

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-V (NEW) EXAMINATION – WINTER 2018

Subject Code:2150601

Date:07/12/2018

Subject Name: Highway Engineering

Time: 10:30 AM TO 01:00 PM

Total Marks: 70

Instructions:

- 1. Attempt all questions.**
- 2. Make suitable assumptions wherever necessary.**
- 3. Figures to the right indicate full marks.**

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|------------|------------|---|-----|---------------------------|
| Q.1 | (a) | What are the significant recommendations of Jayakar Committee Report? | | 03 |
| | (b) | Define the following terms: | | 04 |
| | i. | Camber | ii. | Stopping sight distance |
| | iii. | Super elevation | iv. | Overtaking sight distance |

- (c)** Explain the factors controlling the alignment of roads with the help of sketches. **07**

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| Q.2 | (a) Draw the cross section of divided highway in urban area. | 03 |
| | (b) What do you mean by camber? What are the objects of camber? Discuss the factors on which the amount of camber to be provided depends. | 04 |
| | (c) Derive an expression for calculating the stopping sight distance at level and at grades. | 07 |

OR

- (c) Derive an expression for calculating overtaking sight distance on a highway. 07

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| Q.3 | (a) Design the rate of super elevation for a horizontal highway curve of radius 300 m and speed 80 kmph. | 03 |
| | (b) List the various types of transition curves used in highways. What is an ideal transition curve? Explain. | 04 |
| | (c) Derive an expression for finding the extra widening required on horizontal curve. | 07 |

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| Q.3 | (a) Calculate the safe overtaking sight distance for design speed of 96 kmph. Assume all other data suitably. | 03 |
| | (b) Explain ruling, maximum and exceptional gradients. Specify the values recommended by IRC for plains and hill. | 04 |
| | (c) Enlist the objects of traffic volume studies. Explain various methods of carrying out traffic volume study. | 07 |

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| Q.4 | (a) Distinguish between flexible pavement and rigid pavement | 03 |
| | (b) Explain the various desirable properties of road aggregates briefly. | 04 |
| | (c) Enlist the various tests for road aggregate. Explain impact test with the help of neat sketch and recommended values as per IRC. | 07 |

OR

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| Q.4 | (a) Compare tar and bitumen. | 03 |
| | (b) List the various test conducted on bitumen. Explain penetration test of bitumen. | 04 |
| | (c) Show the various typical failures in flexible pavement with the help of neat sketches. | 07 |

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| Q.5 | (a) Write the significance of highway drainage. | 03 |
| | (b) Write short note on: Prevention of landslides. | 04 |
| | (c) Explain various types of parking with the help of neat sketches. | 07 |

- Q.5 (a) What are the advantages and disadvantages of traffic signals? 03
(b) Briefly explain road side development and arboriculture. 04
(c) Explain sub surface drainage to lower the water table and control of seepage flow with the help of neat sketches. 07

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