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**B.Tech (CIVIL) 7<sup>th</sup> Semester (G-Scheme)**

**Examination, December - 2024**

**CONSTRUCTION PLANNING AND MANAGEMENT**

**Paper - PCC-CE-401-G**

*Time allowed : 3 hours]*

*[Maximum marks : 75*

*Before answering the questions, candidate should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note:** *Attempt five questions in all, selecting one question from each section. Question No. 1 is compulsory. All questions carry equal marks.*

1. Describe the following: 15
- (a) Bar Charts
  - (b) Expected Time
  - (c) Float
  - (d) Optimum Duration
  - (e) Resource smoothing
  - (f) Histograms 15

3521-P-3-Q-9(24)

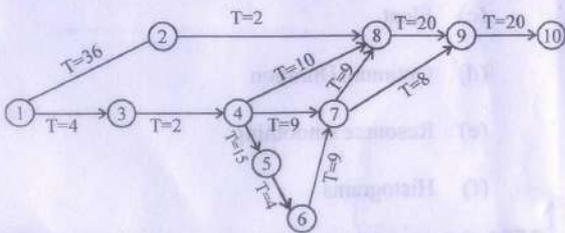
[P.T.O.]

Section - A

- 2. (a) What is the purpose of scheduling and controlling in project management? 7
- (b) Explain the different network methods and techniques. 8
- 3. (a) What are the mean of Beta distribution and Probability distribution in PERT method. 7
- (b) Explain the term mean, variance and standard deviation with the help of suitable example. 8

Section - B

- 4. The network of the project is shown in figure, along with estimated time of completion of each activity. Compute the activity times, free float, independent float and total float for each activity and also locate the critical path. 15



- 5. (a) What do you mean by direct project cost, indirect project cost in a project? 8
- (b) What are the steps used in time cost optimization? 7

Section - C

- 6. (a) What are the classification of major equipment? 8
- (b) Explain the role of concreting plant in detail. 7
- 7. (a) What do you mean by task consideration and cost consideration in the selection of construction equipment? 7
- (b) Explain the equipment engineering consideration in detail. 8

Section - D

- 8. (a) Explain the steps used in updating in CPM. 7
- (b) Explain the BOT techniques and its variance. 8
- 9. (a) Explain the risk associated in construction project management. 7
- (b) Explain the resources leveling in project management. 8

**B.Tech. (Civil Engg.) 7th Semester G-scheme  
Examination, December-2024  
ADVANCED STEEL STRUCTURE  
Paper - PCC-CE-403-G**

*Time allowed : 3 hours]*

*[Maximum marks : 75*

**Note :** (i) **Question No. 1 is compulsory.**

(ii) *Student have to attempt **five** questions in total at least **one** question from each section.*

(iii) *Use of IS 800-1984 or 2007, IS 875-1987 and IS 801-1975 is allowed.*

(iv) *Use of Steel Table is allowed. Assume suitable data is missing.*

1. Explain the following : 6×2.5=15

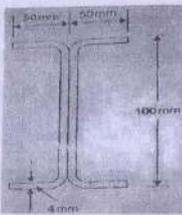
- (i) Sketch the main component of plate girder.
- (ii) Calculate the permissible deflection for a truss of 15m span.
- (iii) Explain Flat width.
- (iv) Describe the different lateral forces act on a tower.
- (v) Discuss moment resistance connection.
- (vi) Discuss load consideration for design of stack.

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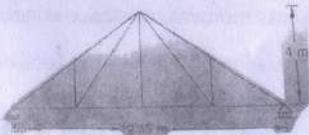
**Section-A**

2. An ISMB 500@0.869 kN/m transmits an end reaction of 130 kN to the flange of column ISHB 250@0.510 kN/m. Design an un-stiffened bolted seat connection. 15
3. Find the permissible load on the column shown in the Figure. The effective length of the column is 3m. 15



**Section-B**

4. Design a steel roof truss shown in Figure for a clear span of 12.0 m. The truss is supported over masonry columns 45 cm × 45 cm trusses are placed 3 m c/c and support galvanised iron sheet on rafters and steel purlins. The rise of the truss is 1/3 of span. The design wind pressure may be assumed to be 1000 N/m<sup>2</sup>. 15



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5. List out the various uses of steel towers. List out the types of towers and explain briefly. What are the various loads may act on Transmission line towers? 15

