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ID : 7800

SECTION : A

SEMESTER : 6<sup>th</sup>

SUBJECT : TRANSPORTATION - I

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SUBMITTED TO : Engr, MAJID NAEEM

Question = 1

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GIVEN DATA :-

60000 vehicles monthly (30 days)

Peak flow rate of 550 vehicles @ 15 min

Required :

Number of vehicles moving per line per hour  
in each direction ?

Peak hour factor PHF = ?

Solution,

60000 vehicles moves in 30 days.

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

Now

$$\text{Per hour} = \frac{2000}{24} = 83.3 \approx 84 \text{ veh/hr}$$

Consider three lanes in each direction

so total six lanes for both direction.

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

Hence 14 Vehicles are moving per lane per hour  
in each direction

To Find PHF = ?

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

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

$$\text{PHF} = 0.00636$$

Ans



## Question NO # 02

Calculate the TMS and SMS from the given Data.

Vehicle	Distance (x) (meter)	Travel time (t) (minute)	Speed Kmph
1	1400m	1.31	64.122
2	1400m	1.51	55.629
3	1200	1.11	64.865
4	1500	0.90	100.00
5	1600	1.12	85.714
6	1800	1.52	71.053
7	1200	1.45	49.655
8	950	0.90	63.333
9	1175	1.33	53.008
10	1200	1.23	63.717
11	1300	1.30	60.000
12	1400	1.20	70.000
13	1800	1.24	87.099
14	1700	1.11	91.892
15	1300	1.00	109.000
16	2100	1.12	112.500
17	1200	0.87	82.258
18	1700	1.40	72.857
19	1600	1.21	79.339
20	1700	0.55	185.455

Unit Conversion

Vehicle	Distance (m) (km)	Time (t) (hours)	Speed km/hr
1	1.400	0.02183	64.122
2	1.400	0.025167	55.629
3	1.200	0.018500	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	0.022167	53.008
10	1.200	0.018833	63.717
11	1.300	0.021667	60.000
12	1.400	0.020000	70.00
13	1.800	0.020667	87.097
14	1.700	0.0195	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	0.023333	72.857
19	1.600	0.0201667	79.339
20	1.700	0.0091667	185.455
<b>Total</b>	<b>29.525</b>	<b>0.572168</b>	<b>1620.995</b>
<b>Average</b>	<b>1.47625</b>	$0.572168 \div 20$ <b>0.028608</b>	$\frac{1620.995}{20} = 81.0497$

Find TMS:

As we know that

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

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

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

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



To find JMS:-

As we know that

$$JMS = \frac{x}{\frac{\sum t_i}{n}} = \frac{x n}{\sum_i t_i}$$

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

$$JMS = \boxed{51.6019 \text{ km/hr}}$$

Explain Railway Engineering in details.

## Railway Engineering:

Railway engineering is the branch of civil engineering which deal with the planning, design, construction, operation and maintenance of the railway track for safe and efficient movement of train is called Railway engineering.

Primary objective of Railway Engineering are.

- \* Safety
- \* Efficiency:

## History

- ⇒ The history of railway is closely linked with the development of citizen.
- ⇒ 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, Nicholas 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.
- ⇒ The locomotive, however, could be used for traction on roads only.
- ⇒ The credit of perfecting the design goes to George Stephenson, who in ~~1804~~ 1814 developed the first steam locomotive used for traction on railways.

Explanation:

The first public railway in the world was opened to traffic on 27<sup>th</sup> September 1825, b/w Stockton and Darlington in UK.

\* Simultaneously, other countries in Europe also developed such railway system; most introduced train for carriage of passenger traffic.

\* The US operated its first railway line b/w Mohawk and Hudson in 1833.

\* The railway line in Germany was operated from Nuremberg to Furth in 1835.

\* It was on 13<sup>th</sup> May 1861 that first railway line was opened for public traffic between Karachi City and Kotri, the distance of 105 miles

→ Speed was 12 mph

⇒ speed is 375 mph.

Briefly explain Airport Engineering.

### 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.

\* Airfield: Airfield is an area where an ~~air~~ aircraft can land and take off, which is equipped with any navigation aids, marking and terminal facilities.

\* Aerodromes:- The area on land or water intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft.



## History

- 1) The world's first airport was built in 1938 at Croydon near London.
- 2) 1903, First successful flight by Wilbur and Orville Wright at Kitty Hawk, North Carolina.
- 3) 1911, post was carried by air in India from Allahabad to Naini (Pilot, Henri Pequet) crossing Ganges.
- 4) 1912, Flight b/w Delhi and Karachi.
- 5) 1954, Boeing Dash 8 ~~to~~ prototype, B707 first flight.
- 6) 2006, Airbus A380 made first flight.

## ICAO

The International Civil Aviation Organization (ICAO) an agency of the United Nations, codifies the principle and technique 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.

## Components of Airport.

- 1) Runway:- Runway is a paved level strip on which landing and take off operations of aircraft take place. It is in leveled position without any obstruction on it.  
Special markings are made on the runway to differentiate it from the normal roadway.
- 2) Taxiway:- Taxiway is path which connects each end of the runway with terminal area apron, hangar etc.  
These are level with asphalt or concrete like runway.
- 3) Apron:- Apron is a place which is used as parking place for aircraft. It is also used for loading and unloading of aircraft.  
Apron is generally paved and located in front of terminal building or adjacent to hangars.

#### 4) 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.

#### 5) Control Tower:-

Control tower is a place where aircrafts under a particular zone is controlled whether they are on land or in air. The observation is done by the controller through radars and information is carried through radio.

#### 6) Hanger:-

Hanger is a place where repairing and servicing of aircraft is done

7) Parking:- The place provided for parking the vehicles of airport staff or passengers which is outside the terminal building.

END