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 _____.

[Turn over

(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.

(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 : 1×5=5

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

(i) rough (ii) dry

(iii) smooth and dry (iv) smooth and wet

(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