

VALLIAMMAI ENGINEERING COLLEGE

DEPARTMENT OF CIVIL ENGINEERING

CE 6604 - RAILWAYS AIRPORT AND HARBOUR ENGINEERING

QUESTION BANK

UNIT 1

RAILWAY PLANNING

PART A

1. Define Permanent way. BT 1
2. List out the elements of permanent way. BT 1
3. Define creep of rail and mention its causes. BT 1
4. Define fish plate. Why is it named so? BT 1
5. Define transition curve and list its types. BT 1
6. Define obligatory points BT 1
7. Distinguish between double headed and bull headed rail BT 2
8. Differentiate cant and negative cant. BT 2
9. Describe in short about pusher gradient. BT 2
10. Differentiate right hand and left hand turnout. BT 2
11. Classify the stresses produced in a railway track. BT 3
12. Classify the methods of survey that should be done for track alignment. BT 3
13. A B.G. railway track is designed for a ruling gradient of 1 in 200 on a curve of 2° . Calculate its grade compensation. BT 3
14. Explain what is a turnout and why it is required. BT 4
15. Compare Creep and Kink in Rails. BT 4
16. Explain the basic requirements of an ideal rail joint. BT 4
17. Draw a neat sketch of a permanent way and mark its parts. BT 5
18. What is to be done if the resistance in gradient is exceeding beyond the allowable limit. BT 5
19. What are the factors to be considered in selecting the sleeper density? BT 6
20. Under what situation is points and crossings recommended. BT 6

PART B

1. Describe in detail about the types of rail joints, rail fixtures and fastening used in a track BT 1
2. When and where the soil suitability analysis is carried out and explain BT 1
3. Define gradient and super elevation; List out its types and explain clearly. BT 1
4. Compare and contrast the different type of sleepers used in Indian railways. BT 2
5. Discuss in detail about points and crossings. BT 2

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6.
 - i. A BG curved railway track has a 4° curvature and 12cm cant. Maximum Permissible speed on the curve is 85Km/hr. Calculate the length of the transition curve. BT 3
 - ii. An 8° curve track diverges from a main curve of 5° 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 45 Km/hr.
7.
 - i. Derive an expression to establish the relationship among gauge, speed, radius of curvature and super elevation (8 marks) BT 3
 - ii. Explain in detail the importance of Indian Railways in the National Development in terms of economic, social and political contributions. (8 marks) BT 4
8. Explain in detail about BT 4
 - (a) Ballast less Track (4 marks)
 - (b) Negative super elevation. (4 marks)
 - (c) Widening of gauge (4 marks)
 - (d) Grade Compensation (4 marks)
9. Design and draw a neat sketch of permanent way cross section and explain the functions of its components. BT 5
10. Compare the conventional and modern methods of surveying for route alignment and justify which one is the best. BT 6

UNIT 2

RAILWAY CONSTRUCTION AND MAINTENANCE

PART A

1. List out the methods used for stabilization of tracks in poor soil. BT 1
2. Define formation. BT 1
3. List out the methods of tunneling construction BT 1
4. When is a branch line called as siding? BT 1
5. List out the materials required for laying of track. BT 1
6. Where is a marshaling yard provided? BT 1
7. Summarize the stages in construction of a railway track BT 2
8. Differentiate metro and mono railway system. BT 2
9. Estimate the number of rails required per Km of railway track. BT 2
10. Describe shortly about passenger platform BT 2
11. Classify the types of railway stations BT 3
12. Relate the importance of construction and maintenance of tracks. BT 3
13. Classify the methods of plate laying. BT 3
14. Explain why ventilation should be provided in tunneling. BT 4
15. Compare the pros and cons of daily maintenance and periodic maintenance. BT 4
16. Classify the types of marshaling yards. BT 4

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17. What are all the factors is to be considered if a railway station is to be constructed. BT 5
18. Design and draw a neat sketch of a junction station. BT 5
19. Under what circumstances does a wayside station be selected BT 6
20. Summarize the operations to be carried out for drainage in tunnelling BT 6

