

B.E. (CE) Part-IV 7th Semester Examination, 2007

## Transportation Engineering-II

(CE-704)

Time : 3 hours

Full Marks : 100

Use separate answerscript for each half.

Assume data reasonably, if required.

### FIRST HALF

(Answer Q.No.1 and any TWO from the rest.)

1. Discuss briefly (any three) : [3×6]
  - a) Length requirement of runway for different aircraft performances.
  - b) Objective and methodology of Runway orientation
  - c) Exit taxiway
  - d) Macroanalysis of air travel demand forecasting
  - e) Runway configuration.
  
2.
  - a) Determine the actual length of a runway having basic runway length of 2500 m for an airport site at the elevation of 320 m above MSL. The monthly mean of average and maximum daily temperature during the hottest month of the year are 28°C and 47°C respectively. The maximum level difference between highest and lowest points at the site is 3.4 m.
  - b) It is observed that the mean service time at a runway to be used only for the arriving aircrafts is 1 minute per aircraft with standard deviation of 15 seconds. The average rate of the arrivals is 50 aircrafts per hour. Determine the mean service rate of operation if the average delay is reduced by 40%. [8+8]
  
3.
  - a) Define briefly (any four) :
    - (i) Semaphore signal, (ii) Rapid Rail Transit, (iii) Diamond Crossing,
    - (iv) Different types of way side stations, (v) Triangle.
  - b) Determine the distance between heel block and toe of stock rail if the theoretical length of tongue rail, actual length of tongue rail, length of stock rail from its toe to toe of tongue rail and thickness of tongue rail at toe are 4.82 m, 4.67 m, 1.50 m and 0.006 m respectively. [(2½×4)+6]

4. A diversion is to be provided on a B.G. track for repair of a bridge and it will be required for more than 15 days. The diversion is 30 m away from the main track and the straight portion of the diversion parallel to main track is 50 m. The radius of the curves and the length of the straight portion between two reverse curves are 475 m and 30 m respectively. The gradient to be provided should not be steeper than 1 in 100. The width of formation at main track is 6.20 m. It is decided that speed of train should be restricted to 25 kmph along the diversion.

Determine :

- i) Length of diversion along main track
- ii) Length of diversion along diverted route
- iii) Maximum permissible lowering of the bank of the diversion with respect to the formation of main track
- iv) Cant at the curves
- v) Theoretical maximum speed on curves. [3+3+4+3+3]

### SECOND HALF

(Answer Q.No.5 and any TWO from the rest.)

5. Write short notes on any three : [3×8]
- a) Wears of rails and preventive measures
  - b) Coning of wheels and tilt of rails
  - c) Wharf and Pier, and their characteristics and advantages
  - d) Change of wave heights due to shallowing of water
  - e) Different gauges of rails and advantage of uniform gauge in a country.
6. State the assumptions made for small amplitude wave theory. Describe the equation for the surface profile of such a wave. State the relation between wave length  $L$ , time period  $T$  and water depth  $d$ . What is the values of  $L$  for deep water condition? [13]
7. What are the advantages of a rubble mound break water? Give a sketch for cross-section of such a break water. State the design criteria for such break water. [13]
8. What are the component of a port?  
Differentiate between :
- (a) Wet dock and tidal dock, (b) Basin and apron, (c) Dry dock and dock.
- State the principles of port planning. How the shape and size of a basin are fixed? [13]