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Question Paper Code: 51134

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2016

Third Semester

Civil Engineering

15UCE304 - HIGHWAY AND RAILWAY ENGINEERING

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

- The sequence of four stages of survey in a highway alignment is
 - reconnaissance survey, map study, preliminary survey and detailed survey
 - map study, preliminary survey, reconnaissance survey and detailed survey
 - preliminary survey, map study, reconnaissance and detailed survey
 - map study, reconnaissance, preliminary survey and detailed survey
- Minimum stopping distance for moving vehicles on road with a design speed of 80 km/hour, is
 - 80 m
 - 100 m
 - 150 m
 - 200 m
- Which of the following tests measure the toughness of road aggregates?
 - crushing strength test
 - abrasion test
 - impact test
 - shape test
- The maximum thickness of expansion joints in rigid pavement is
 - 5 mm
 - 25 mm
 - 50 mm
 - 100 mm

5. The suitable surfacing material for a bridge deck slab is
- (a) sheet asphalt (b) mastic asphalt
(c) bituminous carpet (d) rolled asphalt
6. The maximum thickness of expansion joints in rigid pavement is
- (a) 5 mm (b) 25 mm (c) 50 mm (d) 100 mm
7. In India, the first train was run between
- (a) Bombay and Pune (b) Delhi and Bombay
(c) Delhi and Calcutta (d) Bombay and Thane
8. In railway locomotives, coning of wheels is done at a slope of
- (a) 1 in 15 (b) 1 in 20 (c) 1 in 25 (d) 1 in 30
9. In India, usually plate laying is done by the method of
- (a) American method (b) Telescopic method
(c) Side method (d) None of the above methods used
10. The station, where trains do not stop is called
- (a) flag station (b) way side station
(c) block station (d) junction station

PART - B (5 x 2 = 10 Marks)

11. How roads are classified based on location and function?
12. Mention the components of flexible and rigid pavements.
13. Give the various typical failures in cement concrete pavements.
14. What are the various gauges adopted by Indian Railways?
15. Differentiate between railway station and railway yard.

PART - C (5 x 16 = 80 Marks)

16. (a) Briefly explain the engineering surveys needed for locating a new highway. (16)

Or

(b) The speeds of overtaking and overtaken vehicles on a two-way traffic road are 90 km/h and 60 km/h respectively. The acceleration of overtaking vehicle is 0.95 m/sec^2 .

- (i) Calculate safe overtaking sight distance
- (ii) Mention the minimum length of overtaking zone
- (iii) Calculate the desired length of overtaking zone (16)

17. (a) Discuss the desirable properties of road aggregate. List the various test carried out on road aggregate and briefly mention the use of each test. (16)

Or

(b) Design the flexible pavement for construction of new highway with the following data.

Number of commercial vehicles as per last count = 1000 commercial vehicles

Period of construction = 3 years

Annual traffic growth rate = 8 %

Design CBR of subgrade soil = 10%

Category of road : National highways, two lane single carriage way

Design life : 15 Years (16)

18. (a) (i) Write down the steps involved in water bound Macadam road construction. (8)

(ii) What are the requirements for a good highway drainage system? (8)

Or

(b) Write the major defects in flexible pavements and their remedial measures. (16)

19. (a) Draw a typical cross section of a permanent way and indicate its components. Explain various functions of each component. (16)

Or

(b) (i) A 5° curve diverges from a 3° main curve in reverse direction in the layout of B.G Yard. If the speed on the branch line is restricted 35 kmph .determine the restricted speed on the main curve. (10)

(ii) Why widening of gauges is necessary in the curves? Justify. (6)

20. (a) Explain the different types of signals used in the station. (16)

Or

(b) Explain in detail about the various methods of plate laying in the construction of a railway track. (16)
