Reg. No. | | | | | | | | | | | | |

Question Paper Code : 57188

18/6/16 FN

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016

Sixth Semester

Civil Engineering

CE6604-RAILWAYS, AIRPORTS AND HARBOUR ENGINEERING

(Regulations 2013)

Time : Three Hours **Maximum : 100 Marks**

Answer ALL questions.

PART – A (10 × 2 = 20 Marks)

1. What is meant by permanent way ?
2. What are the various types of gradients that are adopted in laying a railway track ?
3. What are the different methods of plate laying ?
4. What is a Mono rail ?
5. What are the advantages of air transport compared to other modes of transportation ?
6. Write the classification of airport as per ICAO.
7. What is the difference between a runway and taxiway ?
8. List the various types of runway marking.
9. What is the difference between a harbour and a port ?
10. What is the objective of Coastal Regulation Zone notification ?

PART – B (5 × 16 = 80 Marks)

11. (a) (i) What are the ideal requirements of a permanent way ? **(8)**

(ii) What is the function of a sleeper ? Compare different types of sleepers. **(8)**

OR

(b) (i) Explain the different surveys involved in fixing the alignment of railway tracks. **(8)**

(ii) A 5° curve diverges from a 3° main curve in reverse direction in the layout of a B.G yard. If the speed on the branch line is restricted to 35 kmph, determine the restricted speed on the main line. **(8)**

12. (a) Write short notes on :

(i) Track drainage **(8)**

(ii) Tunneling methods **(8)**

OR

(b) How are railway stations classified ? Explain the features of each station. **(16)**

13. (a) Draw an airport layout and explain its components. **(16)**

OR

(b) (i) What are the facilities to be provided in the terminal building of an international Airport ? **(8)**

(ii) What are the different systems of aircraft parking ? Explain the suitability of each system. **(8)**

14. (a) (i) Explain the role of wide rose diagram in the orientation of runways. **(8)**

(ii) The length of a runway at mean sea level, standard temperature and zero gradient is 600 m. The site has an elevation of 100 m, with a reference of 28 °C. The runway has to be constructed with an effective gradient of 0.5%. Determine the actual length of the runway at site. **(8)**

OR

(b) (i) Explain in detail about airport zoning. **(8)**

(ii) Explain the elements of airport lighting with neat sketches. **(8)**

15. (a) (i) What are the factors to be considered for the selection for harbour ? **(8)**

(ii) Explain the coastal protection works. **(8)**

OR

(b) Explain the different types of breakwaters with neat sketches. **(16)**

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 71589

31/05/2017 FN

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Sixth Semester

Civil Engineering

CE 6604 — RAILWAYS, AIRPORTS AND HARBOUR ENGINEERING

(Regulations 2013)

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Compare any two characteristics of Railways with that of Roads.
2. Define super-elevation in Railways. Specify the value of super-elevation adopted for Indian Broad Gauge Railways for speed less than 100km/h.
3. List any two basic types of tunnelling methods and state the contexts of their adoption.
4. Draw a diagram for the 'formation in embankment'.
5. Why is a site on top of a hill considered more suitable to locate an airport?
6. What is the relevance of socio — economic characteristics of the catchment area for airport planning?
7. What are airport zones? Why are they important?
8. Draw a sketch of the 'runway shoulder marking'.
9. Distinguish between a 'harbour and a port'.
10. List the primary classification of harbours

PART B — (5 × 16 = 80 marks)

11. (a) (i) Derive an expression for super-elevation in railways. (8)

(ii) A branch line of eight degree curve, diverges in opposite direction from a broad gauge main line with five degree curve. The speed on the branch line is 30 km/hr. Calculate the Super-elevation and permissible speed on the main line. (8)

Or

(b) (i) Explain with neat sketches any four obligatory points controlling railway alignment. (8)

(ii) Illustrate with neat sketches a 'Points and Crossings' and state its working principles. (8)

12. (a) Explain with neat sketches any two methods of Plate Laying and state their relative merits and demerits. Which of those two methods are widely adopted by Indian Railways. (16)

Or

(b) Draw seIf-explanatory sketches of the following.

