMC 250. The channels are connected on either side of a 12mm thick gusset plate. Design the welded joint to develop the full strength of the tie. However the overlap is to be limited to 400mm. [14M]

4 Design a simply supported beam of span 4 m carrying a reinforced concrete floor capable of providing lateral restraint to the top compression flange. The uniformly distributed load is made up of 20kN/m imposed load and 20 kN/m dead load (section is stiff against bearing). Assume Fe 410 grade steel. [14M]

5 Determine the tensile strength of a roof truss member consisting of 2 ISA 90 × 60 × 6 mm connected on either side by long legs to a gusset plate 8 mm thick by 4mm welds over an effective weld length of 200 mm. [14M]

6 An upper storey column ISHB 300 @ 577 N/m carries a factored load of 1200 kN and a factored moment of 12 kN-m. It is spliced with a lower storey column ISHB 400 @ 806 N/m. Design a suitable splice. [14M]

7 Design a gusseted base for a built up column consisting of 2 MC 250 placed back to back separated by a distance of 160mm. The factored axial load on the column is 1200kN. [14M]

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III B. Tech II Semester Regular Examinations, April - 2016
DESIGN AND DRAWING OF STEEL STRUCTURES
(Civil Engineering)

Time: 3 hours

Max. Marks: 70

Answer any ONE Question from Part – A and any THREE Questions from Part – B
Use of IS:800:2007; IS 875:1987(PART-3); IS 1384:1985; Steel tables is allowed.

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PART –A

1   Design a welded plate girder to carry a superimposed load of 50kN/m and two concentrated loads of 200kN each at one third points of the span. The effective span of the plate girder is 24m. Assume that the girder is laterally supported throughout its length. The yield strength of the steel of both the flanges and the web is 250MPa. Draw cross section of plate girder and end portions of the plate girder.   [28M]

2   Design a gusseted base to carry an axial factored load of 3000 kN. The column is an ISHB 450 @ 855 N/m with two 250×22 mm cover plates on either side. The effective height, of column is 5 m. The column is to rest on a M20 concrete pedestal. Draw to scale the plan and elevation.   [28M[

PART -B

3   Design a suitable longitudinal fillet weld to connect 120x8mm plate to 150x10mm plate to transmit a pull equal to the full strength of small plate. Assume welding is to be made in the field.   [14M]

4   Design a laterally unrestrained beam to carry a uniformly distributed load of 30kN/m. The beam is unsupported for a length of 3m and is simply placed on longitudinal beams at its ends.   [14M]

5   Determine the tensile strength of roof truss diagonal of 150×75×10mm connected by its long lag to a gusset plate 8mm thick by 6mm welds. Adopt f_y = 250 MPa.   [14M]

6   Design a welded laced column of effective length 8 m to carry a factored axial load of 1000 kN using two channels placed back to back. Provide a single lacing system.   [14M]

7   Calculate the design load carrying capacity in compression of discontinuous strut 3.m long consisting of two angle section 75×75×10 mm for:
i) Connected to the same side of a gusset plate 8mm thick
ii) Connected to both sides of 8mm thick gusset plate.
With welds of 8mm size Adopt f_y = 250 MPa.   [14M]

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Code No: RT32011 $\qquad$ **R13** SET - 1

III B. Tech II Semester Regular Examinations, April- 2016
ENVIRONMENTAL ENGINEERING – I
(Civil Engineering)

Time: 3 hours $\qquad$ Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A**is compulsory
3. Answer any **THREE** Questions from **Part-B**
*****

PART –A

1	a)	Explain the factors affecting the design period.	[5M]
	b)	Write short notes on Mass curve analysis?	[4M]
	c)	Why turidity in water is considued objectionable?	[3M]
	d)	Write short note on double filtration.	[4M]
	e)	What are the various forms of application of chlorine?	[3M]
	f)	What points are to be kept in view in the design of distribution system?	[3M]

PART -B

2	a)	What do you understand by 'per capita demand' of water? How is it determined?	[5M]
	b)	What per capita demand would you recommend for a small down with a population up to 2 lakhs?	[4M]
	c)	Explain in brief various factors that affect population growth.	[7M]
3	a)	What are the various sources of water used in water supply schemes? Discuss their merits and demerits from quality and quantity point of view.	[10M]
	b)	How do you differ the gravity and pressure conduits?	[6M]
4	a)	Describe in brief various important tests conducted for chemical examination of water.	[8M]
	b)	Write a note on coliform index. How do you determine it?	[8M]
5	a)	Draw a neat flow chart of water treatment plant and explain it.	[12M]
	b)	What is the principle of plan sedimentation?	[4M]
6	a)	Write a note on water softening accelerator.	[4M]
	b)	What is the underlying principle used in the aeration of water? What types of aerators are most commonly used? State the limitations of aeration unit operation.	[12M]
7	a)	What do you understand by an equivalent pipe? How do you determine its length when the pipes are (i) in series (ii) in parallel?	[10M]
	b)	Write short notes on scour valves and check valves.	[6M]

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III B. Tech II Semester Regular Examinations, April - 2016
ENVIRONMENTAL ENGINEERING – I
(Civil Engineering)

Time: 3 hours   Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**
*****

PART –A

1	a)	Write about the importance and necessity of protected water supply systems.	[4M]
	b)	Differentiate clearly between gravity spring and Artesian spring.	[4M]
	c)	What is the importance under laying the determination of total solids in a water sample?	[3M]
	d)	What are the factors effecting sedimentation?	[3M]
	e)	Write a note on hypo chlorination.	[3M]
	f)	Write about the equivalent pipe methods.	[5M]