PART B

1. Describe in detail about plate laying techniques. BT 1
2. When and where should a tunnel be provided and explain the methods of tunnel construction in soft ground. BT 1
3. List out the type of railway stations and explain each one of them in detail. BT 1
4. Discuss in detail about the modern methods of maintenance. BT 2
5. Summarize how poor soil is being stabilized and explain the methods in detail. BT 2
6. Classify the stages in construction of railway track and explain in detail. BT 3
7.
 - i. Calculate the quantity of all the materials required for track laying. (8 marks) BT 3
 - ii. Compare the advantages and disadvantages of conventional maintenance and modern maintenance techniques. (8 marks) BT 4
8. Explain in detail about Directed Track Maintenance and Measured Shovel Packing BT 4
9. Design and draw a neat sketch of marshaling yard and explain in detail. BT 5
10.
 - i. On what situations will mono rails, metro rails be selected. Explain (4 marks) BT 6
 - ii. Explain in detail about how ventilation and drainage should be provided in tunneling. (12 marks)

UNIT 3

AIRPORT PLANNING

PART A

1. List the components of an airport. BT 1
2. Define airport zoning laws. What is its significance? BT 1
3. Tell the advantages of head wind? BT 1
4. Write the objectives of airport master plan BT 1
5. Write the airport parking configuration BT 1
6. Describe the passenger loading methods BT 1
7. Distinguish terminal apron and cargo apron BT 2
8. Predict the objective of airport drainage BT 2

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9. Discuss the purpose of Air Traffic Control BT 2
10. Summarize the four groupings of Aircraft parking system? BT 2
11. Illustrate what is a hangar and mention its types. BT 3
12. Show the outline of ICAO master planning process BT 3
13. Classify the terminal apron parking concepts BT 3
14. Drawings for layout plan for an airport - explain BT 4
15. Comment on holding bays and bypasses BT 4
16. Analyze the importance of preplanning for an airport project. BT 4
17. Prepare a typical layout of airport for a single runway and two parallel runways BT 5
18. Prepare a plan to manage the passenger volume BT 5
19. Summarize the factors affecting airport operating capacity? BT 6
20. Recommend the criteria for site selection BT 6

PART B

1. (i) List the factors to be considered for the selection of site for a commercial airport BT 1
(ii) Explain the importance of airport planning.
2. What are flight rules? Discuss the advantages and disadvantages of each system. BT 1
3. Describe the necessity, functions and special characteristics of airport drainage. BT 1
4. Summarize briefly the various runway geometrics as recommended by ICAO. BT 2
5. Describe the motor vehicle parking area and its parking patterns in airports BT 2
6. Briefly explain the Night- time aids provided at Airports. BT 3
7. (i) Describe briefly the salient features and functions of aprons in an airport. BT 3
(ii) What are the passenger facilities, required at an airport terminal? Explain using sketches. BT 4
8. Explain the characteristics of commercial airport layout and military airport layout. BT 4
9. Draw a typical layout of any international airport in India and explain its concept. BT 5
10. Discuss the importance of air traffic control and list the various equipment's needed for en-route air traffic control. BT 6

UNIT 4

AIRPORT DESIGN

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PART A

1. How orientation of runway is done? On what basis it is decided. BT 1
2. What is a wind rose diagram? BT 1
3. List the elements to be considered in the Geometric design of runways. BT 1
4. Describe bypass taxiway BT 1
5. Define clear zone. BT 1
6. Define turning zone BT 1
7. Differentiate runway and taxiway BT 2
8. Differentiate between VFR and IFR. BT 2
9. Discuss airport markings BT 2
10. Differentiate between domestic airport and international airport citing examples of Indian Airports BT 2
11. Illustrate the purpose of installing visual aids in a airport BT 3
12. Classify airports based on functions and aircraft types. BT 3
13. Show the importance of various imaginary surfaces around the airport. BT 3
14. Explain the term cross wind components and wind coverage. BT 4
15. Classify the elements of airport lightings. BT 4
16. Air traffic control aids- explain BT 4
17. Integrate zoning laws BT 5
18. Prepare the list of deciding factors for an aircraft size? BT 5
19. Turning radius in a taxiway is decided based on? BT 6
20. Explain the Airside part of an airport? BT 6

