

Total No. of printed pages = 5

**END SEMESTER EXAMINATION – 2021**

Semester : 5th (New/Old Syllabus)

Subject Code : CT-505

**TRANSPORTATION ENGINEERING**

Full Marks – 70

Time – Three hours

The figures in the margin indicate full marks for the questions.

**Instructions :**

1. *All* questions of PART–A are compulsory.
2. Answer *any three* questions from PART–B.

**PART – A**

**Marks – 25**

1. Fill in the blanks : 1×10=10
  - (a) Indian Road Congress (IRC) was formed in the year \_\_\_\_\_.
  - (b) The meeting of second 20-year Road Development Plan was held in the place \_\_\_\_\_.

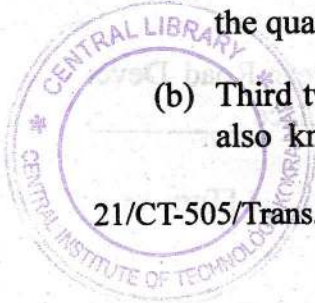
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- (c) The shape of camber best suited for cement concrete pavement is \_\_\_\_\_.
- (d) Motor Vehicle Act was passed in the year \_\_\_\_\_.
- (e) Camber in the road is provided for \_\_\_\_\_.
- (f) Loss Angeles Abrasion test is used to measure \_\_\_\_\_ value of aggregates.
- (g) Ductility test is carried out in \_\_\_\_\_ material.
- (h) The value of CBR in CBR test is calculated at \_\_\_\_\_ mm penetration.
- (i) The maximum allowable Los Angeles abrasion value for high quality surface course is \_\_\_\_\_.
- (j) Aggregate impact test is used to measure \_\_\_\_\_ value of aggregates.

2. Write true or false : 1×10=10

- (a) Flakiness index test is carried out to determine the quality of bitumen.
- (b) Third twenty year Road Development Plan is also known as Nagpur Road Plan.

21/CT-505/Trans.Engg.(N/O) (2)



- (c) One of the main purpose of providing ballast is to increase the drainage.
- (d) Reaction time of a driver increases with the increase in speed of the vehicle.
- (e) PIEV theory is related to the stopping distance of train in railway engineering.
- (f) The slope of the flange part of railway wheel is 1:15.
- (g) Reaction time of a driver is usually considered as 5 seconds.
- (h) Cant is provided in highway to regulate the traffic flow.
- (i) The gauge distance for a B.G. track is 3.0m.
- (j) The maximum width of a single lane highway in India is 8.0m.

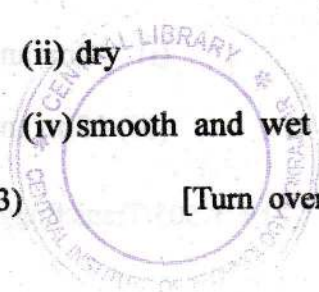
3. Choose the correct answers :  $1 \times 5 = 5$

(a) Coefficient of friction is less when the pavement surface is

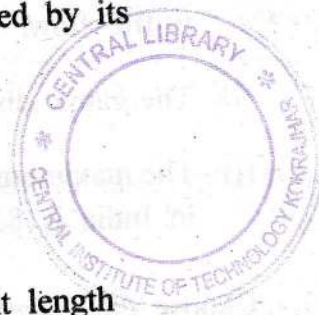
- (i) rough
- (ii) dry
- (iii) smooth and dry
- (iv) smooth and wet

21/CT-505/Trans.Engg.(N/O) (3)

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- (b) Stopping sight distance is always
- (i) less than overtaking sight distance
  - (ii) equal to overtaking sight distance
  - (iii) more than overtaking sight distance
  - (iv) None of the above
- (c) Compared to a level surface, on a descending gradient, the stopping sight distance is
- (i) less                      (ii) more
  - (iii) same                    (iv) dependent on the speed
- (d) The rail is designated by its
- (i) length
  - (ii) weight
  - (iii) cross-section
  - (iv) weight per unit length
- (e) The standard length of a rail in BG and MG are respectively
- (i) 12m and 12m    (ii) 12m and 13m
  - (iii) 13m and 12m    (iv) 13m and 13m



PART – B

Marks – 45

4. Explain the CBR method of pavement design. How is this method useful to determine thickness of component layers ?  $5+10=15$
5. Specify the materials required for construction of earth roads. Discuss the advantages and limitations of earth roads.  $5+10=15$
6. What are the different components of a permanent way or a railway track ? State the functions of each of the components ?  $5+10=15$
7. What is sight distance ? What are the different sight distance situations considered in the design ?
  - (a) Calculate the minimum and desirable length of overtaking zone.
  - (b) Calculate the minimum sight distance required to avoid a head on collision of two cars approaching from the opposite directions at 90 and 60 km/hr. Assume a reaction time of 2.5 seconds, co-efficient of friction of 0.7 and a brake efficiency of 50 per cent, in either case.  $8+7=15$

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