PART -B

2	a)	Explain in detail about water demands and its variations.	[10M]
	b)	Write a short note on population forecasting.	[6M]
3	a)	What are the factors governing the selection of the intake structure?	[6M]
	b)	Discuss the merits and demerits of different kinds of pipes.	[10M]
4	a)	Write a note on bacteriological analysis of water.	[6M]
	b)	Describe in brief various tests conducted for physical examination of water.	[10M]
5	a)	Explain the theory of filtration as used in the purification of water.	[8M]
	b)	What is the action of coagulants added to raw material?	[8M]
6	a)	What do you understand by chlorination? Explain its action in killing bacteria.	[8M]
	b)	Describe a simple process for carrying out deflouridation of water suitable for rural population of the country.	[8M]
7	a)	Discuss with the help of diagrams, various methods of laying out the distribution system.	[10M]
	b)	Write short notes on air values and check values.	[6M]

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$\boxed{\textbf{R13}}$

III B. Tech II Semester Regular Examinations, April - 2016
ENVIRONMENTAL ENGINEERING – I
(Civil Engineering)

Time: 3 hours   Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**
*****

PART –A

1	a)	What is the role of environmental engineer?	[3M]
	b)	Write short notes on infiltration gallery for a city water supply scheme.	[4M]
	c)	What is the principle involved in the determination of the p^H value of a sample?	[3M]
	d)	Write a short note on water Borne diseases.	[5M]
	e)	What do your understand by treatment of water? Why is it necessary?	[3M]
	f)	What is the difference between disinfection and sterilization?	[4M]

PART –B

2	a)	Mention the different methods of forecasting the future population of given town. Describe in detail.	[10M]
	b)	What per capita demand would you recommend for a large city with a population over 5 lakhs? Why?	[6M]
3	a)	Explain in detail about the various types of wells with the help of sketches.	[10M]
	b)	Discuss about the design aspects of pipe lines	[6M]
4	a)	Briefly describe the presumptive coliform rest carried out in routine analysis of water.	[8M]
	b)	Write a note on common impurities found in water.	[8M]
5	a)	Describe in brief various types of sedimentation tanks generally used.	[8M]
	b)	What is meant by coagulation? What are the common coagulants used?	[8M]
6	a)	Differentiate between the fluoridation and defluoridation.	[8M]
	b)	Name various disinfection methods and explain any one of them in detail.	[8M]
7	a)	Differentiate between Hardy cross and equivalent pipe methods.	[8M]
	b)	Write a short note on Sluice value and Air values.	[8M]

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Code No: RT32011

R13

SET - 4

III B.Tech II Semester Regular Examinations, April - 2016
ENVIRONMENTAL ENGINEERING – I
(Civil Engineering)

Time: 3 hours   Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**
*****

PART –A

1 a) Describe the role of various agencies in the planning and development of water supply. [4M]

b) Differentiate between gravity well and pressure well. [4M]

c) What is the most accurate method of determining hardness of a water sample? Discuss its importance. [4M]

d) Differentiate between Stoke's law and Newton's law. [4M]

e) What do you understand by break point chlorination? What are its advantages? [3M]

f) Discuss about Hardy cross method. [3M]

PART -B

2 a) Explain in brief the factors affecting water demand. [6M]

b) Write a short note on design period. [5M]

c) Write a note on various water borne diseases. [5M]

3 a) What are the different kinds of pipes available for use in water supply system? Discuss their merits. [8M]

b) Discuss in detail about the types of water bearing formations. [8M]

4 a) Differentiate between the B-Coli and E-Coli. [10M]

b) What are the WHO guidelines for drinking water? [6M]

5 a) Describe various methods of application of coagulants. [8M]

b) Describe with the help of sketches a slow sand filter. Explain its working. [8M]

6   Write short notes on the following:

a) Disinfection of water against viruses [4M]

b) Aeration [4M]

c) Ultra filtration [4M]

d) Softening of water. [4M]

7   Describe the various methods of distributing water and discuss the advantages and disadvantages of each. [16M]

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R13

SET - 1

III B. Tech II Semester Regular Examinations, April- 2016
ENVIRONMENTAL POLLUTION AND CONTROL
(Civil Engineering)

Time: 3 hours   Maximum Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**
*****

PART –A

1	a)	Define decibel.	[3M]
	b)	Explain Role of recirculation in industrial waste water treatment.	[4M]
	c)	How do you manage leachates from a land fill site?	[4M]
	d)	What is meant by environmental sanitation?	[3M]
	e)	How do you dispose the electronic waste- explain briefly?	[4M]
	f)	Explain what is meant by sustainable development.	[4M]

PART -B

2	a)	List the various air pollutants	[4M]
	b)	Write an account of causes and control methods of air pollutants.	[8M]
	c)	List out the Air quality standards.	[4M]
3	a)	What are the various industrial waste water treatment units?	[3M]
	b)	What are the pollution controlling strategies for industrial waste water management?	[8M]
	c)	What is the role play by the Common Effluent treatment plant?	[5M]
4	a)	What are the different methods of solid waste disposal? Explain the method of composting.	[8M]
	b)	Write a detailed note on solid waste management.	[8M]
5	a)	Explain the environmental sanitation methods suitable for Hotels and Hostels.	[8M]
	b)	Write a detailed note on low cost waste disposal methods.	[8M]
6	a)	Write a detailed note on nuclear waste management.	[8M]
	b)	Write a detailed note on biomedical waste management.	[8M]
7	a)	What are the elements of sustainable development, explain them?	[8M]
	b)	Write a short note on i) Sustainable strategies, ii) Cleaner production.	[8M]

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III B.Tech II Semester Regular Examinations, April - 2016
ENVIRONMENTAL POLLUTION AND CONTROL
(Civil Engineering)

Time: 3 hours $\hfill$ Maximum Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**
*****

PART –A

1 a) What are the sources of air pollutants? [3M]

b) How do you measure the noise pollution? [4M]

c) What is importance of source segregation? [4M]

d) What are the sanitation methods adopted for social gatherings? [3M]

e) What are Hazardous wastes? List them? [4M]

f) What are the impediments for sustainable development? [4M]

PART -B

2 a) With neat sketch explain working principle of cyclones. [4M]

b) Write an account of causes and control methods of air pollutants. [8M]

c) List out the NAAQ standards. [4M]

3 a) Write a note on incineration. [3M]

b) What are the pollution controlling strategies for industrial waste water management? [8M]

c) Explain the importance of neutralization, equalization and proportioning. [5M]

4 a) Explain features and process of sanitary landfill. [8M]

b) Write a detailed note on solid waste management. [8M]

5 a) Explain the sanitation methods suitable for Hotels and Hostels. [8M]

b) What is meant by environmental sanitation? Explain the low cost waste disposal methods. [8M]

6 a) Write a note on treatment and management of chemical wastes. [8M]

b) Write a detailed note on biomedical waste management. [8M]

7 a) What are the elements of sustainable development, explain them? [8M]

b) Write a short note on [8M]
i) Barriers to sustainability ii) Cleaner production for achieving sustainability.

