MUTHAYAMMAL ENGINEERING COLLEGE
(AUTONOMOUS)
RASIPURAM – 637 408
DEPARTMENT OF CIVIL ENGINEERING
QUESTION BANK
(REGULATION – 2019)

YAER/SEMESTER: III/VI

SUBJECT CODE : 19CEE27

SUBJECT NAME : RAILWAYS, AIRPORTS AND HARBOUR ENGINEERING

UNIT-I

RAILWAY PLANNING AND DESIGN

PART-A (2 MARKS)

1. What is meant by permanent way?
2. What are the various types of gradient that are adopted in laying a railway track?
3. What are the functions of ballast in a railway track?
4. What do you mean by crossing?
5. Compare any two characteristic of railways with that of roads.
6. Define creeps in sleepers.
7. Why widening of gauges needed in the curves?
8. State the effect of creep.
9. What are the functions of rails?
10. What is the requirement of ideal fastenings?
11. State the disadvantages of coning of wheels.
12. What is meant by 'cant deficiency'?
13. What are the uses of Remote Sensing in route alignment?
14. Mention the function of formation.
15. What is creep? How is it prevented?
16. What do you mean by sleeper density?
17. What are the functions of formation?
18. Write the classification of gradients.
19. Define Gauge
20. Define Rails
21. What are the different types of rail sections?
22. What are the uses of Fish plates?
23. What is the use of Keys?
24. What is meant by spikes?
25. Classify Sleepers

UNIT-I

RAILWAY PLANNING AND DESIGN

PART-B (16 MARKS)

1. i) What ate the ideal requirement of a permanent way? (06)
   ii) What is the function of a sleeper? Compare different types of sleepers.(10)
2. Explain the different surveys involved in fixing the alignment of railway tracks.
3. Draw a neat sketch of the permanent way and explain the function of different components.
4. Discuss the functions and requirement of various elements of railway permanent way.
5. Explain with neat sketch any four obligatory points controlling railway alignment.
6. Illustrate with neat sketch a 'points and crossings' and state its working principles.
7. i)Define super-elevation. List the factors considering in design of super elevation.(10)
   ii) Compare the different ballast materials used for railway track.(6)
8. i) Write short notes on negative super elevation and cant deficiency.(8)
   ii) Explain coning of wheels with neat sketch. (8)
9. Compare the different types of sleepers. Give all details
10. i) Briefly explain the modern methods of surveys for track alignment. (8)
    ii) What is the necessity of geometric design of a railway track? Enumerate the significant features of a railway track. (8)
11. i)Bring the ideal requirements of permanent way.(8)
12. ii)Elucidate the advantage of railways. (8)
13. What do you understand by the following terms for the section of the track "Grade compensation on curves" and "Widening of gauge".
14. Explain the permanent way components with a sketch.
15. Explain in detail about rail fastenings and fixtures with a suitable figure
16. Discuss in detail about points and crossings
17. Define gradient; List out its types and explain clearly.

UNIT II

RAILWAY CONSTRUCTION AND MAINTANENCE

PART – A (2MARKS)

1. What are the different methods of plate laying?
2. What is Mono rail?
3. What are the methods to improve the poor sub grade soil?
4. What is a marshalling yard?
5. List any two basic types of tunnelling methods and state the contexts of their adoption?
6. Write the significance of earthwork in railway construction.
7. Define tunnelling

8. Define ‘heel divergence’.
9. What are the sources of moisture in a railway track?
10. List the components of a switch.
11. Differentiate between ‘gravity yard’ and ‘hump yard’.
12. State the principle of interlocking
13. Classify the Crossings?
14. Define cross-over in track junction
15. What are the three stages of construction of new railway track?
16. What are the necessities of points and crossings?
17. What are the two types of Switches?
18. Define Crossings
19. What you mean by Diamond crossing?
20. Define Ladder tracks?
21. Define Platforms.
22. Define station yards
23. Define Buffer stop

UNIT II

RAILWAY CONSTRUCTION AND MAINTANENCE

PART-B (16MARKS)