(i) A Crossing Station (4)

(ii) A Junction Station (6)

(iii) A Terminal Station (6)

13. (a) (i) Briefly discuss with sketches any four factors you would keep in view, while selecting a suitable site for an airport. (8)

(ii) Evaluate the suitability of the site of any one existing international airport in India against those four factors referred in the question. 13(a) (i). (8)

Or

(b) Draw a typical layout of an international airport in India and show locations of Runway, Taxii Way, Apron, Airport Building, Parking and Circulation Area. (16)

14. (a) (i) Following is the average wind data for ten years, when wind intensity is above 6km/hr. An airport is to be designed for two runways. Determine the best runway orientation and calculate total wind coverage.

Wind direction	Percentage of time
N	6.5
NNE	10.4
NE	8.0
ENE	4.2
E	1.7
ESE	0.6
SE	0.7
SSE	3.9
S	7.5
SSW	14.5
SW	10.2
WSW	5.9
W	4.2
WNW	0.3
NW	0.2
NNW	4.8

(ii) Length of a runway at mean sea level, standard temperature and zero gradients is 1600 m. The site has an elevation of 320 m, with a reference temperature 33.6 degree centigrade. The runway has to be constructed with an effective gradient of 0.25%. Determine the actual length of runway at the site. (6)

Or

(b) Draw neat sketches and explain the 'Approach zone profile' and 'Clearance over Highways and Railways' for an Instrument Landing System Runway. (16)

15. (a) (i) Describe any four factors of site investigation for location of harbours and the significance of each one of them. (8)

(ii) Explain any six factors, for which a harbour engineer must have consideration, while planning and designing a harbour. (8)

Or

(b) (i) Bring out the Environmental Concern of port operations focussing on any four impacts. (8)

(ii) Illustrate with neat sketches any four types of Coastal Protection works. (8)

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Reg. No. :

07/05/18

FN

Question Paper Code : 40816

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018

Sixth Semester

Civil Engineering

CE 6604 – RAILWAYS, AIRPORTS AND HARBOUR ENGINEERING

(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions.

PART – A (10×2=20 Marks)

1. Write any four vital role of railways in Regional Development.
2. What do you mean by the term 'Coning of Wheels' in railway geometric planning ?
3. List out any four advancements in track laying in India.
4. What is meant by 'Soil Stabilisation' in railway track design ?
5. Write any one major classification of airports with its standards.
6. Write any one airport zoning with its significance.
7. List out the various types of Apron in airport design.
8. What are the types of wind rose diagram in airport design ?
9. What do you mean by the term 'Littoral Drift' ?
10. Differentiate between 'Wharves and Jetties' in harbor engineering.

PART – B (5×13=65 Marks)

11. a) Write in brief the modern methods of track alignment, survey and design in today's context.

(OR)

b) Write in detail the any eight types of 'Fixtures and Fastenings' in railway construction with its functioning.

12. a) Explain in detail various methods of railway yards with its operations.

(OR)

b) Explain in brief the vital characteristics of different types of railways for urban transportation.

13. a) Length of a runway at mean sea level, standard temperature and zero gradients is 1790 m. The site has an elevation of 310 m with a reference temperature 35 degree centigrade. The runway has to be constructed with an effective gradient of 0.25%. Determine the actual length of the runway at the site by assuming all relevant data.

(OR)

b) Explain in detail the vital factors to be kept in mind as an Airport Planner for selecting a suitable site for an international airport.

14. a) Draw a layout of Chennai airport and explain its salient features with provision of all basic and desirable amenities provision.

(OR)

b) Write in detail the various design elements to be considered in taxi-way laying as per International Standards.

15. a) Draw a layout of Chennai harbor and explain its salient features and list out various terminal facilities normally to be provided.

