Name Yaseen Kamal

ID # 7794

Section A

Final Paper Transportation Planing & Engr.

QNO 1):

Given Data:

6000 vechiles mothly (30 days)
peak slow rate of 550 vehicles @ 15mm

Required:

No. of vehicles moving per line per hour in each direction?
peak hour factor PHF=?

Solution:

6000 vehicles moves in 30 days

60 vehicles per day $= \frac{6000}{30} = 200$ /days

Now per hour $= \frac{2000}{24} = 83.3 \approx 84$ veh/hr

consider 3 lines in each direction
so total six lines for both direction.

so $\frac{84}{6} = 14$ vehicles

Hence 14 vehicles are moving per lines per hour in each direction

To Find PHF

$$PHF = \frac{\text{Hourly Volume}}{4 \times \text{Max 15 min volume}}$$

$$= \frac{14}{4 \times 550}$$

$$\boxed{PHF = 0.00636}$$

Q No. 27:

Ans):

Vechicle	unit Distance (Km)	Conversion Time (hours)	speed km/hr
1	1.400	0.02183	64.122
2	1.400	0.025167	55.629
3	1.200	0.012500	64.865
4	1.500	0.01500	100.00
5	1.600	0.018667	85.714
6	1.800	0.025333	71.053
7	1.200	0.024167	49.655
8	0.950	0.01500	63.333
9	1.175	0.0022167	53.008
10	1.200	0.018833	63.717
11	1300	0.021667	60.000
12	1.400	0.02000	70.00
13	1.800	0.020667	87.097
14	1.700	0.0185	91.892
15	1.800	0.016667	108.000
16	2.100	0.018667	112.500
17	1.200	0.014500	82.759
18	1.700	0.02333	72.857
19	1.600	0.021667	79.339
20	1.700	0.0091667	185.455
Total	29.525	0.572168	1620.995
Average	1.47625	0.028608	81.0497

Find TMS:

As we know that

$$TMS = \frac{\Sigma\left(\frac{x}{t_i}\right)}{n}$$

$$= \frac{1620.995 / 0.572168}{20}$$

$$= \frac{2833.07525}{20}$$

$$TMS = 141.6537 \text{ km/hr}$$

To Find SMS:

$$SMS = \frac{x}{\frac{\Sigma_i t_i}{n}} = \frac{xn}{\Sigma_i t_i}$$

$$SMS = \frac{20 \times 1.47625}{0.572168}$$

$$SMS = 51.6019 \text{ Km/hr}$$

QNO. 4):

Ans:

Airport Engineering:

→ Airport engineering encompasses the planning, design and construction of terminals, runways and navigation aids to provide safe movement for passenger and freight service.

→ An airport is facility where pessengers connect from ground transportation to air transportation.

Airfield: is an area where an aircraft can land and take off which is equipped with any navigational aids, markings and terminal facilities.

Aerodromes: is a defined area on land or water (including any building installations and equipment) intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft

History of Air Transport:

→ The world's first airport was built in 1928 at Croydon near London (England).

→ 1903 - First successful flight by Wilbur and orville wright at Kitty HoWK, North Carolina.
→ 1911 - post was carried by air in India from Allahabad to Naini crossing Ganga.
→ 1918 - Flight between Delhi and Karachi.
→ 1954 - Boeing Dash 80 type prototype B707 first flight.
→ 2006 - Airbus A388 made first flight (one of the biggest passenger air craft i-e 800 persons).

ICAO:

→ The International civil Aviation organization (ICAO), an agency of the united Nations, codifies the principles and techniques of international air navigation and fosters the planning and developmeat of international air transport to ensure safe and orderly growth.
→ 1944 - Chicago convention, establishing ICAO.

Components of Airport:

1- Runway.
2- Taxiway.
3- Apron
4- Terminal building.
5- Control Tower
6- Hanger
7- Parking.

Runway:

→ Runway is a paved land strip on which landing and take-off operations of aircraft takes place It is in leveled position without any obstructions on it.

→ special markings are made on the runway to differ it from the normal roadways. Similarly, after sunset, specially providing lightings are helped the aircrafts for safe landing.

→ Many factors are considered for design of runway. The direction of runway should be in the direction of wind. Sometimes cross winds may happen. So for safety considerations second runway should be laid normal to the main runway.

Taxiway:

→ Taxiway is path which connects each end of the runway with terminal area, apron, hanger etc.

→ These are laid with asphalt or concrete like runway.

→ In modern airports are laid at an angle of 30 degree to the runway so that aircrafts can use it to change from one runway to other easily.

