BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI
FIRST SEMESTER 2016 – 2017
RURAL ROAD TECHNOLOGY - Mid Semester Exam

Course No: CE G549 **Date: 5-10-2016[4pm start]**
Duration: 90 Mins (Closed book) **Max. Marks: 50**

Note:

I: Choose the best answers: **[10 x 1=10]**

1. What are the activities done by PTA's?
2. The minimum cross-slope to be provided at shoulder is _____%.
3. Maximum allowable rutting for flexible pavements in rural road is _____.
4. The minimum 28 day compressive strength required for design of concrete pavement for rural roads is _____.
5. The total length of rural roads constructed during the PMGSY scheme is _____
6. The codal provision used for the design of flexible rural roads with low volume is _____.
7. The rainfall is considered as extremely high if the rainfall intensity exceeds _____.
8. As per the guidelines for the rural roads, the minimum soaked CBR specified for the sub-base is _____.
9. The chainage 1/500 indicates _____.
10. The full title of "IRC 56-2011" is _____.

II: Short answers **[10 x 2 = 20]**

1. What were the major reasons behind the failure of earlier road plans (before PMGSY) in India? When did PMGSY start? Who was our Prime Minister during that period? (1+0.5+0.5)
2. What is a core network? What are the different components of core network? Who are national quality and state quality monitors? (0.5+0.5+1)
3. What is grade compensation? What is the maximum allowable value for grade compensation? (1+1)
4. How traffic is estimated, as per design guidelines given in IRC SP 72-2007? How many days flexural strength is required for design of concrete pavements in rural roads? (1+1)
5. What are the different types of drainage system? What data are required before starting a drainage design? (1+1)
6. Warm Mix Asphalt Vs Hot Mix Asphalt - Discuss merits and demerits.
7. What is the difference between plan and map? What is meant by linear chart in DPR?
8. What are the advantages of Jute Coir and Plastic waste in the rural road construction?
9. Explain the vehicle axle configuration with the articulation (1.22+2.22).
10. The following is the code with respect to the preparation of DPR. Explain the meaning.

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III: Long answers: **[20 marks]**

1. For an area of 500 sq.km, the peak discharge found for strata of sandy soil is 4 x 10^6 cm^3/sec. Find the critical intensity of rainfall if the coefficient of runoff is 0.20. Design a trapezoidal concrete drainage system with side slope of 30 degrees. The height and base width for the

section is 40 cm and 30 cm. Assume 80% of the height will be wetted. Allowable velocity for concrete drain is 6 m/sec and Manning coefficient is 0.013. [3]

2. Explain the different joints in concrete pavement for rural roads using suitable sketches. What are the critical stress considered in design of considered in design of concrete pavement in rural roads for traffic level between 50-150 cvpd? [3+2]
3. Derive the expression for extra-widening. Why is it provided? [2]
4. Answer the following with respect to the rural roads and DPR. [5 x 2 = 10]
    a) What are the two volumes of DPR? What are the basic ingredients of the DPR?
    b) Who is responsible for the preparation of DPR? What is the qualification criterion of the DPR consultant?
    c) What is the maintenance period of the rural roads after the construction of roads?
    d) What is the recent development with respect to monitoring of the rural roads?
    e) What is the approximate cost of construction of road? What are the basic reasons for the failure of roads?