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R13

SET - 3

III B. Tech II Semester Regular Examinations, April - 2016
ENVIRONMENTAL POLLUTION AND CONTROL
(Civil Engineering)

Time: 3 hours   Maximum Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**
*****

PART –A

1 a) List the air pollution control devises.   [3M]

   b) What is the benefit of Equalization in waste water treatment?   [4M]

   c) What are the strategies to consider in rural sanitation?   [4M]

   d) What is meant by Incineration?   [3M]

   e) Brief the Hospital waste management.   [4M]

   f) What is the role of cleaner production in achieving sustainability?   [4M]

PART -B

2 a) What are the sources of SPM?   [4M]

   b) Write an account on effects and control methods of air pollutants.   [8M]

   c) Explain the methods used for reduction of residential noise.   [4M]

3 a) List the different treatment units used in the waste water treatment.   [3M]

   b) What are the pollution controlling strategies for industrial waste water [8M]
      management?

   c) What is the role play by the Common Effluent treatment plant?   [5M]

4 a) Write a short note on i) Composting ii) Landfill.   [8M]

   b) Write a detailed note on solid waste management.   [8M]

5 a) Explain the environmental sanitation methods suitable for Hotels and Hostels. [8M]

   b) Explain various low cost sanitation methods used for rural sanitation.   [8M]

6 a) Write a detailed note on nuclear waste management.   [8M]

   b) Write a detailed note on biomedical waste management.   [8M]

7 a) Write a note on   [8M]
      i) Indicators of sustainable development   ii) Barriers to sustainability.
   b) Write a short note on   [8M]
      i) Sustainable strategies   ii) Sustainable development.

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Code No: RT32016A   R13   SET - 4

III B. Tech II Semester Regular Examinations, April - 2016
ENVIRONMENTAL POLLUTION AND CONTROL
(Civil Engineering)

Time: 3 hours   Maximum Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**
*****

PART –A

1   a)   What are the types and sources of air pollutants?   [3M]

   b)   Define decibel.   [4M]

   c)   What are the strategies to consider in rural sanitation?   [4M]

   d)   What are the sanitation methods adopted for social gatherings?   [3M]

   e)   What is the role of cleaner production in achieving sustainability?   [4M]

   f)   How do you dispose the nuclear waste- explain briefly?   [4M]

PART -B

2   a)   Explain the methods used for reduction of industrial noise.   [4M]

   b)   Write an account of causes and control methods of air pollutants.   [8M]

   c)   List out the Air quality standards.   [4M]

3   a)   Note down the different types waste water treatment units used for treating the   [3M]
     industrials wastes.

   b)   What are the pollution controlling strategies for industrial waste water   [8M]
     management?

   c)   What is the role play by the Common Effluent treatment plant?   [5M]

4   a)   Write a short note on i) incineration ii) Composting.   [8M]

   b)   Write a detailed note on solid waste management.   [8M]

5   a)   Explain the sanitation methods adopted for swimming pools and bathing   [8M]
     ghats.

   b)   Write a detailed note on low cost waste disposal methods.   [8M]

6   a)   Write a detailed note on electronic waste management.   [8M]

   b)   Write a detailed note on biomedical waste management.   [8M]

7   a)   Write a note on   [8M]
     i) Indicators of sustainable development ii) Barriers to sustainability.

   b)   Write a short note on   [8M]
     i) Sustainable strategies ii) Industrialization and sustainable development.
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III B. Tech II Semester Regular Examinations, April - 2016
GEOTECHNICAL ENGINEERING – II
(Civil Engineering)

Time: 3 hours　　　　　　　　　　　　　　　　　　　　　　　Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
　　　 2. Answering the question in **Part-A** is compulsory
　　　 3. Answer any **THREE** Questions from **Part-B**
*****

PART –A

1　a)　What are the methods of soil exploration?　　　　　　　　　　　[3M]

　　b)　Explain finite and infinite slopes.　　　　　　　　　　　　　　[4M]

　　c)　What are factors affecting Bearing Capacity?　　　　　　　　　[4M]
　　d)　What are the different types of foundation settlements?　　　　　[3M]

　　e)　How do you determine the group efficiency of piles?　　　　　　[4M]
　　f)　What is grip length with respect to well foundations?　　　　　　[4M]

PART -B

2　a)　Explain with neat figure area ratio, inside and outside clearances of a cutting　[4M]
　　　　edge used for soil exploration borings.
　　b)　Explain in detail about preparation of soil investigation report including　[8M]
　　　　RECORD OF BORING [IS : 1892-1979]
　　c)　An SPT was conducted in a dense sand deposit at a depth of 20 m, and a value　[4M]
　　　　of 48 was observed for N. The density of the sand was 14 kN/m^3. What is the
　　　　value of N, corrected for overburden pressure?

3　a)　Explain Taylor's stability number.　　　　　　　　　　　　　　[3M]

　　b)　Explain Culmann's graphical method and also it's advantages.　　[8M]

　　c)　An embankment is inclined at an angle of 35° and its height is 15 m. The angle　[5M]
　　　　of shearing resistance is 15° and the cohesion intercept is 200 kN/m^2. The unit
　　　　weight of soil is 18 kN/m^3. If Taylor's stability number is 0.06, find the factor
　　　　of safety with respect to cohesion.

