

QUESTION BANK

UNIT 1

Part A

1. Why is railway track termed as permanent way?
2. What is coning of wheels? What is its purpose?
3. Define Creep of rail and mention its causes.
4. Distinguish between double headed and bull headed rails.
5. Enumerate the factors affecting the choice of railway gauge.
6. Mention the use of remote sensing in route alignment.
7. State advantages of ballast less track.
8. Define obligatory points.
9. What is Cant Gradient?
10. State any four ideal requirements of a permanent way.
11. Enumerate any two merits of EDM with respect to any one corresponding conventional instruments.
12. A B.G. railway track is designed for a ruling gradient of 1 in 200 on a curve of 2° . Find the grade compensation.
13. Differentiate L.R.T. and M.R.T.S.
14. Define sleeper density.
15. What is a pandrol clip?
16. Draw a sketch of a railway track and its components.
17. Define 'Fish Plate'. Why is it named so?
18. Mention the types of rail joints.
19. Define transition curve and list its types.
20. What are the basic requirements of a ideal rail joint.

Part B

1. A. Explain in detail the importance of Indian Railways in the National Development in terms of economic, social, spatial and political contributions.
B. Draw the cross section of a double track permanent way in embankment and indicate the components.
2. A. Briefly explain the modern methods of surveys for track alignment.
B. What is the necessity of geometric design of a railway track? Enumerate the significant features of design of a railway track.
3. A. What is a sleeper density? What sleeper density is adopted in Indian Railways? Why sleepers are not uniformly spaced throughout the length of rail?
B. What are the requirements of an ideal joint? Explain any two joints used in Indian Railways with neat sketches.

4. A. Explain the four stages of engineering surveys to decide railway alignment.
B. What are the different types of gradients in railways? Discuss the factors governing the gradients.
5. A. Derive an expression to establish relationship among gauge, speed, radius of curvature and super elevation.
B. A 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.
6. A. Compare and contrast the different types of sleepers used in railways.
B. The average speed on a B.G. 3° curve is 75 Km/hr. Compute the equilibrium super elevation and the maximum permissible speed allowing for a cant deficiency of 75mm.
7. Write short notes on the following.
 - (a) Ballast less Track
 - (b) Negative super elevation.
 - (c) Widening of gauge
 - (d) Grade Compensation
8. A. A BG curved railway track has a 4° curvature and 12cm cant. Maximum Permissible speed on the curve is 85Km/hr. Determine the length of the transition curve.
B. A vehicle moving on a BG track has a wheel base of 4.724m. Diameter of the wheel is 1524mm. Flanges project 32mm below top of the rail. Radius of curvature is 168m. Determine the extra width of gauge required.
9. Draw a neat dimensional sketch of permanent way cross section and explain the functions of various components.
10. A. Describe the preliminary survey for the alignment of a railway line. Enumerate the data to be collected.
B. Briefly explain about the use of Remote Sensing and GIS for track alignment.

Question bank

Unit 2

Part A

1. What is meant by Turnout ? Why is it required?
2. What is Track Circuiting? State its purpose.
3. Define theoretical nose of crossing.
4. What is a semaphore signal?
5. Define throw of switch.
6. What is a junction station?
7. What are track resistances?
8. Define yard and state its types.
9. Briefly explain the different aspects of semaphore signal
10. What is a trap indicator?
11. Write short notes on audible signal.
12. Explain briefly Automatic Warning system.
13. Differentiate space interval system and time interval system.
14. List out the various modern signaling installations.
15. Define sighting board. Mention its purpose with neat sketch.
16. Differentiate contrary flexure and similar flexure with neat sketch.
17. Draw a neat sketch of scissor crossover.
18. Distinguish between co-acting and repeated signal.
19. Define routing signal.
20. Differentiate mechanical signaling system and electrical signaling system.

Part B

1. What are points and crossings? Draw a neat sketch of a right hand turnout and indicate the components. State its working principle.
2. a) How are signals classified? Explain how the locational signals are used to guide the trains.
b) Explain with neat sketch a diamond crossing.
3. Explain about Marshalling yard with a neat sketch.
4. a) Discuss the importance of track drainage. How is it achieved?
b) Explain the centralized train control system.
5. Describe the operations involved in plate laying by telescopic method.
6. a) What is directed track maintenance of high speed tracks? Discuss the suitability of this method under Indian conditions.
b) Explain automatic block system of train control.
7. a) What are the functions of railway station? Explain briefly the various requirements of a railway station at an unimportant city.
b) Why is relaying of track required? Describe the standard method of relaying a track?
8. Write short notes on
 - a) level crossing
 - b) Interlocking
 - c) Rolling stock
 - d) Wayside station.
9. Mention the objectives of signaling. How are signals classified? Mention the functions of each signal.
10. Explain modern methods and materials used for construction of railway tracks.
- 11.

QUESTION BANK

UNIT 3

Part A

1. List the components of an airport.
2. Define airport zoning laws. What is its significance?
3. Define cross wind component.
4. What is approach surface?
5. Define Wind coverage.
6. List the various airport imaginary zones.
7. What is orientation of runway? On what basis it is decided.
8. What is a wind rose diagram?
9. What are the corrections required for runway length.
10. What are the aims of airport drainage?
11. Define clear zone.
12. Define turning zone.
13. What is the necessity for surveying in construction of a new airport?
14. What are the factors to be considered for layout of taxiway?
15. What are the phases of Master plan by FAA recommendation?
16. What are the advantages of head wind?
17. List the aircraft component parts.
18. Define bypass taxiway.
19. Define saturated runway capacity.
20. How is turning radius in a taxiway determined?

