Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**M.E –II$^{st}$ SEMESTER–EXAMINATION – JULY- 2012**

**Subject code: 1721306** **Date: 10/07/2012**

**Subject Name: Transportation Facility Design**

**Time: 10:30 am – 13:00 pm** **Total Marks: 70**

## Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

**Q.1 (a)** What are the functions of the Airport Passenger Terminal ? State Principal user classes of the Airport Passenger Terminal. **07**

**(b)** Explain, with a flow-chart the facilities required at the Airport, Passenger Terminal. **07**

**Q.2 (a)** Explain engineering concepts for horizontal and vertical alignment in design of Highway (inter-urban) and urban streets. **07**

**(b)** Explain the hierarchy of highway system with respect to inter urban and urban contexts along with their functions. **07**

**OR**

**(b)** Explain, with a flow-chart, the passenger and baggage flow at International Airport Terminal. **07**

**Q.3 (a)** Sketch the basic forms of At-grade intersections. Explain basic principles of design for At-grade intersections. **07**

**(b)** Explain, with sketches, different types of grade-separated intersections along with their suitability. **07**

**OR**

**Q.3 (a)** Sketch Rotary intersection showing various elements and state advantages and disadvantages of rotary intersection, along with general guidelines for selecting a rotary type of intersection. **07**

**(b)** Traffic flow at an urban intersection in the design year are given below : **07**

| Approach Rd. | Left Turning | | | Straight Ahead | | | Right Turning | | |
|---|---|---|---|---|---|---|---|---|---|
| | Cars | $CV_s$* | 2W** | Cars | $CV_s$* | 2W** | Cars | $CV_s$* | 2W** |
| North | 200 | 50 | 100 | 250 | 100 | 150 | 150 | 50 | 80 |
| East | 180 | 60 | 80 | 220 | 50 | 120 | 200 | 40 | 120 |
| South | 250 | 80 | 100 | 150 | 50 | 90 | 160 | 70 | 90 |
| West | 220 | 50 | 120 | 180 | 60 | 100 | 250 | 60 | 100 |

* $CV_s$ = Commercial vehicles (PCU= 2.8)

** 2W = Motorized 2 – Wheelers (PCU = 0.75)

The roads intersect at right angles and have a carriageway width of 15m. Design a rotary intersection making suitable assumptions.

**Q.4 (a)** Explain the design criteria for separate cycle tracks (non-motorized transport) and Pedestrians. **07**

**(b)** A fixed time 2-phase signal is to be provided at an intersection having a North-South and an East-West road where only straight – ahead traffic is permitted. The design – hour flows from various arms and the saturation flows for these arms are given in the following table : **07**

| | North | South | East | West |
|---|---|---|---|---|
| Design hour (q) flow ($PCU_s$/hr) | 800 | 400 | 750 | 600 |
| Saturation flow(s) ($PCU_s$/hr) | 2400 | 2000 | 3000 | 3000 |

Calculate the optimum cycle time and green times for the minimum overall delay. The inter-green time should be the minimum necessary for efficient operation. The time lost per phase due to starting delays can be assumed to be 2 seconds. The value of the amber period is 2 second.

**OR**

**Q.4 (a)** Explain, the warrants (criteria) for deciding on signal installation at a particular intersection. **07**

**Q.4 (b)** What is the need for coordinated control of signals at various intersections on main traffic route. Explain various types of coordinated signal system. **07**

**Q.5 (a)** Explain “stops”, “stations” and “terminals” with respect to urban transit. **07**

**(b)** Explain Inland Port Facilities Planning for export-import business. Also, explain Inland port Terminal services. **07**

**OR**

**Q.5 (a)** State the requirements of good port for waterways. Classify harbours. Distinguish between natural and artificial harbours. **07**

**(b)** Explain various services for shipping terminals as part of port facilities. **07**

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