**Section-C**

6. Design an elevated cylindrical steel tank with hemispherical bottom for 3,00,000 liters capacity. The tank has conical roof. The ring beam of the tank is at a height of 15m from the ground level. The tank is to be build at Bhopal. Take  $f_y = 250 \text{ N/mm}^2$ . 15
7. Design for Delhi a self-supporting steel stack of height 100m above the foundation. The diameter of the cylindrical part of the chimney is 4m. The foundation has to rest on medium soil having bearing capacity of 250 kN/m<sup>2</sup>. The chimney has one breech opening the topography at the site is almost flat, and the location is of terrain category 3. 15

**Section-D**

8. (a) Draw a neat sketch of plate girder giving elements and state function of each element.
- (b) What are the various types of stiffeners and state minimum web thickness provisions as per IS 800-2007? 15

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[P.T.O.]

9. Design a welded plate girder for an effective span of 30 m and carrying a uniformly distributed load of 25 kN/m with two concentrated loads 150 kN each at 10 m from either ends. Assume that the top compression flange is restrained laterally. Use Fe415 grade steel. Design as an unstiffened plate girder with thick web.

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**B.Tech. 7th Semester (Civil Engg.)**  
**G. Scheme Examination, December-2024**  
**DESIGN OF HYDRAULIC STRUCTURE**  
**Paper - PCC-CE-405-G**

*Time allowed : 3 hours]*

*[Maximum marks : 75*

*Before answering the questions, candidate should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

*Note : Attempt five questions in all, selecting one question from each section. Question No. 1 is compulsory. All questions carry equal marks.*

1. Describe the following : 15
- (a) Give criteria for the safe design of earth dam.
  - (b) Write down base flood routing equation.
  - (c) Factors governing the design of weir
  - (d) Importance of rock toe and relief well
  - (e) Define canal fall. Where these are located?
  - (f) What is exit gradient and its importance?

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**Section - A**

2. The following hydraulic data pertain to bridge site of river : Maximum discharge = 5000 cumecs, highest flood level = 116.5 m, River Bed level = 110 m, Average diameter of river bed material = 0.10 mm. Design the bell bund including launching apron to attain the river. Design neat sectional view of guide bank with necessary dimensions. 15
3. Explain in detail the concept of hydraulic routing and hydraulic method of flood routing. 15

**Section - B**

4. Derive the expression for Bed width ( $B_x$ ) for any distances for the flumed section of an aqueduct and syphon aqueduct by Mitra's Hyperbolic transition method. 15
5. Design a vertical drop weir on the basis of Bligh's theory with the help of given data :  
Maximum flood discharge = 2500 cumecs, HFL before construction of weir = 290 m  
River Bed Level = 280 m, Allowable flux = 1.5 m,  
Coefficient of Creep = 12  
Assume any other data if necessary. 15

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**Section - C**

6. Compute the discharge over an ogee spillway with the coefficient of discharge as 2.0 at the head of 5 m. Effective length of spillway is 105 m. Neglect the velocity of approach. 15
7. Design a 1.8 m Sarda type fall for a canal having discharge of 14 cumecs with the help of following data :  
Bed level = 105m, Side slope = 1:1, Bed level downstream = 107.5 m,  
Bed width upstream and downstream = 12m, Assume Bligh's coefficient = 6, Type of soil = Good Loam 15

**Section - D**

8. With the help of neat sketch explain the method of drawing top seepage line in a homogeneous dam without any arrangement of drainage. 15
9. (a) Explain the planning and investigation of dam and reservoir site. 7.5  
(b) Explain the preparation and protection of foundation and abutment. 7.5

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**B. Tech. 7<sup>th</sup> Semester G-Scheme (Civil) Elective-IV**

**Examination, December, 2024**

**RIVER ENGINEERING**

**Paper : PEC-CEEI-417-G**

*Time allowed : 3 hours]*

*[Maximum marks : 75*

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard will be entertained after examination.*

*Note: Attempt five questions in all, selecting one question from each section. Q. No. 1 is compulsory. All questions carry equal marks.*

1. Describe the following : 15
- (a) Sediment Transport
  - (b) River basins
  - (c) Delta Formation
  - (d) Cutoff
  - (e) Time Series
  - (f) Guide Bank

3529-P-3-Q-9 (24)

[P.T.O.]

