

THEORY

WEEK	CONTENT NO.	LESSON NO.	CLASS/ QUIZ TEST	BRIEF DESCRIPTION OF CONTENT
01	1.1-1.5	01		1.1 Describe a brief history of railways. 1.2 Mention the characteristics of railways. 1.3 Describe the advantages of railways. 1.4 Comparison between highway and railways. 1.5 Describe the future of railways in Bangladesh.
	2.1-2.5	02		2.1 Mention the objectives of railway surveys. 2.2 Explain the reasons for laying a new railway line. 2.3 Describe the importance of reconnaissance survey for railways. 2.4 Describe the process of preliminary survey for railways. 2.5 Describe in details the location survey for railways.
02	3.1-3.8	01		3.1 Define permanent way . 3.2 State the requirements of permanent way. 3.3 Define rail and rail gauge. 3.4 Mention the functions and requirements of an ideal rail. 3.5 Mention different types of rail. 3.6 Mention the advantages of flat footed rail. 3.7 Illustrate weight and section of rail. 3.8 Explain the effect of corrosion of rails.
	3.9-3.16	02		3.9 Mention the points that govern the length of rail. 3.10 State the meaning and causes of wear of rail. 3.11 Describe the methods adopted to reduce wear of rail. 3.12 Mention the causes of failure of rails. 3.13 Illustrate the term coning of wheel, its disadvantages of coning of wheel and its remedy. 3.14 State the meaning of hogged rails. 3.15 Describe the methods of rectifying damaged rail. 3.16 Illustrate buckling of rail and the precautions to be taken to prevent buckling of rail.
03	4.1-4.7	01		4.1 State the meaning of fastening. 4.2 Mention the requirements of an ideal rail fastening. 4.3 Mention different types of rail joint. 4.4 Mention the characteristics of an ideal rail joint. 4.5 State the meaning of bearing plate, fish plate, spikes, hook bolt, fang bolt, Chair and keys. 4.6 Describe welding rail 4.7 Mention the advantages and disadvantages of welding rail.
	5.1-5.10	02		5.1 State the meaning of sleeper. 5.2 Mention the functions of sleeper. 5.3 Mention the requirements of an ideal sleeper. 5.4 Mention the classification of sleeper. 5.5 List the materials used for sleeper. 5.6 Mention the advantages & disadvantages and limitations of timber sleeper. 5.7 Mention the advantages & disadvantages and limitations of steel sleeper. 5.8 Mention the advantages & disadvantages and limitations of cast iron sleeper. 5.9 Mention the advantages & disadvantages and

				<p>limitations of concrete sleeper.</p> <p>5.10 Explain the density of sleepers.</p>
04	6.1-6.10	01		<p>6.1 State the meaning of ballast.</p> <p>6.2 Mention the functions of ballast.</p> <p>6.3 Mention the characteristics of good ballast.</p> <p>6.4 Mention the requirements of an ideal material for ballast.</p> <p>6.5 Describe the materials used as ballast with their advantages and disadvantages.</p> <p>6.6 Specify the size of good quality ballast.</p> <p>6.7 State the meaning of depth of ballast.</p> <p>6.8 State the meaning of screening of ballast.</p> <p>6.9 Describe the process of screening of ballast.</p> <p>6.10 Describe the quantity of ballast needed for construction of permanent way.</p>
			C.T.-01	1.1-6.10
05	7.1-7.6	01		<p>7.1 State the meaning of creep.</p> <p>7.2 Mention the causes of creep in permanent way.</p> <p>7.3 Explain the factors to determine the magnitude of creep.</p> <p>7.4 Explain the effect of creep in permanent way.</p> <p>7.5 Describe the procedure of measuring the amount of creep.</p> <p>7.6 Describe the methods of correcting the creep.</p>
	8.1-8.8	02		<p>8.1 Mention the disadvantages of curvature in a railway track.</p> <p>8.2 Mention different types of curve used in railway track.</p> <p>8.3 State the meaning of degree of curve or limiting radius of a curve.</p> <p>8.4 Define transition curve.</p> <p>8.5 Mention the necessity of transition curve in a railway track.</p> <p>8.6 Calculate the length of transition curve in a railway track.</p> <p>8.7 State the meaning of shift.</p> <p>8.8 Calculate the amount of shift in a railway.</p>
06	9.1-9.7	01		<p>9.1 State the meaning of super elevation or cant.</p> <p>9.2 Mention the purposes of super elevation on a curve.</p> <p>9.3 Describe the factors which affect the super elevation.</p> <p>9.4 Calculate the quantity of super elevation in a railway track.</p> <p>9.5 Define cant deficiency, equilibrium cant, negative cant and cant gradient.</p> <p>9.6 Explain the speed of train on curve.</p> <p>9.7 List the procedure for finding respective speeds on main line and branch line.</p>
			Q.T.-01	7.1-9.7