1. Explain the operation involved in plate laying by the telescopic method.
2. Explain the methods of maintenance of tracks.
3. 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 in Indian Railways?
4. Draw self-explanatory sketches of the following.
   (i) A crossing station.
   (ii) A junction station.
   (iii) A terminal station.
5. Explain briefly the construction and maintenance of railway track.
6. Illustrate with a neat sketch, the turnout, points and crossings and explain their working principles.
7. How are railway station classified? Explain the features of each station.
8. What is a marshalling yard? Explain with a neat sketch, the working of a hump type of marshalling yard.
9. When and where should a tunnel be provided and explain the methods of tunnel construction in soft ground.
10. Describe in detail about plate laying techniques
11. Discuss in detail about the modern methods of maintenance
12. List out the type of railway stations and explain each one of them in detail

13. Describe the following;
    (i) Necessity of track maintenance
    (ii) Essentials of good track maintenance
    (iii) Advantages of proper maintenance

UNIT – III
AIRPORT PLANNING
PART-A (2MARKS)

1. What are the advantages of air transport compared to other modes of transportations?
2. Write the classification of airport as per ICAO.
3. Why is a site on top of a hill considered more suitable to locate an airport?
4. What is the relevance of socio-economic characteristics of the catchment area for airport planning?
5. Write the objectives of airport planning.
6. Write the components of an airport.
7. Write any one major classification of airports with its standards.
8. List out the advantages and disadvantages of air transport.
9. What are the drawings should be prepared for construction of new airport?
10. Define apron.
11. What are the four basic patterns of runway?
12. Define terminal building.
13. What are the different types of parking of aircraft?
14. What is the main function of hangar?
15. What are the factors should be consider for layout of taxiway?
16. What are the advantages of head wind?
17. What is the transitional surface in airport design?
18. Define passenger flow
19. What are the systems of aircraft parking?
20. What are the basic requirements to be kept in mind while deciding the site for a terminal building?
21. Define number of gate position
22. What do you mean by airport capacity?

UNIT – III
AIRPORT PLANNING
PART-B (16MARKS)

1. Draw an airport layout and explain its components.
2. What are the facilities to be provided in the terminal building of an international airport?
3. What are the different systems of aircraft parking? Explain the suitability of each system

4. Briefly discuss with sketches any four factors you would keep in view, while selecting a suitable site for an airport
5. Evaluate the suitability of the site of any one existing international airport in India against those four factors referred in the question.
6. What are the characteristics of a good airport layout?
7. Explain the airport master plan.
8. List out the factor to be considered for the site selection of a commercial airport
9. Draw a layout of Chennai airport and explain its salient features with provision of all basic and desirable amenities provision.
10. Write in detail the various design elements to be considered in taxi-way laying as per International standards.
11. List the factors to be considered for the selection of site for a commercial airport Explain the importance of airport planning.
12. Describe the necessity, functions and special characteristics of airport drainage
13. i) List out the factor to be considered for the site selection of a commercial airport
    ii) Summarize briefly the various runway geometrics as recommended by ICAO.
14. Explain the characteristics of commercial airport layout and military airport layout.
15. What are the basic patterns of runway configurations? Discuss each pattern.

UNIT – IV

AIRPORT DESIGN

PART-A (2MARKS)

1. What are the different between a runway and taxiway?
2. List the various types of runway marking.
3. What are airport zones? Why are they important?
4. Define crosswind component.
5. Draw a sketch of the "runway shoulder marking".
6. What is airport zoning?
7. Define wind coverage.
8. What is meant by basic runway length?
9. What are the types of wind rose diagram in airport design?
10. Mention the purposes of installing visual aids at the airport.
11. What is wind rose diagram?
12. Write any one airport zoning with its signification.
13. Define crosswind component and wind coverage.
14. What are the types of zoning?
15. Define clear zone.
16. Define Turning zone.
17. What are the airport markings?
18. What are the two arrangements adopted for approach lighting?
19. Give the elements of airport lightings.

20. What are the guidance and information required by the pilots during landing operation?
21. What are the factors which affect the size of an apron?
22. What are the markings made on the runways?
23. How turning radius of a taxiway is determined?
24. State the use of wind cone.
25. What is mean by buffer zone?
26. List out the various types of Apron in airport design.
27. What are the advantages of airport marking?
28. Define the term visibility.

UNIT – IV

AIRPORT DESIGN

PART-B (16 MARKS)

1. Explain the role of wind rose diagram in the orientation of runways.
2. The length of a runway at mean sea level, standard temperature and zero gradients is 600m.The site has an elevation of 100m, with a reference of 28 ºC. The runway has to be constructed with effective gradient of 0.5%.Determine the actual length of the runway at site.
3. Explain in detail about airport zoning.
4. Discuss in detail about wind rose diagram. Explain different types of wind rose diagram
5. Explain the elements of airport lighting with neat sketches.
6. Following is the average wind data for ten years, when wind intensity is above 6 km/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

7.The Length of a runway at mean sea level, standard temperature and zero gradients is1600m.The site has an elevation of 320 m, with a reference temperature 33.6 degree centigrade. The runway has to be construction with an effective gradient of 0.25%.Determine the actual length of runway at the site.