PART B

1. What are the basic patterns of runway configurations? Discuss each pattern. BT 1
2. Describe about Exit taxiway and factors to be considered for the location of an Exit taxiway. BT 1
3. Explain the steps in the determination of proper orientation for runway BT 1
4. Discuss in detail about wind rose diagram? Explain different types of wind rose diagrams. BT 2
5. Distinguish between Type I and Type II wind rose diagrams. Explain how the optimum runway orientation is determined. BT 2
6. The typical wind data for an airport site is given in the following table. Determine the best orientation of the runway with the help of a wind rose diagram given in **table 1** BT 3

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7. (i) The length of a runway at mean sea level, standard temperature and zero gradients is 1600m. The site has an elevation of 320m, with a reference temperature of 33.6°C. The runway has to be constructed with an effective gradient of 0.25%. Calculate the actual length of the runway at site BT 3
- (ii) The length of runway under standard conditions is 1620m. The airport site has an elevation of 270m. Its reference temperature is 32.90°C. If the runway is to be constructed with an effective gradient of 0.20%. Determine the corrected runway length BT 4
8. Explain in brief: BT 4
1. Clear Zone.
 2. Approach zone
 3. Turning zone.
 4. Buffer zone.
9. Describe the importance of runway lighting. Explain threshold lighting with the help of sketches. BT 5
10. (i) Explain the various runway and taxiway markings. BT 6
 (ii) What are different control surfaces at an airport? Explain the concepts of airport zoning with the help of sketches.

Table 1

Wind Direction	Percentage of time		
	6.4 – 25 Kmph	25-50 Kmph	50-80 Kmph
N	4.7	1.50	0.1
NNE	3.5	0.75	0.0
NE	1.8	0.03	0.1
ENE	3.0	0.02	0.03
E	2.2	2.40	0.0
ESE	5.8	4.95	0.0
SE	7.0	1.40	0.0
SSE	8.0	0.02	0.0
S	4.8	1.40	0.10
SSW	2.6	0.75	0.0

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SW	1.2	0.03	0.10
WSW	3.8	0.02	0.03
W	1.9	2.40	0.0
WNW	6.4	5.25	0.0
NW	6.3	1.40	0.0
NNW	7.2	5.20	0.30

UNIT 5

HARBOUR ENGINEERING

PART A

1. How the positions of light houses are decided? BT 1
2. Write a brief note on inter- modal transfer facilities BT 1
3. List the various mooring accessories. BT 1
4. What do you understand by littoral drift? BT 1
5. What are the basic requirements of signals? BT 1
6. Why a shore protection work is needed? BT 1
7. Differentiate Quay and Pier BT 2
8. Distinguish between diurnal and semi-diurnal tides BT 2
9. Describe wharf? Name the types BT 2
10. Distinguish between Dolphins & Jetties BT 2
11. Classify Harbour? BT 3
12. Illustrate coastal shipping with an example BT 3
13. Mention any two erosion protection Methods in Coastal Zone? BT 3
14. Mention some of the features of a harbour BT 4
15. Explain Breakwater BT 4
16. How to design the entrance of a harbor? BT 4
17. Prepare the requirements for a good marine signal BT 5
18. How is Inland Water Transport different from sea transport? BT 5
19. Compare fog signal and audible signal BT 6
20. Summarize the requirements of good port? BT 6

PART B

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1. Draw a neat sketch of a harbour layout & show the Various Components. BT 1
Mention the objectives of each.
2. What do you Understand by the term “Navigational Aids”? Why are they BT 1
provided in harbours? Explain with a sketch any one of them.
3. Define dredging? Explain the reasons for its adoptions. How dredged BT 1
Materials are disposed off?
4. i. Discuss the factors to be considered while selecting a BT 2
suitable site for the construction of a port?
ii. Distinguish Between Pier Wharf. Explain their utility with the help
of sketches?
5. i. What are the functions of wet Docks? Explain with Sketches, BT 2
their working & main features.
ii. Explain with sketch the features of a composite Breakwater
6. Classify harbours on broad basis and on the basis of utility and explain them. BT 3
7. (i).Classify different types of break water. Explain any one in brief. BT 3

(ii) Define a port and bring out the differences between a port and a harbor. BT 4
What are the requirements of good port?
8. Explain the concept of littoral drift and how it affects the location of harbor. BT 4
9. Discuss the tides and wave effects and its action on coastal structures. BT 5
10. Explain the different natural phenomena to be studied before the design of BT 6
harbours

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