07	11.1-11.5	01		<p>11.1 Define points and crossings.</p> <p>11.2 Mention the purposes of points and crossings.</p> <p>11.3 Define the terms: switch, tongue rail, check or guard rail, stock rail, stretcher bar, throw of switch, fouling mark, right hand switch and left hand switch.</p> <p>11.4 Describe the method of laying sleepers for points and crossings.</p> <p>11.5 Describe the steel used for points and crossings.</p>
	11.6-11.13	02		<p>11.6 Describe the shape of switches.</p> <p>11.7 State the meaning of clearance and switch angle.</p> <p>11.8 State the meaning of crossing.</p> <p>11.9 Describe different types of crossing.</p> <p>11.10 Describe the theoretical nose of crossing and actual nose of crossing.</p> <p>11.11 Define the terms: crossing clearance, crossing number and crossing angle.</p> <p>11.12 Mention the advantages and disadvantages of level crossing.</p> <p>11.13 Describe the points to be considered in maintaining points and crossing.</p>
08	12.1-12.12	01		<p>12.1 Explain the importance of signaling in railways.</p> <p>12.2 Describe different types of signal.</p> <p>12.3 Describe a typical layout of signal.</p> <p>12.4 Discuss the control of movement of trains.</p> <p>12.5 Describe the following trains system.</p> <p>12.6 Describe the absolute block system.</p> <p>12.7 Describe pilot guard system.</p> <p>12.8 Describe centralize traffic control system.</p> <p>12.9 Describe automatic signaling.</p> <p>12.10 State the meaning of interlocking.</p> <p>12.11 Mention the essential principles of interlocking.</p> <p>12.12 Describe the methods of interlocking.</p>
			C.T.-02	11.1-12.12
09	14.1-14.7	01		<p>14.1 Explain the necessity for maintenance work in railway.</p> <p>14.2 Mention the advantages of good track maintenance.</p> <p>14.3 Describe the maintenance work of a track.</p> <p>14.4 Describe the duties of gang mate, key man and permanent way inspector (PWI) in the maintenance work.</p> <p>14.5 Describe the maintenance work of railway bridge/culvert.</p> <p>14.6 Describe the process of maintenance work of rolling stock.</p> <p>14.7 Mention the causes of accident in a railway track.</p>
	14.8-14.14	02		<p>14.8 Describe the process of signaling during maintenance work.</p> <p>14.9 Describe the necessity of speed restriction during maintenance work.</p> <p>14.10 List the name of tools required for maintenance work.</p> <p>14.11 Describe the process of packing of ballast in a railway track.</p> <p>14.12 Explain the importance of inspection of rails.</p> <p>14.13 Mention the process of inspection of track.</p> <p>14.14 Describe the maintenance and boxing of ballast.</p>

10	15.1-15.9	01		<p>15.1 Define tunnel.</p> <p>15.2 Mention the purpose of tunnels.</p> <p>15.3 Describe a brief history of development of tunnels.</p> <p>15.4 Describe the development of railway tunnels.</p> <p>15.3 Describe the advantages and disadvantages of tunnels.</p> <p>15.4 Mention the economics of tunneling.</p> <p>15.5 Mention the favorable condition for the tunnel construction.</p> <p>15.6 Mention the classification of tunnels.</p> <p>15.7 Describe the size and shape of tunnels with neat sketches.</p> <p>15.8 Mention the advantages of underground railways.</p> <p>15.9 Mention the points to be considered in connection with the maintenance of railway tunnels.</p>
			Q.T.-02	14.1-15.9
11	16.1-16.5	01		<p>16.1 State the meaning of harbor.</p> <p>16.2 Mention the purposes and utility of harbor.</p> <p>16.3 Mention different types of harbor.</p> <p>16.4 Mention the suitable location for harbor.</p> <p>16.5 Describe the following terms: natural harbor, semi-natural harbor, artificial harbor, military harbor and commercial harbor.</p>
	17.1-17.6	02		<p>17.1 State the meaning of port.</p> <p>17.2 Mention the purposes and utility of port.</p> <p>17.3 Classify different types of port.</p> <p>17.4 Mention the suitable location for port.</p> <p>17.5 Mention the points to be considered in selecting the site for a port.</p> <p>17.6 Write briefly on port of entry, ocean port, inland waterway port, free port, and anchorage area, marine terminal, turning basin, gross tonnage, cargo or freight tonnage and balance.</p>
12				REVISE (1.1-17.6)
			C.T. 03	1.1-17.6

PRACTICAL

WEEK	CLASS	JOB	DESCRIPTION
01	01	01 02	1. Draw the section of a permanent way showing the components. 2. Draw the sketches of double headed rail, bull headed rail and flat footed rail with measurements.
02	02	03	3. Draw the sketches of narrow gauge, meter gauge, broad gauge and mixed gauge used in Bangladesh showing the measurements.
03	03	04 05	4. Draw the sketches of fish plate, bearing plate, dog spike, screw spike, round spike and elastic spike with measurements. 5. Draw the sketches of different types of sleepers used in Bangladesh.
04	04	06	6. Draw the sketches of different ballast section.
05	05	07 08	7. Draw the sketches of wayside station, junction and terminals showing platform and other components. 8. Draw the sketches of main track and side track of a double line railway station.
06	06	09	9. Draw the sketches of different types of yards in railway.
07	07	10	10. Draw the sketches of a level crossing showing all components.
08	08	11	11. Draw the sketches of points and crossing showing all components.
09	09	12	12. Draw the sketches of triangle, scotch block, buffer stop and derailing switch.
10	10	13	13. Draw the sketches of acute crossing, double crossing, square crossing and diamond crossing.
11	11	14	14. Prepare a model of a typical points and crossing using aluminum channel, wooden sleepers and other available materials.
12	12	15 16	15. Visit to a nearby station to see the different components of a railway station and submit a report. 16. Visit to an important harbor and port.

REFERENCE BOOKS

1. Railway Engineering - S C Rangwala
2. Railway Engineering – B L Gupta and Amit Gupta
3. Marine Structure and Port Facilities - Quinn