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

9.Draw neat sketch and example the "Approach zone profile “and "Clearance over Highways and Railways “for an Instrument landing System Runway

10. Briefly explain the night time aids provided at airports.

10. The length of runway under standard conditions is 1620 m. The airport site has an elevation of 270m. Its reference temperature is 32.9 ºC. If the runway is to be constructed with an effective gradient of 0.20%. Determine the corrected runway length.

11. Following is the average wind data for ten years, when wind intensity is above 6 km/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	6.10
NNE	4.15
NE	1.93
ENE	2.85
E	3.30
ESE	10.15
SE	7.80
SSE	7.52
S	6.10
SSW	3.15
SW	1.33
WSW	3.65
W	4.00
WNW	10.75
NW	7.30
NNW	12.00

11. The Length of a runway at standard condition is 2500 m. determine the required runway length at an airport site with the following particulars.
    Mean Maximum daily temperature = 44.5ºC
    Mean Average daily temperature = 28.3 ºC
    Elevation of site above MSL = 350 m
    Effective Gradient of Runway = 0.2%

UNIT V

HARBOUR ENGINEERING

PART – A (2 MARKS)

1. What is the difference between a harbour and a port?
2. What is the objective of Coastal Regulation Zone notification?
3. What are the requirements of good port?
4. Differentiate between a Pier and a Quay.
5. Distinguish between a 'harbour and a port'.
6. List the primary classification of harbour.
7. Differentiate 'jetty' and 'dolphin'.
8. List the erosion protection methods in coastal zone.
9. What do you understand by Littoral drift?
10. What are the basic requirements of signals?
11. What is the necessity of docks?What do you understand about littoral drift?
12. How will you orient the entrance of a harbour?
13. Write down the equation used for finding the harbour entrance
14. Differentiate between a 'wharf' and 'jetty'.
15. Differentiate between 'neap tides' and 'spring tides'.
16. Distinguish between 'tides' and 'waves'.
17. Why is dredging so essential in port operations?Classify Harbour?
18. Mention the Different Layout of ports.
19. Define dredging
20. Define Pier heads
21. Define Harbour
22. Define Port
23. Define – Dolphins
24. Define dredging
25. Classify Harbour
26. Define Break water
27. What are the functions of wet Docks?
28. Differentiate between wharf and Jetty?
29. Define Pier heads

UNIT V

HARBOUR ENGINEERING

PART – B (16 MARKS)

1. What are the factors to be considered for the selection for harbour?
2. Explain the coastal protection works
3. Explain the different types of breakwater with neat sketches.
4. Explain the classification of harbours.
5. Explain the different components of port with a neat sketch.
6. 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)
7. i) Bring out the environmental concern of port operation focusing on any four impacts. (8)
   ii) Illustrate with neat sketches any two types of Coastal Protection works. (8)
8. How harbours are classified? Explain using examples of Indian harbours
9. .i)What is the function of a dry dock? Explain the working of a floating dry dock? (8)
   ii)Why shore protection is necessary? Explain the different shore protection works generally carried out. (8)
10. What are the types of Navigational Aids?
11. What is 'break water'? Illustrate the construction features of various types of breakwaters
12. .Write the short notes on the following:
    (i) Marine survey (4)
    (ii) Mooring accessories (4)
    (iii) Navigational aids (4)
    (iv) Dredging (4)
13. Discuss the fixed navigation structures and floating navigation aids.
14. i)Classify harbours on board basis and on the basis of utility and explain them. (10)
    ii)Write descriptive notes on mooring and mooring accessories. (6)
15. i) Define a port and bring out the differences between a port and a harbour. What are the requirements of a good port? (8)
    ii) Classify different types of break water. Explain any one in brief.(8)
16. Explain the working principle of dry and wet docks.
17. Describe briefly the function of fixed and floating signals with necessary sketches.
18. Write a detailed note on breakwaters.
19. What the requirements of good port?
20. Classify harbours on the basis of utility and explain them.
21. Distinguish between wet docks and dry docks. Describe the operation of the various dry docks with neat sketches.