**20CE603**

**Hall Ticket Number:**

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| **III/IV B.Tech (Regular) DEGREE EXAMINATION** | | | |
| **July/August, 2023** | **Civil Engineering** | | |
| **Sixth Semester** | **Highway Engineering** | | |
| **Time:** Three Hours | | **Maximum:** 70 Marks | |
| ***Answer question 1 compulsory.*** | | | **(14X1 = 14Marks)** |
| ***Answer one question from each unit.*** | | | **(4X14=56 Marks)** |
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|  |  |  | CO | BL | M |
| 1 | a) | Define the term alignment. | CO1 | L1 | 1M |
|  | b) | Explain the effect of off-tracking of vehicles | CO1 | L2 | 1M |
|  | c) | What are the factors on which the stopping sight distance depends? Explain briefly. | CO1 | L1 | 1M |
|  | d) | What is Traffic Rotary? | CO2 | L1 | 1M |
|  | e) | Define Weaving traffic. | CO2 | L1 | 1M |
|  | f) | Explain basic capacity. | CO2 | L2 | 1M |
|  | g) | State the components of the flexible pavements. | CO3 | L2 | 1M |
|  | h) | Define dowel bar and what are its uses. | CO3 | L1 | 1M |
|  | i) | What are the requirements of flexible pavement? | CO3 | L1 | 1M |
|  | j) | How the excavation is done in highway construction? | CO4 | L2 | 1M |
|  | k) | Define tack coat and what is its purpose. | CO4 | L1 | 1M |
|  | l) | Briefly list the method of construction of gravel roads. | CO4 | L2 | 1M |
|  | m) | What are the different Road Network Patterns available? | CO1 | L1 | 1M |
|  | n) | Explain possible capacity. | CO2 | L2 | 1M |
| **Unit-I** | | | | | |
| 2 | a) | Briefly explain the engineering surveys needed for locating a new highway. | CO1 | L2 | 7M |
|  | b) | What is the importance of Nagpur road plan in highway planning of our country? Explain the plan formula and the salient features of the plan. | CO1 | L1 | 7M |
|  |  | **(OR)** |  |  |  |
| 3 | a) | Derive the equation for stopping sight distance at level and grades. | CO1 | L2 | 7M |
|  | b) | The speed of overtaking and overtaken vehicles are 70 and 40 Kmph, respectively on a two way traffic road. If the acceleration of overtaking vehicle is 0.99m/sec2.  i) Calculate safe overtaking sight distance  ii) mention the minimum length of overtaking zone and  iii) Draw a neat sketch of the overtaking zone and show the positions of the sign posts. | CO1 | L4 | 7M |
| **Unit-II** | | | | | |
| 4 | a) | Discuss various road user characteristics in traffic engineering. | CO2 | L1 | 7M |
|  | b) | What are the various types of road markings commonly used? What are the uses of each? | CO2 | L1 | 7M |
| **(OR)** | | | | | |
| 5 | a) | The average normal flow of traffic on cross roads A and B during period are 400 and 250 PCU Per hour: the saturation flow values on these roads are estimated as 1250 and 1000 PCU Per hour respectively. The all-red time required for pedestrian crossing is 12Secs. Design two phase traffic signal by Webster’s method. | CO2 | L4 | 7M |
|  | b) | What are the various types of traffic signs commonly used. | CO2 | L1 | 7M |
| **Unit-III** | | | | | |
| 6 | a) | Explain the functions of various layers in flexible pavement with a neat sketch. | CO3 | L2 | 7M |
|  | b) | Explain CBR method and the test procedure in laboratory. How are the results of the test obtained and integrated. | CO3 | L2 | 7M |
| **(OR)** | | | | | |
| 7 | a) | Briefly outline the IRC recommendations for determining the thickness of the cement concrete pavements? | CO3 | L2 | 7M |
|  | b) | Explain Flexible and Rigid Pavements and bring out the points of difference. | CO3 | L2 | 7M |
| **Unit-IV** | | | | | |
| 8 | a) | Explain the construction of dense bituminous macadam along with its specifications. | CO4 | L2 | 7M |
|  | b) | Explain in detail the construction of cement concrete pavement. | CO4 | L2 | 7M |
| **(OR)** | | | | | |
| 9 | a) | Explain briefly about classification of maintenance works? | CO4 | L2 | 7M |
|  | b) | Explain various failures in flexible pavements. | CO4 | L1 | 7M |