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**Section-A**

2. (a) What is the concept of streams and explain the classification of streams.  
(b) Explain the river morphology and various classification schemes for it. 15
3. Explain the importance of regimes of flow. Also, explain in detail bed load transport and bed load equations used for the calculation of bed load. 15

**Section-B**

4. Explain the causes, characteristics and shapes of meanders formation in the river flow. 15
5. Explain the causes of the instability of rivers and the method of control of delta formation. 15

**Section-C**

6. Explain the mechanics of Alluvial Rivers and restoration structures. 15
7. Explain the procedure of natural channel design analysis and usage of channel geometry data for channel analysis. 15

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**Section-D**

8. (a) Describe the classification of river training.  
(b) Explain the concept of protection for bridges with reduced waterway. 15
9. (a) Explain the concept of embankment and spurs.  
(b) What are the useful works constructed for protection from flood. 15

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**B.Tech. (Civil) Elective-V, 7th Semester (G-Scheme)**  
**Examination, December-2024**  
**RAILWAY AND AIRPORT ENGINEERING**  
**Paper - PEC-CEEI-419G**

*Time allowed : 3 hours]*

*[Maximum marks : 75*

**Note :** (i) *Question No. 1 will be compulsory and of short answer type.*

(ii) *Each question carries equal marks (15 marks).*

(iii) *Students have to attempt five questions in total by selecting one question from each section.*

1. (a) Explain the significance of sleeper spacing in railway tracks. 2.5
- (b) What are the functions of ballast in railway tracks? 2.5
- (c) Explain the term 'mucking' in tunnel construction. 2.5
- (d) Name the different visual aids in connection with airport. 2.5
- (e) List two factors affecting the geometric design of a runway. 2.5
- (f) What are the main objectives of railway signaling systems? 2.5

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**Section-A**

2. (a) Discuss the role of Railways in industrial progress of a nation. 8  
(b) Describe the functions and requirements of rails in a railway track. 7
3. If a  $8^\circ$  curve track diverges from a main curve of  $5^\circ$  in an opposite direction in the layout of a B.G. yard, Calculate the super-elevation and the speed on the branch line, if the maximum speed permitted on the main line is 50 kmph. 15

**Section-B**

4. (a) What are the functions of points and crossings in railway track layout? 8  
(b) What is meant by crossing? What are the essential requirements of a good crossing? 7
5. (a) What are the functions of a Railway station? Discuss the various requirements of a railway station. 10  
(b) Define interlocking. 5

**Section-C**

6. Describe the process of modernization in railway tracks for high-speed trains. What modifications are needed in track design and materials to support higher speeds? 15

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7. Describe the criteria for selecting a tunnel site, and explain different methods used for underground excavation in tunnel construction. 15

**Section-D**

8. (a) Name the different characteristics of aircrafts. How do they affect the planning and design of airports? 8  
(b) Evaluate the impact of surrounding land use and environmental factors of airport site selection and development. How can these factors affect airport planning? 7
9. (a) What do you understand by the term runway capacity? What are the factors affecting runway capacity? 9  
(b) Write short notes on : 6  
(i) beacon light  
(ii) runway threshold lighting

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B. Tech. (Civil) 7th Semester (G-Scheme)

Examination, November-2023

**CONSTRUCTION PLANNING AND  
MANAGEMENT**

**Paper-PCC-CE-401-G**

*Time allowed : 3 hours]*

*[Maximum marks : 75*

**Instructions :**

- (i) **Question No.1 is compulsory.**
- (ii) **Attempt one question from each section.**
- (iii) **All questions carry equal marks.**
- (iv) **Assume missing data, if any, suitably.**

1. Describe the following:

- (a) Write about the Event and Activity.
- (b) Write about hoists.
- (c) What is project planning?
- (d) What are the uses of compaction?
- (e) What is crashing a project in project management?
- (f) Bar chart

**Section-A**

2. Draw a network diagram for the given activity and durations in the following table:

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[P. T. O.]

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Find out the critical path, EST, EFT, LST, LFT, total float and free float.

Description of activity	Activity symbol	Preceding activity	Succeeding activity	Duration days
Dig foundation	A	None	B	3
Place form work	B	A	C	6
Place concrete	C	B	G	6
Obtain steel	D	G, H	None	7
Cut and bent	E	None	F	4
Place steel reinforcement	F	E	G	3
Obtain materials for concrete	G	F, C	D	2
	H	None	D	12

3. (a) What are different elements present in PERT network and explain with an example?  
 (b) What do you mean by frequency distribution? What is the use of beta distribution in PERT?