4　a)　Explain the differences between local and general shear failures and factors　[4M]
　　　　considered for their identification.
　　b)　What are the assumptions in Terzaghi's theory for shallow foundations　[4M]

　　c)　A loading test was conducted with a 300 mm square plate at depth of 1 m below
　　　　the ground surface in pure clay deposit. The water table is located at a depth of
　　　　4 m below the ground level. Failure occurred at a load of 45 kN. What is the　[8M]
　　　　safe bearing capacity of a 1.5 m wide strip footing at 1.5 m depth in the same
　　　　soil? Assume γ= 18 kN/m^3 above the water table and a factor of safety of 2.5.
　　　　The water table does not affect the bearing capacity in both cases.
　　　　For $\Phi = 0°$, Terzaghi's factors are Nc= 5.7, $Nq = 1$, and $N\gamma$= 0.

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5 a) Explain plate load test in detail and its limitations. [8M]

   b) Two load tests were conducted at a site - one with a 0.5 m square test plate and the other with a 1.0 m square test plate. For a settlement of 25 mm, the loads were found to be 60 kN and 180 kN, respectively in the two tests. Determine the allowable bearing pressure of the sand and the load which a square footing of 2 m × 2 m, can carry with the settlement not exceeding 25 mm. [8M]

6 a) Explain different classifications of piles with neat sketches. [8M]

   b) A square group of 9 piles was driven into soft clay extending to a large depth. The diameter and length of the piles were 30 cm and 9 m respectively. If the unconfined compression strength of the clay is 90 kN/m^2, and the pile spacing is 90 cm centre to centre, what is the capacity of the group? Assume a factor of safety of 2.5 and adhesion factor of 0.75. [8M]

7 a) Explain with neat sketches different tilts and shifts of wells and their rectifying measures. [8M]

   b) Explain with a neat sketch different forces acting on well foundations and construction and Sinking of wells. [8M]

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R13

III B. Tech II Semester Regular Examinations April - 2016
GEOTECHNICAL ENGINEERING – II
(Civil Engineering)

Time: 3 hours   Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**
*****

PART –A

1 a) What is the need of soil exploration?   [3M]

   b) Explain finite and infinite slopes.   [4M]

   c) What are the factors effecting Bearing Capacity?   [4M]

   d) What are the different types of foundation settlements?   [3M]

   e) How do you determine the group efficiency of piles?   [4M]

   f) What are the different shapes of wells and draw neat figures?   [4M]

PART -B

2 a) Explain with neat figure area ratio, inside and outside clearances of a cutting   [4M]
       edge of a sampler used for soil exploration borings.
   b) Write detailed notes on Standard Penetration Test procedure and corrections   [8M]
       required.
   c) Write differences between undisturbed and disturbed soil samples.   [4M]

3 a) What is meant by slope factor of safety?   [3M]

   b) A cutting is made 10 m deep with sides sloping at 8 : 5 in a clay soil having a   [8M]
       Mean undrained strength of 50 kN/m^2 and a mean bulk density of 19 kN/m^3.
       Determine thefactor of safety under immediate (undrained) conditions given
       the following details of the impending failure circular surface: The centre of
       rotation lies vertically above the middle of theslope. Radius of failure arc =
       16.5 m. The deepest portion of the failure surface is 2.5 m belowthe bottom
       surface of the cut (*i.e.,* the centre of rotation is 4 m above the top surface of the
       cut). Allowance is to be made for tension cracks developing to a depth of 3.5 m
       from surface. Assume that there is no external pressure on the face of the slope.
   c) Explain Taylor's stability number and how it is modified for different stability   [5M]
       conditions of canal slope.

4 a) What are the assumptions in Terzaghi's theory for shallow foundations?   [4M]

   b) Explain the differences between local and general shear failures and factors   [4M]
       considered for their identification.
   c) Explain IS code method for determining soil bearing capacity.   [8M]

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5 a) Explain in detail the methods for determining safe bearing pressure based on   [8M]
      N- value.

   b) Two load tests were conducted at a site one with a 0.5 m square test plate and   [8M]
      the other with a 1.0 m square test plate. For a settlement of 25 mm, the loads
      were found to be 60 kN and 180 kN, respectively in the two tests. Determine
      the allowable bearing pressure of the sand and the load which a square footing
      of 2 m × 2 m, can carry with the settlement not exceeding 25 mm.

6 a) Explain at least two dynamic formulae of piles.   [8M]

   b) A square group of 9 piles was driven into soft clay extending to a large depth.   [8M]
      The diameter and length of the piles were 30 cm and 9 m respectively. If the
      unconfined compression strength of the clay is 90 kN/m^2, and the pile spacing
      is 90 cm centre to centre, what is the capacity of the group? Assume a factor of
      safety of 2.5 and adhesion factor of 0.75.

7 a) Explain with neat sketch different components of wells and their functions.   [8M]

   b) Explain with neat sketches different types of caissons based on their method of   [8M]
      construction

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R13

III B. Tech II Semester Regular Examinations, April - 2016
GEOTECHNICAL ENGINEERING – II
(Civil Engineering)

Time: 3 hours   Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**
*****

PART –A

1   a)   What are the methods of soil exploration?   [3M]

b)   Explain types of slope failures.   [4M]

c)   What is the Criteria for the determination of bearing capacity of soils?   [4M]

d)   What are the allowable settlements of structures?   [3M]

e)   What is a negative skin friction?   [4M]

f)   What is grip length with respect to well foundations?   [4M]

PART -B

2   a)   How do you decide depth and spacing of boring in soil investigation?   [4M]

b)   Explain in detail about preparation of soil investigation report including. [8M]
RECORD OF BORING [IS : 1892-1979]

c)   An SPT was conducted in a dense sand deposit at a depth of 22 m, and a value [4M]
of 48 was observed for N. The density of the sand was 15 kN/m^2. What is the
value of N, corrected for overburden pressure?

