

CS/B.Tech/CE(O)/ODD/SEM-7/CE-703C/2019-20



**MAULANA ABUL KALAM AZAD UNIVERSITY OF
TECHNOLOGY, WEST BENGAL**

Paper Code : CE-703C

PUID : 07227 (To be mentioned in the main answer script)
**ADVANCED HIGHWAY AND TRANSPORTATION
ENGINEERING**

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own
words as far as practicable.*

GROUP - A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any ten of the following : $10 \times 1 = 10$
 - i) The basic objective of traffic engineering is to achieve
 - a) ~~Efficient, free and rapid flow of traffic with least priority given to accidents~~
 - b) Efficient, free and rapid flow of traffic with fewer accidents
 - c) Efficient and rapid flow of traffic
 - d) Rapid flow of traffic.

**** -7517/7(O)**

[Turn over

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- ii) When the width of car parking space and width of street are limited, generally preferred parking system is
- a) Parallel Parking
 - ~~b) 45 degree parking~~
 - c) 65 degree parking
 - d) 90 degree parking.
- iii) Speed regulations on roads is decided on the basis of
- a) 60 percentile cumulative frequency
 - b) 75 percentile cumulative frequency
 - ~~c) 80 percentile cumulative frequency~~
 - d) 95 percentile cumulative frequency.
- iv) Which one is not a public transport mode
- a) MRTS
 - b) BRTS
 - ~~c) LRTS~~
 - d) CAR.
- v) The first stage in the function of traffic engineering department is
- a) Planning and design
 - b) Collection of data
 - ~~c) Investigations~~
 - d) Finance.
- vi) The rial is designated by its
- ~~a) Length~~
 - b) Weight
 - c) Cross-section
 - d) Weight per unit length.

- vii) Creep is the
- ~~a) Longitudinal movement of rail~~
 - b) Lateral movement of rail
 - c) Vertical movement of rail
 - d) Difference in level of two rails.
- viii) Maximum degree of curvature for MG rail is limited to
- a) 10 degree
 - b) 16 degree
 - c) 30 degree
 - ~~d) 26 degree.~~
- ix) The maximum number of vehicles can be parked with
- a) Parallel parking
 - ~~b) right angle parking~~
 - c) 45° angle parking
 - d) 75° angle parking.
- x) The colour of light used for visibility during fog is
- ~~a) Red~~
 - b) Yellow
 - c) Green
 - d) White.
- xi) The most efficient traffic signal system is
- a) Simultaneous system
 - b) alternate system
 - ~~c) flexible progressive system~~
 - d) simple progressive system.
- xii) A complete signal-time cycle constitutes
- a) red timing
 - b) yellow timing
 - c) green timing
 - ~~d) all of these.~~

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GROUP - B

(Short Answer Type Questions)

Answer any three of the following. $3 \times 5 = 15$

2. What are the human factors and driver characteristics in traffic engineering ? Discuss. $2 + 3$
3. Classify airports based on ICAO and FAA. 5
4. a) Draw the schematic of planning process showing the various stages of transportation planning.
b) How the land-use and transportation demand are related to each other ? $4 + 1$
5. a) What are the different surveys are conducted to fix a best possible alignment in a railway project ?
b) What is superelevation ? What are the limits of superelevation in Indian railway system ? $1 + 4$
6. a) What is Apron ? What are the parameters are considered while design the size of the Apron ?
b) Discuss the factors which control the Taxiway Layout. $2 + 3$

GROUP - C

(Long Answer Type Questions)

Answer any three of the following. $3 \times 15 = 45$

7. a) Discuss the regulatory traffic signs with sketch.
b) Write the advantages and disadvantages of Traffic Signals ?

- c) The average normal flow of traffic on cross roads A and B during design period are 400 and 250 pcu per hour; the saturation flow values on these roads are estimated as 1250 and 1000 pcu per hour respectively. The all-red time required for pedestrian crossing is 12 sec. design two phase traffic signal by Webster's method with phase diagram. 4 + 3 + 8
8. a) What are the design factors of a Rotary Intersection ?
- b) Consider the following six-zone model of a town. Zones 1, 2 and 3 are fully residential areas and Zones 4, 5 and 6 are fully shopping areas. The shopping areas, the shopping trip attracted (per day), the shopping trips produced (per day), and the travel distances are shown in Table 1. The cells which have a "-" imply that those data are irrelevant to the problem. Determine the trip distribution between the zones for the following different scenario : 5 + 10

Table 1

Zone	Shop area (m ²)	Trips Produced	Trips attracted	Distance (km) to					
1	-	1000	-	-	-	-	4	2	7
2	-	2000	-	-	-	-	3	1	6
3	-	3000	-	-	-	-	5	2	6
4	1000	-	800	4	3	5	-	-	-
5	2000	-	1200	2	1	2	-	-	-
6	3000	-	1200	7	6	6	-	-	-

- i) Use origin-Constrained gravity model assuming $f(a)$ to be linear function of the shopping area (in square meter) with a slope of 0.01 and constant term of 10. Also assume (d_{ij}) to be d_{ij}^2 where d_{ij} is the distance in KM.
- ii) Use the origin-destination constrained gravity model with the same relevant assumptions as those in (i). <http://www.makaut.com>
9. a) A taxiway is to be designed for operating Boeing 70-320 which has the following characteristics. Determine the turning radius of the taxiway.
- | | |
|---|---------|
| Wheel base | 17.70 m |
| Tread of main loading gear | 6.62 m |
| Turning speed | 40 kmph |
| Coefficient of friction between tire and pavement surface | 0.13 |
- b) What are the surveys required for Airport site selection ?
- c) Discuss briefly the Wind Rose. 5 + 5 + 5
10. a) What are the primary requirements of a Railway Station ?
- b) Write short note on Hump Yards and Locomotive Yards.
- c) What are the classifications and types of signals in railway engineering ? 5 + 5 + 5

11. a) If a 8° curve track diverges from a main track of 5° in an opposite direction in the layout of a B.G track, calculate superelevation and speed on the branch line, if the maximum speed permitted on the main line is 45 kmph. 5
- b) Classify rail sleepers. What are the necessities points and crossings in rails. 3 + 2
- c) Explain coning of wheels with neat diagram. What is corrugation in rails ? Suggest remedial measure for corrugation. 2 + 2 + 1
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