ANNA UNIVERSITY
DEPARTMENT OF CIVIL ENGINEERING

QUESTION BANK

Subject / Code : Railways, Airport and Harbor Engineering / CE 2303

Year / Semester : III / V

UNIT I

RAILWAY PLANNING AND DESIGN

PART A

1. What are the functions of sleepers?
2. List the different conventional methods of surveys for track alignment.
3. What is creep? How is it prevented?
4. What is cant deficiency?
5. State the effects of creep.
6. Calculate the super elevation in a broad gauge track having a curvature of 5º and the equilibrium speed of the track is 60Kmph.
7. What are the functions of rails?
8. What are the requirements of ideal fastening?
9. State any two factors which govern the selection of gauge.
10. What are the advantages of concrete sleepers?
11. What is fish plates and why it is used in railways?
12. What are the different materials used as ballast?
13. What is grade compensation?
14. What is meant by kinks in rails and what are the causes of formation of it?
15. List the different railways for urban railway transportation.

PART B

1. Briefly explain the modern methods of surveys for track alignment.*
2. (a) Explain the widening of gauge on curves with the formula.

   (b) Briefly explain about super- elevation, gradients.
3. (i) Briefly explain the modern methods of surveys for track alignment.

   (ii) What are the objectives of providing transition curves in railways?
4. (i) What are the requirements of an ideal permanent way? What are the factors that govern the cross section and length of rails?

   (ii) Explain super elevation giving the relationship of super elevation with gauge, speed and radius of the curve.
5. Compare the different types of sleeper. Give all details.
6. (i) What do understand by 'cant deficiency'?

   (ii) If a 8^o curve track diverges from main curve of 5^o in an opposite direction in the layout of a BG yard. Calculate the super elevation and speed on branch line, if the maximum speed permitted on the main line is 45Kmph.
7. (i) What is the necessity of geometric design of a railway track? Enumerate the significant features of design of a railway track.

   (ii) What are the requirements of an ideal rail joint? Explain any two joints used in Indian Railway lines with neat sketches.

UNIT II

RAILWAY TRACK CONSTRUCTION, MAINTENANCE AND OPERATION

PART A

1. Write a brief note on automated track maintenance.*
2. What are the advantages of electric traction
3. What is meant by track circuiting?*
4. Define 'heel divergence'.
5. What are the sources of moisture in a railway track?
6. State the principle of interlocking.
7. List the two types of switches.
8. List the type of signals based upon functional characteristics.
9. Define turnout shortly.
10. What is a buffer stop?
11. List the factors to be considered in the selection of a site for a railway station.
12. Define a locomotive.
13. List the equipment needed for rolling stock.
14. List the construction stages of a railway track.
15. What is telescopic method of track laying?
16. With a neat sketch explain the drainage method adopted at a mid- section.
17. Explain MSP.
18. What is Directed Track Maintenance (DTM)?

PART B

1. Illustrate with a neat sketch, the turnout, points and crossings and explain their working principles.*

2. Briefly explain about

   (i) Track drainage

   (ii) Re- laying of railway track

   (iii) Track circuiting

3. (i) With neat sketches, differentiate between reception, signal and departure signals.

   (ii) What is meant by a crossing? Discuss various types of crossings used in Indian railways.

4. (i) Explain in detail the miscellaneous measures of track modernization.

   (ii) Define 'plate laying'. Explain the telescopic methods of plate laying.

5. How are stations classified? Explain the features of each station.

6. Explain with neat sketches, how surface and sub-surface water can be removed from railway track.

7. (i) Explain the centralized traffic control system.

   (ii) What is a marshalling yard? Explain with a neat sketch, the working of a hump type of marshalling yard.

UNIT III

AIRPORT PLANNING AND DESIGN

PART A

1. Define cross wind component and wind coverage.*
2. Differentiate between domestic airport and international airport citing examples of Indian Airports.
3. Explain the terms cross wind component and wind coverage.
4. What is the need for clear zone?
5. List the various imaginary surfaces around the airport.
6. Define wind rose diagram.
7. Explain the term cross wind components and wind coverage.
8. Define Airport capacity (runway capacity).
9. What is a Master plan?
10. How ICAO classified the Airports?
11. What is Air Traffic Potential?
12. Name the Airport Organisations.
13. Mention factors of Air Traffic Potential.
14. What is an Exit Taxiway?
15. List the assumed conditions in deciding Basic Runway Length.
16. What is meant by Zoning Laws?
17. What is meant by Ponding in airport drainage?
18. List the assumptions made in the design of airport sub grade drainage.
19. Classify airports based on functions and aircraft types.
20. What is the Airside part of an airport?

21. List the data to be collected for a Regional Planning. Mention any five factors to be considered for Airport site selection.
22. What is a Wind rose diagram and mention its types.
23. List the objectives of Surface drainage in airport.
24. List the elements to be considered in the Geometric design of runways.
25. List the elements to be considered in the Geometric design of taxiways.
26. What are the criteria to evaluate the effects on airport system?
27. What are the deciding factors of an aircraft size?
28. What is an Airport?
29. What are the cases to be considered for deciding Basic Runway length?
30. What are Imaginary Surfaces?
31. What are the types of Imaginary surfaces?

PART B

1. (i) Explain the steps in the determination of proper orientation for runway.*

   (ii) Give the various geometric standards for different classes of runways and taxiways.*

2. (i) Explain in detail about airport zoning.

   (ii) 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 33.6ºC. The runway has to be constructed with an effective gradient of 0.25%. Determine the actual length of the runway at site.

3. (i) List the factors to be considered for the selection of site for a commercial airport.*

   (ii) What are the functions of airport drainage system?