3   a)   What is meant by slope factor of safety?   [3M]

b)   A cutting is made 10 m deep with sides sloping at 8:5 in a clay soil having a [8M]
mean undrained strength of 50 kN/m^2 and a mean bulk density of 19 kN/m^3.
Determine the factor of safety under immediate (undrained) conditions given the
following details of the impending failure circular surface: The centre of
rotation lies vertically above the middle of the slope. Radius of failure arc =
16.5 m. The deepest portion of the failure surface is 2.5 m belowthe bottom
surface of the cut (*i.e.,* the centre of rotation is 4 m above the top surface of the
cut). Allowance is to be made for tension cracks developing to a depth of 3.5 m
from surface. Assume that there is no external pressure on the face of the slope.

c)   Explain Taylor's stability number and how it is modified for different stability [5M]
conditions of canal slope.

4   a)   Explain types of foundations and factors to be considered in their location.   [4M]

b)   Explain the differences between local and general shear failures and factors   [4M]
considered for their identification.

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c)   [8M]

A loading test was conducted with a 300 mm square plate at depth of 1 mbelow the ground surface in pure clay deposit. The water table is located at a depth of 4 m below the ground level. Failure occurred at a load of 45 kN. What is the safe bearing capacity of a 1.5 m wide strip footing at 1.5 m depth in the same soil? Assume $\gamma= 18$ kN/m^3 above the water table and a factor of safety of 2.5. The water table does not affect the bearing capacity in both cases.

For $\Phi= 0°$, Terzaghi's factors are $Nc= 5.7$, $Nq = 1$, and $N\gamma= 0$.

5   a)   Explain in detail the methods for determining safe bearing pressure based on N-value.   [8M]

    b)   A footing, 2 m square, is founded at a depth of 1.5 m in a sand deposit, forwhich the corrected value of N is 27. The water table is at a depth of 2 m from the surface. Determine the net allowable bearing pressure, if the permissible settlement is 40 mm and a factor of safety of 3 is desired against shear failure.   [8M]

6   a)   Explain different classifications of piles with neat sketches.   [8M]

    b)   A group of 16 piles of 50 cm diameter is arranged with a centre to centre spacing of 1.0 m. The piles are 9 m long and are embedded in soft clay with cohesion 30 kN/m^2. Bearing resistance may be neglected for the piles. Negative Adhesion factor is 0.6. Determine the ultimate load capacity of the pile group.   [8M]

7   a)   Explain with neat sketch different components of wells and their functions.   [8M]

    b)   Explain with a neat sketch different forces acting on well foundations and the construction and Sinking of wells.   [8M]

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R13

III B. Tech II Semester Regular Examinations, April - 2016
GEOTECHNICAL ENGINEERING – II
(Civil Engineering)

Time: 3 hours   Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**
*****

PART –A

1	a)	What is the need of soil exploration?	[3M]
	b)	Explain types of slope failures	[4M]
	c)	What is the Criteria for the determination of bearing capacity	[4M]
	d)	What are the allowable settlements of structures?	[3M]
	e)	What is a negative skin friction?	[4M]
	f)	What are the different shapes of wells and draw neat figures?	[4M]

PART -B

2	a)	How do you decide depth and spacing of boring in soil investigation?	[4M]
	b)	Write a detail notes on Standard Penetration Test procedure and corrections required.	[8M]
	c)	Write differences between undisturbed and disturbed soil samples.	[4M]
3	a)	Explain Location of the Most Critical Circle in the method of slices.	[3M]
	b)	Explain Culmann's graphical method and also it's advantages.	[8M]
	c)	An embankment is inclined at an angle of 35° and its height is 15 m. The angle of shearing resistance is 15° and the cohesion intercept is 200 kN/m^2. The unit weight of soil is 18.0 kN/m^3. If Taylor's stability number is 0.06, find the factor of safety with respect to cohesion.	[5M]
4	a)	Explain the differences between local and general shear failures and factors considered for their identification.	[4M]
	b)	Explain types of foundations and factors to be considered in their location	[4M]
	c)	Explain IS code method for determining soil bearing capacity.	[8M]
5	a)	Explain plate load test in detail and its limitations	[8M]
	b)	A footing, 2 m square, is founded at a depth of 1.5 m in a sand deposit, for which the corrected value of N is 27. The water table is at a depth of 2 m from the surface. Determine the net allowable bearing pressure, if the permissible settlement is 40 mm and a factor of safety of 3 is desired against shear failure.	[8M]

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6 a) Explain at least two dynamic formulae of piles.   [8M]
   b) A group of 16 piles of 50 cm diameter is arranged with a centre to centre   [8M]
      spacing of 1.0 m. The piles are 9 m long and are embedded in soft clay with
      cohesion 30 kN/m^2. Bearing resistance may be neglected for the piles.
      Negative adhesion factor is 0.6. Determine the ultimate load capacity of the
      pile group.

7 a) Explain with neat sketches different tilts and shifts of wells and their rectifying   [8M]
      measures.
   b) Explain with neat sketches different types of caissons based on their method of   [8M]
      construction.

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R13

III B. Tech II Semester Regular Examinations April- 2016
TRANSPORTATION ENGINEERING – II
(Civil Engineering)

Time: 3 hours

Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1	a)	What is CSI and Adzing?	[3M]
	b)	What are check rails on curves?	[4M]
	c)	Differentiate between – Repeating and Co-acting signals.	[4M]
	d)	What are visual aids? Explain their uses.	[3M]
	e)	What are the different types of Sub surface drainages?	[4M]
	f)	Define the term Break waters. Enlist the different types.	[4M]

PART –B

2	a)	What is Ballast? What are the different types and enumerate the requirements of Good ballast.	[8M]
	b)	Determine the number of sleepers required for the construction of 2000 m of BG track, with a sleeper density of N + 7.	[8M]
3	a)	What is a Transition curve, what are the different types and what are the requirements for an ideal transition curve.	[8M]
	b)	Write a note about (i) Momentum gradient and (ii) Compensated gradient for curvature.	[8M]
4	a)	Draw a neat sketch of Right hand turn out, clearly showing the various elements.	[8M]
	b)	A cross over is to be laid connecting two BG parallel tracks spaced 4.5 m apart. Assuming that 1 in 8.5 crossings are to be used, work out the various details required for setting the cross over.	[8M]
5	a)	The length of runway at sea level, standard atmospheric conditions and zero gradient is 1500 m. The airport site has an elevation of 900 m, and the reference temperature as 20° C. If the proposed runway grading permits an effective gradient of 0.20 percent, determine the actual runway length required at the site.	[8M]
	b)	Explain with neat sketches, the various markings on Runways.	[8M]
6	a)	Explain in brief the difference between functional and structural evaluation of airfield pavements.	[8M]
	b)	Explain in detail the various maintenance works that are performed on Flexible airfield pavements.	[8M]
7	a)	Define (i) Semi diurnal tides, (ii) Mixed diurnal tides, (iii) Neap tides and (iv) Age of tide.	[8M]
	b)	What are Navigational aids? Briefly describe the different types of Floating signals	[8M]