Apron:

→ Apron is a place which is used as parking place for aircrafts. It is also used for loading and unloading of aircrafts. Apron is generally paved and is located in front of terminal building or adjacent to hangers.

→ The size of area to be allowed for apron and design of apron is generally governed by the number of aircrafts and the characteristics of aircraft.

→ Proper drainage facilities should be provided with suitable slop

of pavement. sufficient clearance must be provided for aircrafts to bypass each other.

Terminal Building:

→ Terminal Building is a place where airport administration facilities take place. In this building pre-journey and post journey checking of passengers take place.

→ The terminals can house cafes and lounges to serve as waiting areas for passengers. Ticket counters luggage check-in or transfer, security checks and customs are the basics of all airport terminals.

→ Large airport can have more than one terminal that are connected to one another through link ways such as walkways etc.

Control Towers: The control tower is a place where aircrafts under a particular zone is controlled whether they are in land or in air.

→ The controller from the control tower observes all the aircrafts with in that zone and informs

pilots about their airport traffic

Hangers:

→Hanger is a place where repairing and servicing of aircrafts is done.

→Taxiway connects the hanger with runway so, when a repair needed for aircraft it can be moved to hanger easily.

→It is constructed in the form of large shed using steel trusses and frames. Large area should be provided for Hanger for comfortable movement of aircrafts.

Parking: This is a place provided for parking the vechiles of airport staff or passenger which is outside the terminal building or sometimes under the ground of terminal building.

Runway Marking:

These are provided with different purposes like

→Runway center line marking

→Runway edge stripe

→Touch down or landing zone marking.

→ Threshold marking
→ Runway numbering.

QNO.3):

Ans:

Railway Engineering: The branch of civil engineering which deals with the planning, design, construction operation and maintenance of the railway tracks for safe and efficient movement of trains is called Railway Engineering.

→ primary objectives of Railway Engineering are;

- safety
- Efficiency

History:

→ The history of railway is closely linked with the development of civilization.

→ As the necessity arose, human beings developed various methods of transporting goods from one place to another.

→ In the primitive days goods were carried as head loads or in carts drawn by men and animal.
→ Then efforts were made to replace animal power with mechanical power.
→ The first railway line in India was opened in 1853.
→ The first train, consisting of one steam engine and four coaches, made its maiden trip on 16 April 1853, when it traversed a 21-mile stretch between Bombay and Thane in 1.25 hours.
→ It was on 13th May, 1861 that first railway line was opened for public traffic between Karachi city and Kotri, the distance of 150 miles (169 km)
→ speed was 12 mph.
→ speed is 375 mph.

Components of Railway track:

→ An engineered structure consists of two metal guiding rails on which vehicles are self propelled

→ Rails carry out the function of transmitting the load to a large area of the formation through sleepers and ballast.

Types of Rail:

Rails can be divided into 3 types.

- Double Headed Rails.
- Bull Headed Rails.
- Flat Footed Rails.

Railway Track Gauge:

→ Gauge is defined as the minimum distance between two rails.

OR

→ Rail gauge is the distance between the inner sides of the two parallel rails that make up a single railway line.

→ Sixty percent of World's railways use a 4 feet 8.5 inch (1435 mm) gauge, which is known as Standard gauge or international gauge.

→ Gauge larger than Standard gauges called broad gauge and

→ Gauge smaller than standard are called narrow gauge.
→ A dual gauge railway has three or four rails positioned so that trains of two different gauge can use it.

Uniformity In Gauge:

→ Non uniformity in Gauges causes problems as vehicles from one track could not run on another track.
→ Gauges uniformity is necessary for the railway track of a country.
→ Not adopted in early ages.
→ No standard in the begining.
→ When railroads were originally built, they were built to whatever size was convenient and affordable at that time.
→ In the early days, railroads connected towns and there was not really a "system" that demanded compatibility.

Economy:

→ using a gauge narrower than the standard gauge was Cheaper.

→ In many these sorts of railroads were "private" railways anyway, serving logging camps or other specialized industries, so that they did not need to be compatible with the standard gauge railroads.

Keeping the other people out:

→ In many cases, the different rail gauges were to prevent buy outs or track-age rights being obtained by competing railroads.

→ In WW-II this caused the Nazis (Germany) all kinds of problems.

Loading Gauge: The maximum height and width for railway vehicles and their loads to ensure safe passage through bridges, tunnels and other structures.

→ The function of this structure is to ensure that the topmost and the widest portion of the load will clear all structures such as bridges and tunnels ets along the route.