

Registration No:

--	--	--	--	--	--	--	--	--	--

Total Number of Pages: 02

**B.TECH.**  
**PCI41102**

**4<sup>TH</sup> Semester Regular Examination 2016-17**  
**HIGHWAY & TRAFFIC ENGINEERING**  
**BRANCH: CIVIL ENGINEERING**

**Time: 3 Hours**

**Max Marks: 100**

**Q.CODE: Z561**

**Answer Part-A which is compulsory and any four from Part-B.**  
**The figures in the right hand margin indicate marks.**

**Part – A (Answer all the questions)**

**Q1 Answer the following questions: (2 x 10)**

- The total thickness of Roman road is \_\_\_\_\_. The consumers of petrol were charged an extra levy of rupees \_\_\_\_\_ per litre of petrol to built up road development fund as per CRF act 2000.
- Nagpur road plan formulae were prepared by assuming \_\_\_\_\_ type of road pattern. In first 20-years road plan an allowance of \_\_\_\_\_ percentage is provided for agricultural industrial development.
- As per IRC, minimum width of vehicle is \_\_\_\_\_ with a minimum clearance of \_\_\_\_\_ in case of single lane road.
- WBM roads in localities of heavy rainfall area, the recommended value of camber is \_\_\_\_\_. Guard rail is provided when the road is constructed on a fill exceeds \_\_\_\_\_.
- IRC recommended the minimum shoulder width is \_\_\_\_\_. IRC recommended the minimum desirable width of median for urban area is \_\_\_\_\_.
- Desirable length of overtaking zone is \_\_\_\_\_. The vehicle would overturn on the outer side before skidding if 'f' is \_\_\_\_\_.
- Desirable length of overtaking zone is \_\_\_\_\_. The vehicle would overturn on the outer side before skidding if 'f' is \_\_\_\_\_.
- As per IRC, the maximum value of grade compensation for design IS \_\_\_\_\_. The minimum CBR value of subgrade as per and IRC:37-2012 is \_\_\_\_\_.
- As per IRC, the height of driver eye above road surface for SSD is \_\_\_\_\_ and the reaction time of driver for OSD is \_\_\_\_\_.
- The road which is run parallel to highway and isolated by separator is known as \_\_\_\_\_. Equipment used for measurement of unevenness of pavement is \_\_\_\_\_.

**Q2 Answer the following questions: (2 x 10)**

- What are the disadvantages of attainment of superelevation by elimination of crown of the camber section?
- Differentiate between bitumen and Tar.
- What is vehicle damage factor and lane distribution factor?
- Define 98<sup>th</sup>, 85<sup>th</sup> and 15<sup>th</sup> percentile speed.
- What are the functions of dowel bar and tie bar in rigid pavement?

- f) Differentiate between time mean and space mean speed.
- g) Write any two factors which affect the highway capacity.
- h) What are the disadvantages occur due to improper alignment of highway?
- i) Define PCU.
- j) Why minimum gradient is provided on a highway.

### **Part – B (Answer any four questions)**

- Q3** a) Compare the Nagpur road plan and Bombay road plan. Mention the merits of each. **(8)**
- b) What is the different classification of road based on Lucknow Road Plan? **(7)**  
Briefly explain the different types of road in urban area
- Q4** a) What are the factors affecting the ODS. Calculate the safe overtaking sight distance for a two-way two lane SH for a design speed of 60 kmph, acceleration of overtaking vehicle is  $0.99 \text{ m/sec}^2$ . assume all other data as per IRC. **(8)**
- b) Briefly explain the various stages of work in a new highway project. **(7)**
- Q5** a) Explain the relationship between speed, travel time, volume, density and capacity with figure. **(8)**
- b) A valley curve is formed by a descending grade of 1 in 30 meeting an ascending grade of 1 in 25. Design the length of valley curve for a design speed of 65 kmph. The average height of the head light is 0.8m and beam angle is  $2^\circ$ . **(7)**
- Q6** a) Derive an expression for finding the superelevation required at a horizontal curve **(8)**
- b) What is the significance of softening point test? Briefly explain the softening point test of bitumen. **(7)**
- Q7** a) Design the length of transition curve for a two lane two-way NH having design speed 75 Kmph and radius of circular curve is 225m. Allowable rate of introduction of superelevation is 1 in 150. Pavement rotated about inner edge. **(8)**
- b) Briefly explain the floating car method for speed and delay study. **(7)**
- Q8** a) Explain the various types of failures in flexible pavements and their causes. **(9)**
- b) Explain how the problem of road construction in water logged area may be solved **(6)**
- Q9** a) Specify the materials required for construction of WBM roads. Write down the construction steps for WBM road.. **(8)**
- b) What are the different stress develop in rigid pavement, explain the critical combination of stress due to wheel load and temperature effect **(7)**