#### Section-B

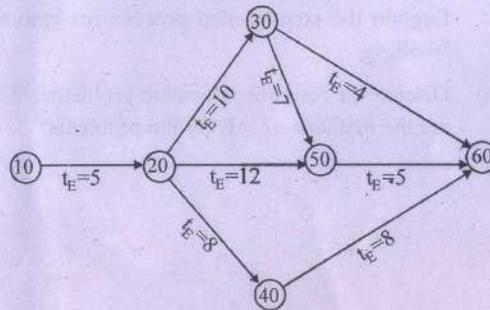
4. The network of a certain project is shown in Fig. with the estimated durations of various activities. Determine the following:  
 (a) Earliest event time and latest event time.

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- (b) Earliest and latest start and finish times of each activity.  
 (c) Total and free floats for each activity.  
 (d) Critical path for the network.



5. Explain about crashing for optimum cost and crashing for optimum resources.

#### Section-C

6. (a) Describe the various applications of a bulldozer.  
 (b) Discuss various operations that can be performed by a bulldozer.
7. Write short notes on:  
 (i) Placing of concrete  
 (ii) Form work  
 (iii) Fabrication and erection

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[P. T. O.]

**Section-D**

8. (a) Discuss BOT technique in detail.  
(b) What do you mean by updating? Why is it essential?
9. (a) Explain what do you mean by resource levelling. Explain the step-by-step process for resource levelling.  
(b) Discuss the resource allocation problems. What are the methods of solving the problems?

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B. Tech. (Civil) 7th Semester (G-Scheme) Examination,  
November-2023

ADVANCED STEEL STRUCTURE

Paper-PCC-CE-403 G

*Time allowed : 3 hours ]*

*[ Maximum marks : 75*

*Note : Question No. 1 is compulsory. Attempt total five question selecting one question from each section. All questions carry equal marks. Use of IS 800-1984 or 2007, IS 875-1975, Steel table is allowed. Assume suitable data.*

1. Write short note on the following : 6×2.5
- (i) Types of cold framed section.
  - (ii) What is meant by stiffened & unstiffened seat connection ?
  - (iii) What are the sections that are normally used as purlins or Girts ?
  - (iv) List out the various uses of steel towers.
  - (v) What are the forces acting on a steel stacks ?
  - (vi) Define plate girder.

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[P.T.O.]

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Unit-I

2. (a) How you will be design of bearing bolts subjected to eccentric loading in the plane perpendicular to the groups of bolts. 7.5
- (b) Explain cold formed light gauge sections and what are the problem associated with light gauge sections. 7.5
3. A bracket is welded to a stanchion by filler welds having a throat thickness of 9mm and a load of 180 kN is applied in the plane of the bracket, as shown in the figure 1. The weld extends round three sides and has the given dimensions. Determine the maximum stress in the throat of the weld. 15

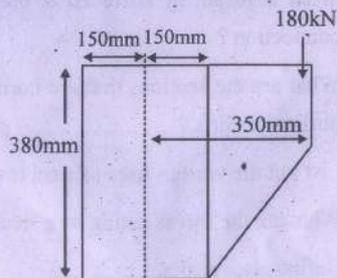


Figure.1

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Unit-II

4. (a) Write about the design aspects of transmission line towers. 7.5
- (b) Explain various steps involved in the design of gantry girder. 7.5
5. Briefly explain about the various structural configurations adopted in towers with neat diagrams. Also explain about the types of bearing systems adopted in towers. 15

Unit-III

6. Design a riveted self supported steel stack located in the outskirts of Bhopal for the following data :
- Terrain category 2
- Topography almost flat
- Height of the steel 80m
- Diameter of the steel stack 3m
- Thickness of brick lining 100mm
- Corrosional Allowance 3mm
- Design the stack at the base. Also design the base plate and the anchor bolts. 15

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[P.T.O.]

