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**PRESIDENCY UNIVERSITY**

**Bengaluru**

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| **End - Term Examinations – JANUARY 2025** |
| **Date:** 09 / 01/ 2025 **Time:** 01:00 pm – 04:00 pm |

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| --- | --- | --- |
| **School:** SOE | **Program:** B.Tech-CIV | |
| **Course Code :**CIV2016 | **Course Name :** Transportation Engineering | |
| **Semester**: III | **Max Marks**: 100 | **Weightage**: 50% |

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| --- | --- | --- | --- | --- | --- |
| **CO - Levels** | **CO1** | **CO2** | **CO3** | **CO4** | **CO5** |
| **Marks** | **2** | **52** | **46** | **-** | **-** |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Do not write anything on the question paper other than roll number.*

**Part A**

**Answer ALL the Questions. Each question carries 2marks. 10Q x 2M=20M**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **1** | List any two objectives of providing transition curve in highways | **2 Marks** | **L1** | **CO2** |
| **2** | Define the following  a) Flakiness index b) Elongation index | **2 Marks** | **L1** | **CO1** |
| **3** | List the types of gradients to be provide on highways as per IRC | **2 Marks** | **L1** | **CO2** |
| **4** | Define the following term related to highway geometric design  a) Intermediate sight distance b) Camber | **2 Marks** | **L1** | **CO2** |
| **5** | List any four factors affecting highway geometric design | **2 Marks** | **L1** | **CO2** |
| **6** | List any four test to be conducted to assess the properties of bitumen in laboratory | **2 Marks** | **L1** | **CO2** |
| **7** | Define super elevation and mention the purpose of proving super elevation on horizontal curves | **2 Marks** | **L1** | **CO2** |
| **8** | Define gauge of a railway track. What is width of gauge in mm for broad gauge | **2 Marks** | **L1** | **CO3** |
| **9** | List any four requirements of a highway alignment | **2 Marks** | **L1** | **CO3** |
| **10** | List any two disadvantageous of air transport | **2 Marks** | **L1** | **CO3** |

**Part B**

**Answer the Questions. Total Marks 80**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **11** | **11a** | list the factors affecting stopping sight distance (SSD) and overtaking sight distance (OSD) | **6 Marks** | **L1** | **CO2** |
| **11b** | Calculate the safe stopping sight distance for design speed of 80 kmph for  a) Two way traffic on two lane road  b) Two way traffic on single lane road  Take friction coefficient is 0.36 and reaction time of driver is 2.5 sec | **14 Marks** | **L3** | **CO2** |
| **Or** | | | | | |
| **12** | **12a** | With the help of neat sketch show the cross section elements of highway in embankment and cutting | **6 Marks** | **L2** | **CO2** |
| **12b** | The speed of overtaking and overtaken vehicle are 70 Kmph and 40 Kmph, respectively on a two way traffic road. If the acceleration of overtaking vehicle is 0.99 m/s2.  a) Calculate safe overtaking sight distance  b) Calculate the minimum and desirable length of overtaking zone  c) Draw the sketch of overtaking zone and show the position of sign post | **14 Marks** | **L3** | **CO2** |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| **13** | **13a** | What are the functions of following components of highway  a) Median or or Traffic Separator b) Road shoulder | **6 Marks** | **L1** | **CO2** |
| **13b** | Determine the length of the transition curve using the following data:  Design speed= 65 kmph  Radius of circular curve= 220 m  Allowable rate of super elevation= 1 in 150  Pavement width including extra widening = 7.5 m  Pavement rotated about the centre line of the payment | **14 Marks** | **L3** | **CO2** |
| **Or** | | | | | |
| **14** | **14a** | While aligning a hilly road with a ruling gradient of 6%, a horizontal curve of radius 60 m is encountered. Find the compensated gradient at the curve. | **6 Marks** | **L2** | **CO2** |
| **14b** | A valley Curve is formed by a descending grade of 1 in 25 meeting an ascending grade of 1 in 20. Design the length of valley curve to fulfill both comfort condition and head light sight distance requirements for a design speed of 80kmph. Assume allowable rate of change of centrifugal acceleration is 0.6 m/s3**.** | **14 Marks** | **L3** | **CO2** |
|  |  |  |  |  |  |
| **15** | **15a** | List and explain the types of surveys required for airport planning | **6Marks** | **L2** | **CO3** |
| **15b** | A vertical summit curve is to be designed when two grades, +1/50 and -1/80 meet on a highway. The SSD and OSD required are 180 and 640 m respectively. But due to the site conditions the length of the vertical curve has to be restricted to a maximum value of 500 m if possible. Calculate the length of the summit curve needed to fulfil the requirements of SSD , OSD or atleast ISD**.** | **14 Marks** | **L3** | **CO3** |
| **Or** | | | | | |
| **16** | **16a** | List and explain any three types of defects in rails | **6 Marks** | **L1** | **CO3** |
| **16b** | Design the rate of super elevation for a horizontal highway curve of radius 500 m and speed 100 kmph.  Assume missing data as per IRC guidelines | **14 Marks** | **L3** | **CO3** |
|  |  |  |  |  |  |
| **17** | **17a** | With the help of neat sketch explain the components of a railway track | **12 Marks** | **L2** | **CO3** |
| **17b** | For a sleeper density of (n+5), calculate the number of sleepers required for constructing a broad gauge railway track of length 650. Take length of one rail for the broad gauge = 13m | **8 Marks** | **L2** | **CO3** |
| **Or** | | | | | |
| **18** | **18a** | With help of neat sketch explain the typical layout of an airport and its Components | **12 Marks** | **L2** | **CO3** |
| **18b** | Calculate the actual length of the runway from the following data:  Airport elevation: RL 100 m  Airport reference temperature: 28oC  Basic runway length: 600m  Highest point along the length: RL 98.2 m  Lowest point along the length: RL 95.2 m | **8 Marks** | **L2** | **CO3** |

**\*\*\*\*\* BEST WISHES \*\*\*\*\***