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SET - 2

III B. Tech II Semester Regular Examinations April - 2016
TRANSPORTATION ENGINEERING – II
(Civil Engineering)

Time: 3 hours   Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**
*****

PART –A

1	a)	Name at least five causes of Rail failures?	[4M]
	b)	What is degree of curve?	[3M]
	c)	What are the objectives of Interlocking?	[4M]
	d)	What do you understand by the term taxiway design?	[3M]
	e)	Differentiate between Airport and Highway pavements.	[4M]
	f)	Define (i) Anchorage area, (ii) Free port and (iii) Beam.	[4M]

PART –B

2 a) With the help of a neat sketch, show the various components of a typical Railway track. [8M]

b) Explain the following terms (i) Track modulus, (ii) Coning of Wheels. Draw neat sketches, wherever necessary. [8M]

3 a) Write a note about - (i) Ruling gradient and (ii) Pusher gradient. [8M]

b) Calculate the super elevation, maximum permissible speed and transition length for a 4 degree curve on a high speed BG section with a maximum allowable speed of 100 kmph. Assume the equilibrium speed to be 70 kmph and the booked speed of the goods train to be 45 kmph. [8M]

4 a) A turn out is to be laid off a straight BG track with a 1 in 11 crossing. Determine the lead and radius for the turn out, given the following data. Heel divergence d = 113 mm, the straight length between the TNC and the tangent point of the crossing curve, h = 1.325m, crossing angle **α** = 3°25'40"and switch angle **β** = 1°8'20". [8M]

b) Describe the three aspects in Upper quadrant signalling. Briefly describe one method of interlocking used by Indian Railways. [8M]

5 a) The length of runway under standard conditions is 1730 m. The airport site has an elevation of 290 m. Its reference temperature is 31.60°C. If the runway is to be constructed with an effective gradient of 0.15 percent, determine the corrected runway length. [8M]

b) What is a Wind rose diagram? What are its types? Explain one. [8M]

6 a) Explain in detail the causes for Airfield Rigid pavement failures. [8M]

b) Discuss the Flexible overlay designs for strengthening airfield pavements. [8M]

7 a) Differentiate between a Jetty and a Wharf. State the conditions under which you will prefer their construction. [8M]

b) Write short notes about (i) Transition sheds and (ii) Work houses. [8M]

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R13

III B. Tech II Semester Regular Examinations, April - 2016
TRANSPORTATION ENGINEERING – II
(Civil Engineering)

Time: 3 hours   Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**
*****

PART –A

1	a)	What is Tilting of Rails?	[3M]
	b)	What is cant deficiency? Draw a neat sketch of the same.	[4M]
	c)	Differentiate between - Stud switch and Split switch	[4M]
	d)	What are the different types of airports?	[3M]
	e)	Write a note about Surface drainages?	[4M]
	f)	Differentiate between Natural and Artificial harbours.	[4M]

PART -B

2 a) What are Sleepers? What are the advantages and disadvantages of Concrete sleepers? [8M]
   b) Determine the number of sleepers required for the construction of 1800 m of BG track, with a sleeper density of N + 5. [8M]

3 a) What are the basic requirements of an Ideal railway alignment? [8M]
   b) A rising gradient of 1 in 120 meets a falling gradient of 1 in 230 on a group A route. The point of intersection has a chainage of 1000 m and its R.L. is 135 m. Calculate the length of the vertical curve, the R.L. and the chainage of the various points in order to set a curve at this location. [8M]

4 a) What essential purposes are served by Signalling and Interlocking? What do you understand by route relay interlocking? [8M]
   b) Two BG tracks cross each other at an angle of 1 in 10. Calculate the important dimensions of the diamond crossing. [8M]

5 a) Explain the various Surveys to be conducted and the data to be collected for Airport site selection [8M]
   b) The runway length required for landing at sea level in standard atmospheric conditions is 3000 m. Runway length required for takeoff at sea level in standard atmospheric conditions is 2500 m. Aerodrome reference temperature is 25° C and that of the standard atmosphere at aerodrome elevation of 150 m is 14.025° C. If the effective runway gradient is 0.5 percent, determine the runway length to be provided. [8M]

6 a) Explain in detail the causes for airfield flexible pavement failures. [8M]
   b) What data is collected for the design of sub surface drainage system for an airport? [8M]

7 a) What are the various services that are required for the maintenance of shipping terminals? [8M]
   b) What is Dredging? Classify the different types of dredging works. [8M]

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R13

III B. Tech II Semester Regular Examinations, April - 2016
TRANSPORTATION ENGINEERING – II
(Civil Engineering)

Time: 3 hours   Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**
*****

PART –A

1	a)	What is Creep? What are its causes?	[3M]
	b)	Write about the engineering surveys to be performed for railway line construction.	[4M]
	c)	Differentiate between - Stock rail and Tongue rail.	[4M]
	d)	What are the various characteristics of a good aircraft?	[3M]
	e)	Enlist the uses of different types of Airport Pavements.	[4M]
	f)	Enumerate the requirements of good port.	[4M]

PART -B

2   a)   Name the different modes of transportation. Enumerate the advantages and disadvantages   [8M]
        of (i) Road and (ii) Rail transportation.
    b)   What is meant by wear of Rails? Enumerate the various types of Rail wear and enlist the   [8M]
        methods by which it can be measured.