(OR)

b) Write short notes on the following :

- Wave action on coastal structures. **(6)**
- Environmental concern on port operations. **(7)**

PART – C **(1×15=15 Marks)**

16. a) With a flow chart explain the activities involved in new railway track laying. Also explain the defects in rails.

(OR)

b) With a case study explain about the planning and design of harbours.

22/04/19

Reg. No. :

Question Paper Code : 52779

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Sixth Semester

Civil Engineering

CE 6604 — RAILWAYS, AIRPORTS AND HARBOUR ENGINEERING

(Regulation 2013)

(Common to PTCE 6604 – Railways, Airports and Harbour Engineering for B.E. Part Time – Fourth Semester – Civil Engineering – Regulation 2014)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is coning of wheels and mention its advantages?
2. Illustrate the functions of ballast.
3. Differentiate between Gravitational yard and Hump yard.
4. Why sand hump is provided at the end of the sidings.
5. Illustrate the types of survey adopted for the site selection of an airport.
6. Why Zoning laws are necessary?
7. Define Hangar.
8. What is Taxiway and why it is provided in an airport?
9. Define Harbour.
10. What do you understand by the term dredging?

PART B — (5 × 13 = 65 marks)

11. (a) Describe the various important surveys adopted for the track alignment of a new railway project.

Or

(b) (i) Explain the circumstances in which Equilibrium cant is provided in a railway track. (5)

(ii) What are the requirements of an ideal permanent way. (8)

12. (a) What are the operations and methods involved in driving a tunnel in rocks.

Or

(b) What are the types of marshalling yard? Also mention the equipments available in station yards.

13. (a) Illustrate the factors affecting the choice of selection of site for an Airport.

Or

(b) Compare the various aircraft parking systems along with its advantages and disadvantages.

14. (a) (i) The data for the hottest month of an year in the year of maximum daily temperature is $43.72°C$ and the mean of average daily temperature is $26.32°C$, Then what is the airport reference temperature. (4)

(ii) The Turning radius for a Taxiway is to be designed for operating aircraft at A type airport having the following character.

1. Subsonic aircraft having wheel base = 17.70m
2. Tread of main landing gear = 6.62
3. Turning speed = 40kmph
4. Co–efficient of friction between tyre and pavement = 0.13 (9)

Or

(b) Runway length required for landing at sea level in standard atmospheric condition is 2100m. Runway length required for takeoff at a level site at sea level in standard atmospheric condition is 2500m Aerodrome elevation is 200m and reference temperature is 24°C. Temperature in the standard atmosphere for 200m is 15°C and runway slope is 0.5%. Determine the length of the runway after applying correction to runway length.

15. (a) Explain about the following terms in detail.

(i) Piers, Quays and Docks (4)

(ii) Wharfs (4)

(iii) Breakwaters (5)

Or

(b) (i) What are the requirements of a good harbour? (6)

(ii) Explain in detail about the classification of harbours. (7)

PART C — (1 × 15 = 15 marks)

16. (a) Evaluate the capacity of 12 Gates which are exclusively used by three classes of aircraft with particulars as shown below. Assume gate utilization factor as 1.

AIRCRAFT TYPE	GATE GROUP	NO. OF GATES	MIX(%)	AVERAGE OCCUPANCY TIME IN MINUTES
A	I	2	15	25
B	II	4	35	45
C	III	6	50	60

Or

(b) Evaluate the equilibrium speed and design the cant to be provided on a BG curve of 3 degree if the speeds of several trains running on the line as follows.

