

Name: → Naseer - Muhammad

Page (1)

I.D: → 7885

Instructor: → Sir Majid Naeem

Subject: → Transportation and planning engineering

Exam: → Final term (Summer)

Date: → 23rd, Sep, 2020

Q1): →

Given Data

60000 vehicles monthly (30 days)

Peak flow rate of 550 vehicles 15min

Required = ?

Number of vehicle moving per lane per hour in each direction

Peak hour factor PHF.

Sol: → 60000 vehicles moves in 30 days.

$$\text{vehicles per day} = \frac{60000}{30} = 2000/\text{days}$$

$$\text{per hour} = \frac{2000}{24} = 83.33 \approx 84 \text{ vehicle/hr}$$

consider three lanes in each direction

total six lanes for both direction

$$\text{So } \frac{84}{6} = 14 \text{ vehicles}$$

So 14 vehicles are moving per lane per hour in each direction

Now find PHF?

$$\text{PHF} = \frac{\text{Hourly volume}}{4 \times \text{maximum 15 min volume within hour}}$$

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

$$\text{PHF} = 0.00636$$

Q2: → Calculate TMS and SMS from the given data. Page (3)

~~Q2~~

Vehicle	Distance meter	Travel time (minute)	Speed Km/hr
1	1400 m	1.31	64.122
2	1400 m	1.51	55.629
3	1200 m	1.11 1.11	64.865
4	1500 m	0.90	100.00
5	1600 m	1.12	85.714
6	1800 m	1.52	71.053
7	1200 m	1.45	49.655
8	1200 950 m	0.90	63.33
9	950 1175 m	1.33	53.008
10	1175 1200 m	1.33	63.717
11	1200 1300 m	1.30	60.000
12	1300 1400 m	1.20	70.000
13	1400 1300 m	1.24	87.097
14	1300 1800 m	1.11	91.892
15	2100 m	1.00	108.000
16	1200 m	1.12	112.500
17	1700 m	0.87	82.759
18	1700 m	0.87	72.852
19	1600 m	1.21	79.339
20	1700 m	0.55	185.455

I.D = 7885

(2)
Ans: →

Vehicle	Distance (km)	Time (hours)	Speed km/hr
1			
2	1.400	0.02183	64.122
3	1.400	0.025167	55.629
4	1.200	0.018500	64.865
4	1.500	0.01500	100.00
5			
6	1.600	0.01867	85.714 85.714
7	1.800	0.02533	71.053
8	1.200	0.024167	49.655
9	0.950	0.01500	63.333
10	1.175	0.022167	53.008
11	1.200	0.018833	63.717
12	1.300	0.021667	60.000
13	1.400	0.020000	70.00
14	1.800	0.020667	87.097
15	1.700	0.0185	91.892
16	1.800	0.016667	108.000
17	2.100	0.018667	112.500
18	1.200	0.014500	82.759
19	1.700	0.02333	72.857 72.857
20	1.600	0.021667	74.857
	1.600	0.0201667	79.339
	1.700	0.0091667	185.455
total	<u>29.725</u> 20	0.57118 0.521824 20	<u>1620.995</u>
Average	1.48625 1.48625	0.0286084 0.0260512 0.572168 20	<u>1620.995</u> 20 = 81.04975 = 81.04975
		Avg = 0.028608	

$$*) TMS = ???$$

$$TMS = \frac{\sum_i (\frac{x}{t_i})}{n}$$

$$TMS = \frac{1620.995}{0.572168}$$

$$TMS = \frac{2833.005341}{20}$$

$$TMS = 141.65 \text{ km/hr}$$

$$*) SMS = ???$$

$$SMS = \frac{x}{\frac{\sum t_i}{n}} \Rightarrow \frac{xn}{\sum t_i}$$

$$SMS = \frac{20 \times 1.48625}{0.572168}$$

$$SMS = 51.95 \text{ km/hr}$$

Q3: → Explain Railway engineering in details? Page (6)

(3)
Ans: → Railway Engineering: →

The branch of civil engineering which deal with the planning, design, construction, operation and maintenance of the railway tracks for safe and efficient movement of trains (people and goods) is called railway engineering.