3   a)   Explain, with neat sketches, the various considerations for providing extra clearances on   [8M]
        Horizontal curves.
    b)   A curve of 500 mradius on a BG section has a limited transition of 50 m. Calculate the   [8M]
        maximum permissible speed and super elevation for the same. The maximum sectional
        speed is 90 kmph.

4   a)   Differentiate between Mechanical and Electrical signalling systems.   [8M]
    b)   Design a turn out for a BG track if the number of the crossing is 12 and the heel   [8M]
        divergence is 124 mm. Assume a simple circular curve from the toe of the switch to the
        TNC.

5   a)   The length of runway under standard conditions is 1620 m. The airport site has an   [8M]
        elevation of 270 m. Its reference temperature is 32.90° C. If the runway is to be
        constructed with an effective gradient of 0.20 percent, determine the corrected runway
        length.
    b)   Compare the recommendations of FAA and ICAO with reference to airport master   [8M]
        planning.

6   a)   Discuss the Rigid overlay designs for strengthening airfield pavements.   [8M]
    b)   Discuss in brief the various factors to be considered in the design of Airfield pavements.   [8M]

7   a)   Define (i) Harbour, (ii) EIS, (iii) Off shore Moorings and (iv) Turning basin.   [8M]
    b)   What are Wharves? Write a note about Open type wharves and Solid type wharves. Draw   [8M]
        neat sketches.

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Code No: RT32014

R13

SET - 1

III B. Tech II Semester Regular Examinations, April- 2016
WATER RESOURCES ENGINEERING–I
(Civil Engineering)

Time: 3 hours   Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**
*****

PART –A

1	a)	Explain hydrologic cycle with a neat sketch.	[3M]
	b)	Discuss Horton's infiltration equation.	[4M]
	c)	Describe briefly the various components of runoff.	[4M]
	d)	Define flood routing. What are the uses of flood routing?	[3M]
	e)	Define transmissivity, storage coefficient and hydraulic conductivity of an aquifer.	[4M]
	f)	Write a short note on rainfall-runoff modeling.	[4M]

PART -B

2	a)	Explain various types of precipitation.	[4M]
	b)	Describe double mass curve method to check the consistency of rainfall data	[6M]
	c)	The annual rainfalls in cm at a station for a period of 21 years from 1960 to 1980 are 97, 125, 103, 81, 101, 119, 103, 79, 102, 118, 98, 83, 105, 123, 100, 86, 99, 114, 91, 83 and 106. Determine the 75% dependable rainfall from frequency analysis.	[6M]
3	a)	Explain any three methods of estimating the evapotransipiration.	[8M]
	b)	Explain the double ring infiltrometer with adjustable depth of flooding with the help of a neat sketch.	[8M]
4	a)	Explain the various factors affecting the runoff.	[6M]
	b)	Given below are the ordinates of a 4-hour unit hydrograph of a basin in m^3/s at one hour intervals. 4, 25, 44, 60, 70, 61, 52, 45, 38, 32, 27, 22, 18, 14, 11, 8, 6, 4, 2 and 1. Derive 2-hour unit hydrograph.	[10M]
5	a)	Explain the Gumbel's method of estimation of T-year flood.	[8M]
	b)	Describe the various steps involved in the Pul's method of reservoir routing.	[8M]
6	a)	Derive an expression for the steady state discharge of a well fully penetrating into a confined aquifer. List out the assumptions made.	[8M]
	b)	During the recuperation test conducted on an open well in a region, the water level in the well was depressed by 3 m and it was observed to rise by 1.75 m in 75 minutes. What is the specific yield from wells in that region? What could be the yield from a well of 5 m diameter under a depression head of 2.5 m? What should be the diameter of the well to give a yield of 12 lit/s under a depression head of 2 m?	[8M]
7	a)	Define Instantaneous unit hydrograph. How does it differ from unit hydrograph of finite duration?	[8M]
	b)	Explain the concept of Clark's Instantaneous Unit Hydrograph.	[8M]

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III B. Tech II Semester Regular Examinations, April - 2016
WATER RESOURCES ENGINEERING–I
(Civil Engineering)

Time: 3 hours   Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**
*****

PART –A

1 a) What are the various forms of precipitation?   [3M]

    b) Define φ-index and W-index and bring out the difference between them.   [4M]

    c) Describe any two methods of separating base flow from total runoff.   [4M]

    d) Differentiate between channel routing and reservoir routing.   [3M]

    e) Explain briefly various types of aquifers.   [4M]

    f) Write short note on rainfall-runoff modeling.   [4M]

PART -B

2 a) Explain various methods of determination of average rainfall over a basin   [6M]

    b) Explain Intensity-Duration-Frequency curves.   [4M]

    c) The average annual rainfalls of 5 rain gauges in a basin are 89,54,45,41 and 55 cm. If the error in the estimation of basin mean rainfall should not exceed 10%, how many additional gauges should be installed in the basin?   [6M]

3 a) Describe how the evaporation is measured using atmometers. Also explain various methods of reducing the evaporation from a water body.   [8M]

    b) A seven hour storm produced the following rainfall intensities in mm/h at half an hour intervals over a basin of area 1830 km^2 are 4, 9, 20, 18, 13, 11, 12, 2, 8, 16, 17, 13, 6 and 1. If the corresponding observed runoff is 36.6 million m^3, estimate the φ-index.   [8M]

4 a) Explain any two methods of estimating runoff   [6M]

    b) The following are the ordinates of a 12-hour unit hydrograph.   [10M]

Time (hr)	0	12	24	36	48	60	72	84
Flow (m^3/s)	0	1600	2900	2600	1400	700	150	0

  If successive 12 hour rainfall excesses are 1.5 cm, 3.0 cm and 0.75 cm for the catchment, obtain the ordinates of a resulting storm hydrograph if constant base flow of 20 m^3/s is assumed.