No of trains	Velocity in kmph
15	50
12	60
8	70
3	80

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Question Paper Code : 80219

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Sixth Semester

Civil Engineering

CE 6604 — RAILWAYS, AIRPORTS AND HARBOUR ENGINEERING

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the functions of ballast in a railway track?
2. What do you mean by crossing?
3. What are the methods to improve the poor subgrade soil?
4. What is a marshalling yard?
5. Write a short note on hangar.
6. List the different types of aircraft parking systems.
7. What is the significance of wind rose diagram?
8. State the importance of airport zoning.
9. What are the requirements of a good port?
10. Differentiate between a Pier and a Quay.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Elucidate the advantages of railways over the other modes of transport. (8)

(ii) Draw a neat sketch of the permanent way and explain the functions of different components. (8)

Or

(b) (i) Derive an expression for the relationship between super elevation, gauge and curve in a railway track. (8)

(ii) Discuss the functions and requirements of various elements of railway permanent way. (8)

12. (a) Explain the operations involved in plate laying by the telescopic method. (16)

Or

(b) Explain the methods of maintenance of tracks. (16)

13. (a) (i) Discuss the merits and demerits of air transport. (8)

(ii) Explain the planning concept of airport buildings. (8)

Or

(b) Explain the factors to be considered for the selection of site for an airport. (16)

14. (a) (i) Explain the different runway geometrics as recommended by ICAO. (8)

(ii) The length of runway under standard conditions is 600 m. The airport site has an elevation of 100 m and reference temperature is 28° C. If the runway is to be constructed with an effective gradient of 0.5%, determine the corrected runway length. (8)

Or

(b) (i) What are the basic patterns of runway configurations? Discuss each pattern. (8)

(ii) Explain the elements of airport lighting with neat sketches. (8)

15. (a) (i) Explain the classification of harbours. (8)

(ii) Explain the different components of a port with a neat sketch. (8)

Or

(b) (i) Explain the different types of breakwaters with neat sketches. (8)

(ii) Explain the salient features of Coastal Regulation Zone Notification 2011. (8)

06/11/17 AN

Reg. No. :

Question Paper Code : 50298

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017
Sixth Semester
Civil Engineering
CE 6604 – RAILWAYS, AIRPORTS AND HARBOUR ENGINEERING
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions.

PART – A (10×2=20 Marks)

1. Define creep in sleepers.
2. Why the widening of gauges needed in the curves ?
3. Write the significance of earthwork in railway construction.
4. Define Tunneling.
5. Write the objectives of airport planning.
6. Write the components of an airport.
7. What is airport zoning ?
8. What is meant by basic runway length ?
9. Differentiate 'jetty' and 'dolphin'.
10. List the erosion protection methods in coastal zone.

PART – B (5×16=80 Marks)

11. a) i) Define super elevation. List the factors considering in design of super elevation. (8)

ii) Write a note on negative super elevation and cant deficiency. (8)

(OR)

b) i) Explain coning of wheels with neat sketches. (8)

ii) Compare the different ballast materials used for railway track. (8)

12. a) Explain briefly the construction and maintenance of railway track. **(16)**

(OR)

b) Discuss the importance of track drainage. How this achieved ? Explain in detail. **(16)**

13. a) i) What are the characteristics of a good airport layout ? **(8)**

ii) Explain the airport master plan. **(8)**

(OR)

b) List out the factors to be considered for the site selection of a commercial airport. **(16)**

14. a) The length of runway at standard condition is 2500m. Determine the required runway length at an airport site with the following particulars. **(16)**

Mean maximum daily temperature = 44.5°C
Mean average daily temperature = 28.3°C
Elevation of site above MSL = 350 m
Effective gradient of runway = 0.21%

(OR)

b) Briefly explain the night time aids provided at airports. **(16)**

15. a) i) How harbours are classified ? Explain using examples of Indian harbours. **(8)**

ii) What is the function of a dry dock ? Explain the working of a floating dry dock. **(8)**

(OR)

b) Why shore protection is necessary ? Explain the different shore protection works generally carried out. **(16)**

22/11/18

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 20280

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Sixth Semester

Civil Engineering

CE 6604 — RAILWAYS, AIRPORTS AND HARBOUR ENGINEERING

(Regulations 2013)

(Common to : PTCE 6604 – Railways, Airports and Harbour Engineering., for B.E. (Part-Time)–Sixth Semester – Civil Engineering., –Regulations 2014)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define coning of wheels.
2. What is grade compensation?
3. Define tunneling.
4. What is marshaling yard?
5. What are the components of airports?
6. Define ICAO.
7. What is meant by basic runway length?
8. What is airport zoning?
9. Define mooring buoy.
10. Define Jetty and Quay.