7. Design a rectangular tank of capacity 1,10,000 litres of water supported over a 12m high staging. Columns are supported over concrete pedestal of M-15 concrete. The bearing capacity of soil is  $100 \text{ kN/m}^2$ . Design wind pressure may be assumed to be  $1.05 \text{ kN/m}^2$ . Plates of 1.25m width and 8.75m length are available. Design :
- (i) The bottom plate 7.5
- (ii) The bottom tee-cover 7.5

#### Unit-IV

8. Design the mid span section of a welded plate girder for span 25m, carrying a udl of  $120 \text{ kN/m}$  for the entire length including self-weight. Also design the intermediate stiffeners provided for the plate girder. 15
9. What are different elements of plate girder ? Write the steps for design of a plate girder. 15

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**B.Tech (Civil), 7th Semester (G-Scheme)  
Examination, November-2023  
DESIGN OF HYDRAULIC STRUCTURE  
Paper -PCC-CE-405-G**

*Time allowed : 3 hours]*

*[Maximum marks : 75*

*Note : Question no. 1 is compulsory. Attempt total five questions selecting one question from each unit. All questions carry equal marks.*

1. Define the following : 6×2.5=15
- (a) Mending Type
  - (b) Dicken's formula for calculating maximum discharge
  - (c) List the forces acting in a gravity dam.
  - (d) Flood routing method
  - (e) Explain Ogee type of spillway.
  - (f) What are the functions of gallery in a gravity dam?

**Unit-I**

2. What are the objectives of river training work? Describe its classification. 15

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3. Design various method adopted for design of guide bank. 15

**Unit-II**

4. (a) Define cross drainage works. Describe its types. 7.5
- (b) Explain the Khosla's theory of independent variables. 7.5
5. Design a suitable cross drainage work given the following data at the site of the crossing of two streams of water
- Irrigation channel
- Full supply discharge - 350 cumecs
- Full supply level - 202.5m
- Canal bed level - 197.5m
- Full supply depth - 4.7m
- Side slop - 0.5H: 1V 15

**Unit-III**

6. (a) What is spillway? Discuss factors affecting its capacity. 7.5
- (b) What is a Spillway? Explain Ogee type of spillway. 7.5

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7. (a) Define different types of fall with suitable diagram. 7.5
- (b) Explain stepwise procedure for designing the Sarda types fall. 7.5

**Unit-IV**

8. (a) Define different types of dam. 7.5
- (b) Explain various modes of failure of gravity dam. 7.5
9. (a) Describe various problems associated in dam construction. 7.5
- (b) Explain thin cylinder method of design of Arch dam. 7.5

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B.Tech (Civil), Elective-III, 7th Semester (G-Scheme)

Examination, November-2023

HYDRO POWER ENGINEERING

Paper -PEC-CEEL-411-G

*Time allowed : 3 hours]*

*[Maximum marks : 75*

*Note : Question no. 1 is compulsory. Attempt total five questions, selecting one question from each unit. All questions carry equal marks.*

1. **Compulsory question; 6 parts :**  $6 \times 2.5 = 15$

- (a) Types of turbine
- (b) Advantages of underground power houses
- (c) Name the principles types of power plants.
- (d) What is unit discharge?
- (e) On what factors selection of turbines depends?
- (f) Define the term "storage" and "pondage".

**Unit-I**

2. (a) What are the different source of energy? Differentiate between renewable and non-renewable energy sources with their advantages and disadvantages. 7.5

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- (b) What is the necessity to demand future demand of load? Explain in detail. 7.5
3. (a) What are the advantages and disadvantages of the hydropower plant? 7.5
- (b) What is Load curve? Explain with sketch. Discuss its use. 7.5

**Unit-II**

4. (a) What do you mean by "run of river plants"? Describe the general layout of run of river plants. 7.5
- (b) What are different types of pump storage plants? Describe reversible turbines and cavitation in turbines. 7.5
5. (a) Explain the basic feature of a pumped storage plants and enumerate its advantages. 7.5
- (b) Define valley dam power plant. 7.5

**Unit-III**

6. (a) What do you mean by water conveyance system? Describe in details. 7.5
- (b) What are various types of penstocks? Explain each. 7.5

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7. (a) What is the function of anchor blocks? What are the forces which should be taken into account in their stability analysis? 7.5
- (b) What are surge shafts and its types? What are the functions of surge shafts. 7.5

**Unit-IV**

8. (a) What are the different types of turbines? Describe the general criterion for the selection of turbine. 7.5
- (b) What is the significance of surge tank and state its advantage? 7.5
9. (a) Write short note on design theory of draft tube and cavitation in turbines in detail. 7.5
- (b) Sketch the detail of typical power house and show all components. Also describe the functions of the component briefly. 7.5