5 a) What do you understand by the frequency factor? How is it determined for Gumbel's distribution?   [8M]

    b) Explain the method of determining the Muskingum parameters K and x of a reach from a pair of observed inflow and outflow hydrographs.   [8M]

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6　a)　Derive the expression for the steady state discharge of well fully penetrating　　[8M]
　　　　into a unconfined aquifer.
　　b)　Explain the terms (i) cone of depression (ii) specific yield　　[8M]
　　　　　　　　(iii) flowing well　　　　(iv) Darcy's velocity.

7　a)　Define Instantaneous unit hydrograph. How does it differ from unit hydrograph　　[8M]
　　　　of finite duration?
　　b)　Explain the concepts of Nash model of Instantaneous Unit Hydrograph.　　[8M]

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R13

III B. Tech II Semester Regular Examinations, April - 2016
WATER RESOURCES ENGINEERING–I
(Civil Engineering)

Time: 3 hours   Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**
*****

PART –A

1	a)	Explain various methods for finding the missing data of rainfall.	[3M]
	b)	Define pan coefficient. Discuss the relative merits and demerits of sunken, floating and land pans.	[4M]
	c)	Describe how unit hydrograph can be used to predict the runoff from storms.	[4M]
	d)	What is a design storm? What is Probable Maximum Flood?	[3M]
	e)	Distinguish between aquifer, aquitard and aquiclude.	[4M]
	f)	Write short note on rainfall-runoff modeling.	[4M]

PART -B

2 a) Explain the Depth-Area-Duration curves   [4M]
   b) What do you understand by dependable rainfall? How do you analyse the available data to obtain 75% dependable annual rainfall?   [6M]
   c) Estimate the total volume of rainfall received in m^3 in a basin consisting of 5 rain gauges. The polygon area of each station in hectare are 518,777, 906, 1495 and 748. The corresponding rainfalls in mm at each rain gauge station in the same order are 267, 198, 142, 114 and 81.   [6M]

3 a) Discuss various factors affecting the evapotranspiration.   [6M]
   b) Define φ-index and W-index.   [4M]
   c) A storm with uniform intensity of 1.6 cm/hour for a period of 8 hours occurring over a basin of area 650 km^2 produced a runoff estimated to be 57.2 million m^3. Find the average infiltration rate during the storm.   [6M]

4 a) List out various physiographic factors which affect runoff. Discuss their influence on the volume of runoff and on the time distribution of runoff.   [8M]
   b) Given below are the ordinates of a unit hydrograph for a storm of 4-hour duration. Find ordinates of flood hydrograph when the maximum flood observed was 400 m^3/s and base flow was 250 m^3/s.   [8M]

Time (hours)	0	4	8	12	16	20	24
Flow (m^3/s)	0	1500	1200	600	220	80	0

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5　a)　Describe the method of estimating a T-year flood using Log-Pearson type-III distribution.　[8M]

　　b)　Derive the Muskingum routing equation and the expressions for the routing coefficients C_0, C_1 and C_2.　[8M]

6　a)　Explain how yield of an open well can be determined using recuperation test.　[8M]

　　b)　In a water table aquifer of 50 m thickness, a 20 cm diameter well is pumped at a uniform rate of 0.05 m^3/s. If the steady state drawdown measured in the observation wells located at 10 m and 100 m distances from the well are 6.5and 0.25 m respectively, determine the hydraulic conductivity of the aquifer.　[8M]

7　a)　Explain the concepts of Nash model of Instantaneous Unit Hydrograph.　[8M]

　　b)　What is a hydrological model? Explain any one of them.　[8M]

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R13

III B. Tech II Semester Regular Examinations, April - 2016
WATER RESOURCES ENGINEERING–I
(Civil Engineering)

Time: 3 hours   Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**
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PART –A

1 a) How to estimate the optimum number of rain gauges required in a basin?   [3M]

    b) Discuss the factors affecting evaporation.   [4M]

    c) What is a S-hydrograph? How it is constructed? What are its uses?   [4M]

    d) Distinguish between return period and exceedence of probability.   [3M]

    e) Write short note on occurrence of ground water.   [4M]

    f) Write short non on rainfall-runoff modeling.   [4M]

PART -B

2 a) Describe any three types of rain gaugesfor measurement of rainfall with neat sketches.   [4M]

    b) Describe the procedure involved in the analysis for developing intensity-duration-frequency relationships. Sketch a typical set of these curves.   [8M]

    c) Rain gauge station X did not function for a part of a month during which a storm occurred. The storm produced rainfalls of 84,70 and 96 mm at three surrounding stations A, B and C respectively. The normal annual rainfalls at the stations X,A,B and C are respectively 770, 882, 736 and 944 mm. Estimate the missing storm rainfall at station X.   [4M]

3 a) Explain how the evapotranspiration can be estimated using the Blaney-Criddle and Thronthwaite equations.   [8M]

    b) What are the factors affecting infiltration? Explain how infiltration can be measured using the double ring infiltrometer.   [8M]

4 a) What is stream gauging? How it is useful? Explain the area-velocity method of stream gauging.   [8M]

    b) Given below are the observed flows (cumecs) from a storm of 6 hour duration on a stream with a drainage area of 316 km^2. Assume a constant base flow of 17 cumecs. Derive a 6-hour duration unit hydrograph.   [8M]

Time (hr)	0	12	24	36	48	60	72
Flow	17	254.5	150	87.7	53.8	31.1	17

5 a) Describe the method of estimating a T-year flood using Gumbel's distribution.   [8M]

    b) Describe the Pul's method of reservoir routing.   [8M]

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6 a) Derive the expression for yield of a open well by recuperation test. [8M]

   b) A 20 cm well penetrates fully a confined aquifer of thickness 30 m. When the [8M]
       well is pumped at rate of 250 litre/minute the steady state drawdown in the two
       observation wells located at 10 m and 100 m distance from the pumping well
       are found to be 3.5 and 0.05 m respectively. Calculate the permeability and the
       transmissivity of the aquifer.

7 a) Define Instantaneous unit hydrograph. How does it differ from unit hydrograph [8M]
       of finite duration?
   b) Explain the concept of Clark's Instantaneous Unit Hydrograph. [8M]

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