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

| Question Paper Code | 13444 |
|---|---|

**B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2025**

Sixth Semester

**Civil Engineering**

**20CEPC602 - RAILWAYS, AIRPORTS AND HARBOR ENGINEERING**

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

**PART - A (MCQ) (10 × 1 = 10 Marks)**

Answer ALL Questions

| | | Marks | K – Level | CO |
|---|---|---|---|---|
| 1. | The narrow gauge is more useful in _____<br>(a) Not useful (b) Plain areas (c) Desert region (d) Mountainous & hilly regions | 1 | K1 | CO1 |
| 2. | According to wave motion theory what causes creep of rail?<br>(a) Moving loads (b) Stationary loads (c) Faulty rails (d) Poor maintenance | 1 | K2 | CO1 |
| 3. | If G is gauge is metres, V is speed of trains in km/hour and R is radius of a curve in metres, the equilibrium super elevation is<br>(a) $e=GV^2/254R$ (b) $e=GV^2/172R$ (c) $e=GV^2/96R$ (d) $e=GV^2/127R$ | 1 | K1 | CO2 |
| 4. | A per the prescribed value, what should be the maximum value of cant excess on Broad gauge?<br>(a) 65mm (b) 75mm (c) 92mm (d) 100mm | 1 | K1 | CO2 |
| 5. | A _____ yard is built using artificial hills, where wagons are pushed by an engine and roll down by gravity into sidings.<br>(a) Gravitational (b) Hump (c) Flat (d) Turnout yard | 1 | K1 | CO3 |
| 6. | Assertion: Hydraulic buffers must be present at terminal station endpoints.<br>Reason: These buffers prevent engines from moving beyond the tracks, ensuring safety.<br>(a) Assertion is True and Reason is False.<br>(b) Assertion is False and Reason is True.<br>(c) Both Assertion and Reason are true, and Reason is correct explanation.<br>(d) Both Assertion and Reason are true, and Reason is incorrect explanation. | 1 | K2 | CO3 |
| 7. | _____ are also called as ramps<br>(a) Apron (b) Hanger (c) Runway (d) None of the mentioned | 1 | K1 | CO4 |
| 8. | Which of the following factor holds good angular parking characteristics?<br>(a) Vehicles are parked making angles with a kerb<br>(b) Right angled parking is adopted only under exceptional conditions<br>(c) Both Vehicles are parked making angles with a kerb & Right angled parking is adopted only under exceptional conditions<br>(d) None of the mentioned | 1 | K2 | CO4 |
| 9. | Effective length of a runway is the distance between<br>(a) Point of intersection of the obstruction clearance line and the extended plane of the runway surface, and the other end of the runway<br>(b) Ends of the runway<br>(c) Point of intersection of the glide path and the extended plane of the runway surface and the other end of the runway<br>(d) Ends of the clear way on either side | 1 | K2 | CO5 |
| 10. | Coastal Regulation Zone (CRZ) Notification, 2011 was notified in<br>(a) January (b) February (c) March (d) April | 1 | K1 | CO6 |

**PART - B (12 × 2 = 24 Marks)**

Answer ALL Questions

| | | | | |
|---|---|---|---|---|
| 11. | What is meant by the term "sleeper density"? | 2 | K1 | CO1 |
| 12. | Write short notes on "Coning of wheels" in railways. | 2 | K2 | CO1 |

| | | | | | |
|---|---|---|---|---|---|
| 13. | Why the widening of gauges is needed in the curves? | 2 | K1 | CO2 |
| 14. | List out the factors which control the alignment of a railway track. | 2 | K1 | CO2 |
| 15. | Classify the methods used for stabilization of tracks in poor soil. | 2 | K2 | CO3 |
| 16. | How signals are classified? | 2 | K1 | CO3 |
| 17. | State the term ICAO and its function. | 2 | K1 | CO4 |
| 18. | Why regional planning is to be considering in airport layout? | 2 | K1 | CO4 |
| 19. | How orientation of runway is done? On what basis it is decided? | 2 | K2 | CO5 |
| 20. | Mention the different zone in airport region. | 2 | K1 | CO5 |
| 21. | What do you understand by littoral drift? | 2 | K1 | CO6 |
| 22. | Why a shore protection work is needed? | 2 | K1 | CO6 |

## PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

| | | | | | |
|---|---|---|---|---|---|
| 23. | a) | Explain the functions and ideal requirements of permanent way with neat sketch. | 11 | K2 | CO1 |
| | | **OR** | | | |
| | b) | Classify the types of track stresses in railway track and explain in detail. | 11 | K2 | CO1 |
| 24. | a) | Write in brief the modern methods of track alignment, survey and design in today's context. | 11 | K2 | CO2 |
| | | **OR** | | | |
| | b) | Illustrate the types of level crossings with neat sketches. | 11 | K2 | CO2 |
| 25. | a) | Explain in detail about plate laying techniques. | 11 | K2 | CO3 |
| | | **OR** | | | |
| | b) | Classify the type of railway stations and explain each one of them in detail. | 11 | K2 | CO3 |
| 26. | a) | Show the Case study of any one Typical airport layout and explain the components. | 11 | K2 | CO4 |
| | | **OR** | | | |
| | b) | Explain how the aircraft characteristics importance in designing of airport. | 11 | K2 | CO4 |
| 27. | a) | | 11 | K3 | CO5 |

| Direction | % within outer parallel lines | Direction | % within outer parallel lines |
|---|---|---|---|
| N | 5.67 | S | 6.00 |
| NEE | 3.85 | SSW | 2.62 |
| NE | 1.50 | SW | 1.00 |
| ENE | 2.50 | WSW | 3.10 |
| E | 2.40 | W | 1.95 |
| ESE | 5.80 | WNW | 7.10 |
| SE | 9.60 | NW | 7.35 |
| SSE | 15.00 | NNW | 13.00 |

The above table gives the wind data recorded from an airport. The permissible cross wind component is 25kmph. Draw the wind rose diagram and determine the calm period, the best direction of runway and the wind coverage.

**OR**

| | | | | | |
|---|---|---|---|---|---|
| | b) | The length of a runway at mean sea level, standard temperature and zero gradients is 1600m. The site has an elevation of 320m, with a reference temperature of 33.6ºC. The runway has to be constructed with an effective gradient of 0.25%. Calculate the actual length of the runway at site. | 11 | K3 | CO5 |
| 28. | a) | Classify different types of break water. Explain in detail. | 11 | K2 | CO6 |
| | | **OR** | | | |
| | b) | Explain the various costal protection works in detail. | 11 | K2 | CO6 |