*Roll No.* _____

# END SEMESTER EXAMINATION
## SEMESTER- V

**COURSE CODE : CE501** | **DURATION : 3 (THREE)HRS**
**COURSE TITLE : HIGHWAY & TRANSPORTATION ENGINEERING** | **MAXIMUM MARKS : 75**
**PASS MARKS : 35 %**
**SESSION : JULY-DEC.' 2021**

*NOTE:* *1. Attempt any 5 (five) questions.*
*2. Mark for each question is shown against it.*
*3. Assume suitable logical data wherever necessary.*

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| **1.** | **(a)** | When, Where and Why the Central Road Research Institute is established? | **(5)** |
| | **(b)** | Briefly outline the classification of roads based on location and function as suggested by I.R.C. | **(5)** |
| | **(c)** | What are the various plans to be prepared after the planning surveys are carried out? | **(5)** |
| | | | |
| **2.** | **(a)** | Explain the necessity and objects of Highway Planning. | **(5)** |
| | **(b)** | What are the various Methods of classifying roads? Briefly outline the Classification based on location and function as suggested in the Nagpur Road plan. | **(10)** |
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| **3.** | **(a)** | The speed of overtaking and overtaken Vehicles is 80 and 50 kmph, respectively on two way traffic. Calculate the safe overtaking sight distance. What is the minimum and desirable length of overtaking zone? Draw a neat sketch of the overtaking zone showing the positions of Sign post. Assume all other data suitably. | **(10)** |
| | **(b)** | What are the types of gradient? Briefly explain each type. | **(5)** |
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| **4.** | **(a)** | What is super elevation? Derive the relation between superelevation and speed of the vehicle on horizontal curve. Design the rate of superelevation for a horizontal curve of a radius 500 m and speed 100km/hr. | **(15)** |
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| **5.** | **(a)** | Explain with neat Sketches how the subsurface drainage system is provided to lower the water table in (a) permeable soils (b) in impermeable soil | **(10)** |
| | **(b)** | Calculate the stopping sight distance on a highway ata a descending gradient of 4% for a design speed of 60 kmph. Assume reaction time of driver =2.5 secs and co-efficient of friction between tyre and road surface = 0.4. | **(5)** |
| | | | |
| **6.** | **(a)** | . Compare and contrast flexible and rigid pavements. | **(5)** |
| | **(b)** | Draw a neat diagram showing various component layers of CC pavement structure. Mention the objectives of each. | **(7)** |
| | **(c)** | Enumerate the function of camber in road. | **(3)** |
| | | | |
| **7.** | **(a)** | Explain CBR and the test procedure in the Laboratory. How are the results of the test obtained and interpreted? | **(8)** |
| | **(b)** | Differentiate between the followings: (a) Cut-backs and Emulsion (b) Softening point and flash point Bitumen. | **(4)** |
| | **(c)** | What are functions of soil as a highway grade? | **(3)** |
| | | | |
| **8.** | **(a)** | Describe the Los Angeles Abrasion test for road aggregates and explain its significance. | **(8)** |
| | **(b)** | What is water bound macadam roads? Explain the detailed procedure for its construction. | **(7)** |

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