Part B

1. A. Discuss in detail the factors to be considered while locating an international airport.
B. An airport is at an elevation of 800m and the airport reference temperature is 21°C. The proposed runway gradient permits an effective gradient of 0.3%. Compute the runway length requires at the site if the basic runway length is 2000m.
2. What is a wind rose diagram? What are its Types? Explain the procedure adopted to draw wind rose diagram by each type.
3. A. Discuss the classification of airports based on the runway length and wheel load.
B. A proposed airport site is at an elevation of 650m and its basic runway length is 2500m. The mean of maximum and average daily temperature at the site are 36.7°C and 26.5°C. The proposed runway gradient indicates an effective gradient of 0.24%. Compute the runway length required.

4. A. Describe the aircraft characteristic that influence the planning and design of an airport.
B. What is basic runway length? Explain the design procedure to determine the actual length of a runway?
5. A. Give the various geometric standards for different classes of runways and taxiways.
B. Discuss the different runway patterns with neat sketches.
6. Explain the necessity of airport drainage. What are its special characteristics?
7. Explain in brief:
 1. Clear Zone.
 2. Approach zone
 3. Turning zone.
 4. Buffer zone.
8. A. Distinguish between Type I and Type II wind rose diagrams. Explain how the optimum runway orientation is determined.
B. What are different control surfaces at an airport? Explain the concepts of airport zoning with the help of sketches.
9. A. A taxiway is to be designed for a supersonic transport which has the following characteristics. Determine the turning radius of the taxiway.
Wheel Base = 31m;
Tread of main loading gear = 7.20m;
Turning speed = 60Kmph.
Coefficient of friction between tyre and pavement surface = 0.13
10. 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.

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
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

QUESTION BANK

UNIT 4

Part A

1. What is Gate Position?
2. Differentiate 'Apron' and 'Holding Apron'.
3. What is the purpose of a hangar?
4. Define terminal building.
5. List the different parking systems.
6. List the various airport layouts.
7. What is the purpose of air traffic control? Mention its primary functions.
8. List the landing aids.
9. What is a helipad?
10. Define wind cone.
11. What are the airport markings?
12. What is the purpose of installing visual aids in a airport?
13. Define heliport.
14. What are the markings made on the runway?
15. What are the systems of aircraft parking?
16. List the types of air traffic control aids?
17. What are the factors affecting the type and intensity of airport lighting?
18. Give the elements of airport lightings.
19. What are the three components of an air traffic control network?
20. Define Passenger flow.

Part B

1. A. Describe the motor vehicle parking area and its parking patterns in airports. B. Write brief note 'Helipads'.
2. Describe the visual and instrumental landing aids.
3. A. How safe air navigation is ensured without any obstructions in an airport area? B. What are the various types of aircraft parking system? Explain with neat sketches.
4. Explain the various runway and taxiway markings.
5. Draw a typical layout of any international airport in India and explain its concept.
6. A. What are the facilities that are to be provided in the terminal building of an international airport? B. Mention the various types of airport marking. Explain with neat sketch the runway marking.
7. A. Draw a typical sketch showing the general lighting pattern for a international airport. B. Explain in brief the need of air traffic control.
8. Write short notes on : 1. ILS; 2. Hangars; 3. Airport Layout

9. What are the characteristics of a good airport layout?
10. Write a brief note on: 1. Holding Apron; 2. Gate Position; 3. Wind Cone

QUESTION BANK

UNIT 5

Part- A

1. What is Littoral drift? What is its impact on harbour Engineering?
2. What is Coastal Shipping ? Give an Example?
3. How is Inland Water Transport different from sea transport?
4. Differentiate between Quay & Pier?
5. Why should a Jetty face be provided with a Cushion?
6. Define Transitshed?
7. What is a Slipway?
8. Distinguish between Dolphins & Jetties ?
9. How harbours are classified according to function ?
10. What is a mooring buoy?
11. What are tetrapods & tribars?
12. Mention any two erosion protection Methods in Coastal Zone?
13. Write the need for coastal regulation zones?
14. What are requirements of good port?
15. Define Breakwater?
16. Define Clapotis?
17. Define types of Dredging?
18. Classify Harbour?
19. Different Layout of ports?
20. What do you understand by the term “Navigational Aids”?

Part - B

1. Discuss the tides & wave effects & its action on Coastal Structures?
2.
 - i. Discuss the factors to be considered while selecting a suitable site for the construction of a port?
 - ii. Distinguish Between Pier Wharf. Explain their utility with the help of sketches?
3.
 - i. Discuss briefly about the container transportation ?
 - ii. Write a detailed note on Inland Water Transportation?
4. Draw a neat sketch of a harbour layout & show the Various Components. Mention the objectives of each.
5.
 - i. What are the functions of wet Docks? Explain with Sketches, their working & main features.

- ii. Explain with sketch the features of a composite Breakwater.
6. Define dredging? Explain the reasons for its adoptions. How dredged Materials are disposed off?
7. What do you Understand by the term “Navigational Aids”? Why are they provided in harbours? Explain with a sketch any one of them.
8.
 - i. Describe any eight factors for site investigation of Harbours & state the significance of each one of them.
 - ii. Explain any six factors for which a harbor engineering must have consideration while planning & designing a Harbour?
9. Discuss in detail the factors to be considered while locating Port.
10. State the difference between a transit & a warehouse with regards to their use & construction?