4. (i) Summarize briefly the various runway geometrics as recommended by ICAO

   (ii) What is a wind rose diagram? Explain different types of wind rose diagrams.

5. The length of runway under standard conditions is 1620m. The airport site has an elevation of 270m. Its reference temperature is 32.90ºC. If the runway is to be constructed with an effective gradient of 0.20%. Determine the corrected runway length.
6. What are the basic patterns of runway configurations? Discuss each pattern.
7. Explain about Exit taxiway and factors for the location of an Exit taxiway.
8. Explain the necessity, functions and special characteristics of airport drainage.
9. Explain the sub surface drainage system of airport.
10. Explain the importance of airport planning.

UNIT IV

AIRPORT LAYOUTS, VISUAL AIDS AND AIR TRAFFIC CONTROL

PART A

1. How the runway numbering is done?
2. Draw a typical pattern of motor vehicle parking in an airport/
3. List the factors affecting the locations of exit taxi- way.
4. Define the term gate position.
5. What are factors affecting airport operating capacity?
6. Define ramp time.
7. How do you select the site for terminal building?
8. List the types of parking from motor vehicles.
9. What is a Terminal area and what are its functions?
10. What are the Planning concepts of a terminal building?
11. What are the Design aspects of a terminal building?
12. What are the Site requirements of terminal building?
13. Mention the facilities provided by the Operational buildings?
14. List the Sequence of activities of Passenger flow in terminal building.
15. List the factors to be considered for an Airport Vehicular circulation.
16. What are the Aircraft service facilities?
17. What are the four groupings of Aircraft parking system?
18. What is a Hangar and mention its types.
19. What are the methods to control Soil erosion due to Jet exhaust?
20. What are the Characteristics of a Balanced Airport Layout?
21. What are the Characteristics of a Helicopter?

22. Mention the classification of Heliports based on usage.

23. What are the factors to be considered for Heliport Site selection?

24. What are the Lighting requirements in a Heliport?

25. What is meant by a Control Tower?

26. What are the Markings required for an airport?

27. What are the types of Visual aids for Aircraft Navigation?

28. What are the Markings in Runway used for Navigation?

29. What are the Markings in Taxiway used for Navigation?

30. What are the informations provided for Proper landing?

31. Mention the elements of efficient Airport Lighting

32. List the Purposes of Air Traffic Control

33. What are the types of Flight Rules for ATC?

34. Differentiate between VFR and IFR.

35. Mention the three parts of ATC network.

36. What are the categories of ATC aids?

37. What are the different Route aids (Airway aids)?

38. What is the different Landing aids (Terminal aids)?

PART B

1. (i) Draw a layout of any one international airport in India and explain the concept.*

   (ii) Explain the planning concept of airport buildings.*

2. (i) Explain the various runway and taxiway markings.

   (ii) Explain in detail about air traffic control.

3. (i) Describe briefly the salient features and functions of aprons in an airport.

(ii) What are the passenger facilities, required at an airport terminal? Explain using sketches.

4. (i) Discuss the importance of air traffic control and list the various equipments needed foe en-route air traffic control.

   (ii) Describe the importance of runway lighting. Explain threshold lighting with the help of sketches.

5. Describe the different systems of aircraft parking.

6. Write notes on the following with neat diagrams:

   (i) Terminal facilities

   (ii) Airport markings

7. Briefly explain the Night- time aids provided at Airports.

8. What are flight rules? Discuss the advantages and disadvantages of each system.

9. Explain the characteristics of commercial airport layout and military airport layout.

10. Draw a typical layout of airport for a single runway and two parallel runways.

UNIT V

HARBOUR ENGINEERING

PART A

1. How the positions of light houses are decided?
2. Write a brief note on inter- modal transfer facilities.
3. Differentiate Quay and Pier.*
4. List the various mooring accessories.
5. What do you understand by littoral drift?
6. What are the basic requirements of signals?
7. What is the necessity of docks?
8. What do you understand by littoral drift?
9. What are coastal structures?
10. What is a breakwater? Name its types.
11. What is a wharf? Name the types
12. Distinguish between fog signal and audible signal.
13. What are the requirements of a marine signal?
14. What are sand dunes?
15. Distinguish between diurnal and semi-diurnal tides.
16. How to design the entrance of a harbour?
17. What is dredging?
18. Why a shore protection work is needed?
19. What are the construction methods for mounds?
20. What is sounding? Name the equipment used for sounding.
21. Define Hydro graphic Surveying.

22. Mention some of the features of a harbour.

23. What is Mean Sea Level (MSL)?

PART B

1. Explain about the different types of break waters with the sketches.
2. (i) Write descriptive notes on mooring and mooring accessories.*

   (ii) What are the different components of a harbor? And explain them with the layout.
3. (i) Discuss the tides and wave effects and its action on coastal structures.

   (ii) Distinguish between wet docks and dry docks. Explain with sketch the features and functioning of a dry dock.
4. (i) List the common types of break waters in use and bring out the advantages of each of them.

   (ii) Discuss briefly container transportation.
5. Write a detailed note on break waters. Explain all essential aspects.
6. (i) What are the types of Navigational Aids?

   (ii) Discuss the fixed navigation structures and floating navigation aids.
7. Classify harbours on broad basis and on the basis of utility and explain them.
8. (i) Define a port and bring out the differences between a port and a harbor. What are the requirements of good port?

   (ii) Classify different types of break water. Explain any one in brief.
9. Explain the different natural phenomena to be studied before the design of harbours.
10. What is littoral drift? How it affects the location of a harbour?