

# CBGS SCHEME



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21CV52

## Fifth Semester B.E./B.Tech. Degree Examination, June/July 2025 Transportation Engineering

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. Define transportation engineering and explain its role in National Development. (08 Marks)  
b. Explain the major road projects currently under progress in India. (06 Marks)  
c. Four new roads P, Q, R and S are planned in a district. The data for these roads are given below table.

| Road | Length (km) | Number of towns and villages served with population ranges |           |            |         | Total production in 1000 tonnes |
|------|-------------|--|-----------|------------|---------|---------------------------------|
|      |             | 1001-2000  | 2001-5000 | 5000-10000 | > 10000 |                                 |
| P    | 300         | 160  | 80        | 30         | 6       | 200                             |
| Q    | 400         | 200  | 90        | 60         | 8       | 270                             |
| R    | 500         | 240  | 110       | 70         | 1       | 315                             |
| S    | 500         | 248  | 112       | 73         | 1       | 355                             |

Based on principle of maximum utility, find out the order of priority for these four roads.

(06 Marks)

OR

- 2 a. What is the necessity of Highway Planning? Explain the various planning surveys to be conducted before finalising the alignment. (10 Marks)  
b. What are the requirements of an ideal alignment? Explain the various engineering surveys to be conducted before finalising the alignment. (10 Marks)

### Module-2

- 3 a. With neat sketch explain the cross-sectional elements of a pavement. (12 Marks)  
b. A car moving with a speed of 80 kmph has to overtake another car moving at a speed of 64 kmph in the 2 lane one way highway. If the reaction time of driver is 2 seconds and acceleration of overtaking car is  $0.95 \text{ m/s}^2$ , calculate safe OSD. (08 Marks)

OR

- 4 a. Calculate the Extra widening required for a 2-lane national highway at a horizontal curve of 300 m radius, considering a wheel base of 8 m and a design speed of 100 kmph. (04 Marks)  
b. A valley curve is formed by a descending grade of 1 in 25 meeting an ascending grade of 1 in 30. Design the length of valley curve to fulfill both comfort condition and head light sight distance requirements for a design speed of 80 kmph. Assume allowable rate of change of centrifugal acceleration  $C = 0.6 \text{ m/s}^3$ . (08 Marks)  
c. Differentiate between Flexible and Rigid Pavements. (08 Marks)

**Module-3**

- 5 a. Explain the desirable properties of aggregates along with the tests conducted to measure the same. (08 Marks)  
b. Explain the California Bearing Ratio Test with neat figure. (12 Marks)

**OR**

- 6 a. Explain the applications of different types of viscosity grade Bitumen. (08 Marks)  
b. Explain the material specifications, construction procedure and quality control of cement concrete pavement layer. (12 Marks)

**Module-4**

- 7 a. Explain hydrological and hydraulic analysis procedure used in the design of surface drainage system. (10 Marks)  
b. Briefly explain the various methods used in highway economic analysis. (10 Marks)

**OR**

- 8 a. With a neat sketch explain different methods of providing sub-surface drainage system. (12 Marks)  
b. Write a note on BOT, BOD, BOOT, BOLT, DBFO, HAM, LDO and OMT. (08 Marks)

**Module-5**

- 9 a. Explain the causes and measures to reduce road accidents. (04 Marks)  
b. With neat sketch, mention the requirements of an ideal permanent way. (08 Marks)  
c. With neat figure briefly explain the layout of an airport. (08 Marks)

**OR**

- 10 a. Calculate the number of sleepers required for constructing a BG track of length 1050 m with sleeper density of  $M + 5$ . (04 Marks)  
b. The length of runway under standard conditions is 2000 m. The elevation of airport site is 300 m. Its reference temperature is  $33.05^{\circ}\text{C}$ . If the runway is to be constructed with an effective gradient of 0.25%, calculate the corrected runway length. (08 Marks)  
c. Briefly explain how the direction of runway is determined using windrose diagram. (08 Marks)

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