→ Primary objectives of Railway engineering are;
→ safety → Efficiency.

*): → History of Railway Engineering: →

→ 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 animals.

→ Then efforts were made to replace animal power with mechanical power.

→ In 1769, Nicholes Carnot, a Frenchman, carried out the pioneering work of developing steam energy.

→ This work had very limited success and it was only in 1804 that Richard Trevithick designed and constructed a steam locomotive.

- This locomotive, however, could be used for traction on roads only,
- The credit of perfecting the design goes to George Stephenson, who in ~~1814~~ 1814 developed the first steam locomotive used for traction rail ways.

→ The first public railway in the world was opened to traffic on 27th September 1825 between Stockton and Darlington in the UK.

*):→ Components of Railway:→

An Engineered structure consisting of two metal guiding rails on which vehicles are self propelled or pulled by a locomotive is called a railway track.

→ Components of railway are:

- Rails → Ballast → sleepers
- Fastenings.

*):→ Rails:→

Rails are the members of the track laid in two parallel lines to provide a continuous and level surface for the movement of trains.

- To be able to withstand stresses, they are made of high carbon steel.
- It has an inverted T or I shaped cross section.

*): Ballast :->

The ballast is a layer of broken stones, gravel or any other granular material placed and packed below and around sleepers for distributing load from the sleepers to the formation.

- > It provides drainage as well as longitudinal and lateral stability to the track.
- > Provides a level and hard bed for the sleepers to rest on.
- > Holds the sleepers in position during the passage of trains.

*): Sleepers :->

Sleepers are the transverse ties that are laid to support the rails.

- > The main function of sleepers are given below;
- > Transfer load from rail to ballast.
- > Prevent the longitudinal movement of rail.
- > Hold the rails in correct gauge and alignment.
- > Give firm and even support to the rails.

*): Fastenings :->

Track fittings and fastening are used for joining rails together as well as fixing them to the sleepers.

- > The purpose of providing fitting and fastening in railway tracks is to hold the rails in their proper position in order to ensure the smooth running of trains.

Q4):→ Briefly explain Airport Engineering?

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 a facility where passengers connect from ground transportation to air transportation.

~~Q~~

*):→ History of Air transport:→

→ The world's first airport was built in 1928 at Croydon near London.
→ 1903 - First successful flight by ~~W~~ Wilbur and Orville Wright at Kitty Hawk, North ~~C~~ Carolina.

→ 1911 - Post was carried by air in India from ~~Allahabad~~ Allahabad to Narni.

→ 1912 - Flight between Delhi and Karachi

*):→ The International Civil Aviation Organization (ICAO)

→ The International ~~Civil Aviation~~ Civil Aviation Organization (ICAO), an agency of the United Nation, codifies the principles and techniques of international air navigation and fosters the planning and development of international air transport to ensure safe and orderly growth.

→ 1944 - Chicago convention, establishing Provisional (ICAO).

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

*):→ Aerodromes:→

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

*):→ Components of Airport:→ The following are components of Airport.

1):→ Runway:→

Runway is a paved land strip on which landing and takeoff operations of aircrafts takes place. It is in leveled position without any obstructions on it.

→ Many factors are considered for design of runway. the direction of ~~the~~ runway should be in the direction of wind. Sometimes cross winds may happen, so for safety consideration second runway should be laid normal to the main runway.

→ The number of runways for an airport is depends upon the traffic. If the traffic is more than 30 movements per hour, then it is necessary to provide another runway.

→ Runway can be laid using bitumen or concrete.

2) → Taxiway →

ID=7885

Page(11)

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

→ These are laid with asphalt or concrete like runways.

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

3) → Apron →

→ Apron is place which is used as parking place for aircrafts. It is used for loading and unloading of aircrafts.

4) → Terminal Building →

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

5) → Control Tower →

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

6) → Hanger →

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

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

*):→ Parking :→

I.D = 7885

Page (12)

This is a place provided for parking the vehicles of airport staff or passengers which is outside the terminal building or sometimes under the ground of terminal building.