

**AIRPORT, RAILWAY AND HARBOUR ENGINEERING  
(CIVL 4143)**

**Time Allotted : 2½ hrs**

**Full Marks : 60**

*Figures out of the right margin indicate full marks.*

*Candidates are required to answer Group A and  
any 4 (four) from Group B to E, taking one from each group.*

*Candidates are required to give answer in their own words as far as practicable.*

**Group – A**

1. Answer any twelve:

**12 × 1 = 12**

*Choose the correct alternative for the following*

- (i) Which sleepers require insulating pads for track circuiting  
(a) Wooden sleepers (b) Steel and CI sleepers  
(c) Concrete sleepers (d) Steel sleepers
- (ii) Which of the following is the most used ballast on Indian railways?  
(a) Sand ballast (b) Broken stone ballast  
(c) Brickbat ballast (d) Coal ash ballast
- (iii) When a train travels around a curve at a speed higher than the equilibrium speed is known as  
(a) Cant (b) Cant Excess  
(c) Cant deficiency (d) None of these
- (iv) Which type of crossing is formed when a right or left rail crosses a similar rail  
(a) Acute angle crossing (b) Obtuse angle crossing  
(c) Square crossing (d) Any random crossing
- (v) Only for divide long block section, No passengers are booked , No train normally stops at these stations.  
(a) A Class station (b) B Class station  
(c) C Class station (d) Flag station
- (vi) Airport elevation is the reduced level above mean seal level of  
(a) Control tower (b) Highest point of the landing area  
(c) Lowest point of the landing area (d) None of these
- (vii) As per ICAO recommendations, minimum width of safety area for instrumental runway should be  
(a) 78 m (b) 150m  
(c) 300 m (d) 450 m

- (viii) How are closed runways marked?  
 (a) With white crosses (b) With yellow diagonal lines  
 (c) With red circles (d) With large yellow crosses
- (ix) What colour are runway centerline lights?  
 (a) Green (b) White  
 (c) Blue (d) Red and white
- (x) What is the primary purpose of an airport drainage system?  
 (a) To store rainwater for future use  
 (b) To ensure proper flow of water and prevent flooding  
 (c) To maintain a constant water supply for fire emergencies  
 (d) To manage aircraft fuel disposal

*Fill in the blanks with the correct word*

- (xi) The friction between the steel wheel and the steel rail is about \_\_\_\_\_ of the friction between the pneumatic tyre and a metalled road.
- (xii) The maximum gradient allowed on the track section is called \_\_\_\_\_.
- (xiii) Hangars are often made of materials like \_\_\_\_\_ or aluminium to withstand environmental factors.
- (xiv) \_\_\_\_\_ drains are commonly used under paved surfaces to prevent water from seeping into the ground below runways and taxiways.
- (xv) The placement of sleepers directly affects the track's \_\_\_\_\_ and helps maintain a smooth and safe ride for trains.

### Group - B

2. (a) What do you mean by capacity of a railway track? How track capacity can be increased? [[CO3](Remember/LOCQ)]
- (b) Define gauge of a railway track. Enumerate the different gauges used in India? What are the factors affecting the choice of particular gauge? [[CO1](Remember/LOCQ)]
- (c) Write a short note on coning of wheels. [[CO2](Understand/LOCQ)]
- (1 + 2) + (1 + 2 + 4) + 2 = 12**
3. (a) How do you define the superelevation? What are the objects of providing superelevation on curves of a railway track? [[CO3](Analyse/IOCQ)]
- (b) What is cant deficiency? [[CO2](Understand/LOCQ)]
- (c) Write short notes on: (i) Grade compensation on curves and (ii) Vertical curves. [[CO2](Understand/LOCQ)]
- (2 + 4) + 2 + (2 × 2) = 12**

### Group - C

4. (a) Describe the factors that influence the selection of site for a railway station. [[CO2](Understand/LOCQ)]

- (b) What are the requirements of a railway station? [[CO1](Remember/LOCQ)]  
**6 + 6 = 12**
5. (a) Define interlocking and explain the principle of interlocking. [[CO3](Remember/LOCQ)]
- (b) Write short note on track circuiting. [[CO3](Remember/LOCQ)]  
**6 + 6 = 12**

### Group - D

6. (a) Enumerate the factors affecting the selection of site for an airport. [[CO6](Understand/LOCQ)]
- (b) Explain the concept of zoning laws with reference to their limitations. [[CO4](Remember/LOCQ)]  
**6 + 6 = 12**
7. (a) What do you mean by airport capacity? Explain the factors affecting airside capacity. [[CO6](Remember/LOCQ)]
- (b) What are the components of a terminal building in an airport? [[CO4](Remember/LOCQ)]  
**(2 + 4) + 6 = 12**

### Group - E

8. (a) Write short notes on Location signs and Direction signs of an airport. [[CO5](Understand/LOCQ)]
- (b) Write short note on Approach Lighting System (ALS). [[CO6](Remember/LOCQ)]  
**6 + 6 = 12**
9. (a) Explain briefly the procedure of estimating runoff in case of airport drainage. [[CO5](Remember/LOCQ)]
- (b) What are the objectives of subsurface drainage? [[CO5](Remember/LOCQ)]  
**6 + 6 = 12**

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	98	2	0