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**B. Tech. (Civil) 7th Semester, (Elective-IV) (G-Scheme)**  
**Examination, November-2023**  
**GROUND WATER ENGINEERING**  
**Paper-PCC-CEEL-413-G**

*Time allowed : 3 hours]*

*[Maximum marks : 75*

**Instructions :**

- (i) **Question No. 1 is compulsory.**
- (ii) **Attempt one question from each section.**
- (iii) **All questions carry equal marks.**
- (iv) **Assume missing data, if any, suitably.**

**1. Describe the following:**

- (a) Groundwater column
- (b) Gravel packing
- (c) Optimum capacity of well
- (d) Induced infiltration
- (e) Leaky confined aquifer
- (f) Collector well and infiltration gallery
- (g) Aquifer storage

**Section-A**

- 2. (a) What is groundwater balance? Describe in detail the groundwater fluctuation and its interpretation.**

**3527-P-3-Q-9 (23)**

**[P. T. O.]**

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- (b) What do you mean by global distribution of water? Describe in detail the groundwater development and potential in India.
3. (a) What is the necessity of ground water exploration? Describe in detail the different methods of investigations.
- (b) What is Darcy's law? Describe different types of aquifers with their properties.

**Section-B**

4. (a) What are Dupuit's assumptions? Derive an equation for steady flow in confined and unconfined aquifer.
- (b) A 45 cm diameter well penetrates a unconfined aquifer of saturated thickness 30 m. Under a steady pumping rate for a long time, the drawdown at two observation wells 15 m and 30 m from the well are 5.0 m and 4.2 m respectively. If the permeability of the aquifer is 20 m/day, Calculate the discharge and drawdown at the pumping well.
5. What is unsteady flow? Describe in detail the different methods of determining the aquifer parameters for unsteady flow.

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**Section-C**

6. What are the different types of strainers used in tube well? Describe the design of tube wells in different aquifers.
7. (a) Describe the different components of a tube well with neat diagram.
- (b) Write short note on the following:
- (i) Sanitary protection of open wells
- (ii) Water withdrawal for different purposes

**Section-D**

8. (a) What do you mean by seawater intrusion? Describe the conjunctive use of groundwater.
- (b) What do you mean by reclaimed watershed recharge? Explain in detail the aquifer storage and recovery.
9. Write short note on the following:
- (a) Seawater intrusion and remediation
- (b) Recharge pits and shafts
- (c) Induced infiltration and water spreading
- (d) Ditching and basins

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**B. Tech. (Civil) Elective-V 7th Semester  
(G-Scheme) Examination, November-2023  
RAILWAY AND AIRPORT ENGINEERING**

**Paper-PEC-CEEL-419-G**

*Time allowed : 3 hours]*

*[Maximum marks : 75*

**Instructions :**

- (i) **Question No.1 is compulsory.**
- (ii) **Attempt one question from each section.**
- (iii) **All questions carry equal marks.**
- (iv) **Assume missing data, if any, suitably.**

**1. Describe the following:**

- (a) Fish plate
- (b) Coning of wheel
- (c) Interlocking
- (d) Superelevation
- (e) Permanent way
- (f) Airport site selection

**Section-A**

2. (a) Illustrate the various types of failures with sketches.
- (b) What is the necessity of bearing plates? Under what circumstances the use of such plates is warranted?

**3530-P-3-Q-9 (23)**

**[P. T. O.]**

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3. Enumerate and explain the various resistances which have to be overcome by a moving train?

**Section-B**

4. Explain right hand turn out and obtuse angle crossing with the help of neat sketches.
5. (a) Describe semaphore type of signal with sketch.  
(b) Explain the working of marshalling yard with neat sketch.

**Section-C**

6. (a) Explain how the maintenance of the surface of rails is done.  
(b) Discuss the modern developments in railways in India.
7. (a) What factors govern the size and shape of a tunnel? Draw a cross section of a typical purpose tunnel.  
(b) What are the basic operations involved while doing tunneling in rocks?

**Section-D**

8. Sketch typical airport layouts for the basic runway configuration.

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9. Write short notes on:-

- (i) Cross wind component  
(ii) Hangar  
(iii) Wind coverage  
(iv) Apron

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