PART B — (5 × 13 = 65 marks)

11. (a) Mention the relative merits and demerits of flat footed and double headed rails.

Or

(b) What is points and crossing? List their types. Draw a neat sketch of right hand turnout and explain.

12. (a) Discuss the importance of track drainage. How is this achieved?

Or

(b) Explain about the construction and maintenance of railway tracks.

13. (a) Enlist and explain the factors to be considered for the selection of site of an airport.

Or

(b) What are the facilities to be provided in the terminal building of an international airport?

14. (a) The length of runway at standard condition is 2500m. Determine the required runway length at an airport site with the following particulars.

Mean maximum daily temperature	=	44.5°C
Mean average daily temperature	=	28.3° C
Elevation of site above MSL	=	350m
Effective gradient of runway	=	0.21%

Or

(b) Briefly explain the night time aids provided at airports.

15. (a) Classify harbours on broad basis and on the basis of utility and explain with examples.

Or

(b) Write a detailed note on break waters.

PART C — (1 × 15 = 15 marks)

16. (a) Compare the different types of sleepers used in Indian railways.

Or

(b) Why shore protection is necessary? Explain the different shore protection works generally carried out.

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Reg. No. :

Question Paper Code : 91314

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019

Sixth Semester

Civil Engineering

CE 6604 – RAILWAYS, AIRPORTS AND HARBOUR ENGINEERING

(Regulations 2013)

Common to : PTCE 6604 – Railways, Airports and Harbour Engineering for B.E. (Part-Time) – Fourth Semester – Civil Engineering – Regulations – 2014)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions.

PART – A **(10×2=20 Marks)**

1. Compare any two characteristics of Railways with that of Roads.
2. Draw the cross section of permanent way.
3. What are the methods to improve the poor subgrade soil ?
4. What is a marshalling yard ?
5. What are the components of airports ?
6. Write the objectives of ICAO.
7. What is Airport Reference Temperature ?
8. Write short note on Approach Zone.
9. What is the difference between a harbour and a port ?
10. Write short note on Coastal Regulation Zone.

PART – B (5×13=65 Marks)

11. a) Describe the functions and requirements of sleeper.

(OR)

b) What is points and crossing ? List their types. Draw a neat sketch of right hand turnout and explain.

12. a) Write short notes on :

i) Railway Track Maintenance. (5)

ii) Tunnelling methods in Hard rock. (8)

(OR)

b) How are railway stations classified ? Explain the features of each station.

13. a) i) Discuss the merits and demerits of air transport. (5)

ii) Explain the planning concept of airport buildings. (8)

(OR)

b) Explain the factors to be considered for the selection of site for an airport.

14. a) Following is the average wind data for ten years, when wind intensity is above 6km/hr. An airport is to be designed for two runways. Determine the best runway orientation and calculate total wind coverage.

Wind direction	Percentage of time
N	6.5
NNE	10.4
NE	8.0
ENE	4.2
E	1.7
ESE	0.6
SE	0.7
SSE	3.9
S	7.5
SSW	14.5
SW	10.2
WSW	5.9
W	4.2
WNW	0.3
NW	0.2
NNW	4.8

(OR)

b) Length of a runway at mean sea level, standard temperature and zero gradients is 1600 m. The site has an elevation of 320 m. with a reference temperature 33.6 degree centigrade. The runway has to be constructed with an effective gradient of 0.25%. Determine the actual length of runway at the site.

15. a) Explain the design aspects to be considered in selection of a harbour. (13)

(OR)

b) Discuss the following :

i) Types of Docks. (3)

ii) Breakwaters. (6)

iii) Littoral Drift. (2)

iv) Quays. (2)

PART – C (1×15=15 Marks)

16. a) Explain the various method of Railway Track Construction.

(OR)

b) With neat sketch explain Runway and Taxiway Marking.