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Transportation - 1

Question :- No! 01

Given data :

60000 vehicles monthly (30 days)

Peak flow rate of 550 vehicles @ 15mm

Required

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

Peak factor PHF ?

Solution :- 60000 vehicles moves in 30 days

$$\text{So Per day} = \frac{60000}{30} = 2000 \text{ day .}$$

Now

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

Consider 2 line in each direction

$$\text{So } \frac{84}{2} = 42$$

Hence 42 vehicles are move in per hour in each line and ~~each~~

To find PHF

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

$$\text{PHF} = \frac{42}{4 \times 550} = 0.019$$

$\text{PHF} = 0.019$

Q NO! 02 Calculate TMS & SMS from the given data

| vehicle number | Distance in meters | Travel time in Second | Speed km/sec |
|----------------|--------------------|-------------------------|---------------------------------|
| 1 | 1400 | $1.31 \times 60 = 78.6$ | $\frac{64.122}{3.6} = 17.8116$ |
| 2 | 1400 | $1.51 \times 60 = 90.6$ | $\frac{55.629}{3.6} = 15.4525$ |
| 3 | 1200 | $1.11 \times 60 = 66.6$ | $\frac{64.865}{3.6} = 18.0180$ |
| 4 | 1500 | $0.90 \times 60 = 54$ | $\frac{100.000}{3.6} = 27.7778$ |
| 5 | 1600 | $1.12 \times 60 = 67.2$ | $\frac{85.714}{3.6} = 23.8094$ |
| 6 | 1800 | $1.52 \times 60 = 91.2$ | $\frac{71.053}{3.6} = 19.7369$ |
| 7 | 1200 | $1.45 \times 60 = 87$ | $\frac{49.655}{3.6} = 13.7930$ |
| 8 | 950 | $0.90 \times 60 = 54$ | $\frac{63.333}{3.6} = 17.5925$ |
| 9 | 1175 | $1.33 \times 60 = 79.8$ | $\frac{53.008}{3.6} = 14.7244$ |
| 10 | 1200 | $1.13 \times 60 = 67.8$ | $\frac{63.717}{3.6} = 17.6991$ |
| 11 | 1300 | $1.30 \times 60 = 78$ | $\frac{60.000}{3.6} = 16.6667$ |
| 12 | 1400 | $1.20 \times 60 = 72$ | $\frac{70.000}{3.6} = 19.4444$ |
| 13 | 1800 | $1.24 \times 60 = 74.4$ | $\frac{87.079}{3.6} = 24.1886$ |

| | | | |
|---------|------------------------------|-----------------------------|---------------------------------|
| 14 | 1700 | $1.11 \times 60 = 66.6$ | $\frac{91.892}{3.6} = 25.5255$ |
| 15 | 1800 | $1.00 \times 60 = 60$ | $\frac{108.000}{3.6} = 30.0000$ |
| 16 | 2100 | $1.12 \times 60 = 67.2$ | $\frac{112.500}{3.6} = 31.2500$ |
| 17 | 1200 | $0.87 \times 60 = 52.2$ | $\frac{82.759}{3.6} = 22.9886$ |
| 18 | 1700 | $1.40 \times 60 = 84$ | $\frac{72.857}{3.6} = 20.2380$ |
| 19 | 1600 | $1.21 \times 60 = 72.6$ | $\frac{79.339}{3.6} = 22.0386$ |
| 20 | 1700 | $0.55 \times 60 = 33$ | $\frac{125.455}{3.6} = 34.8486$ |
| Total | 29725 | 1396.8 | 450.2708 |
| Average | $\frac{29725}{20} = 1486.25$ | $\frac{1396.8}{20} = 69.84$ | $\frac{450.2708}{20} = 22.5135$ |

$$TMS = \frac{\sum \left(\frac{x}{t} \right)}{n}$$

$$TMS = \frac{450.2708}{20} = 22.5135$$

$$TMS = 22.5135 \text{ m/sec}$$

$$SMS = \frac{x}{\left(\sum \frac{t}{n}\right)} = \frac{nx}{\sum t_i}$$

$$\frac{20 \times 1486.25}{1396.8} = 21.2807 \text{ m/Sec}$$

$$\boxed{SMS = 21.2807 \text{ m/Sec}}$$

Q No 03 - Railway Engineering !

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 (people and goods) is called Railway Engineering.

Primary Objectives of railways Engineering are:

- * Safety .
- * Efficiency .

Railway Engineering includes elements of civil, mechanical industrial, and electrical engineering.

Typical task would include determine horizontal, and vertical alignment design, station location and

design, Construction System cost estimating .

and establishment of signaling & controlling System .

Railway engineering is a multidisciplinary science .

There are several sub fields under Rail Engineering .

it is a field of engineering which deals with the design + construction and operation of all railway system . covers a wide range of engineering discipline .

For instance including mechanical engineering, Computer engineering, Civil Engineering . As well as industry engineering . it also includes a number of other important sub - disciplines .

Components of Railway track .

- * Rails
- * Ballast
- * Sleepers
- * Fastenings

Q NO! 4

Airport EngineeringAns:-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 the ground transportation to air transportation.

Component of airport:1. Runway :-

Runway is a paved land strip on which landing and takeoff operation of aircraft take place.

it is leveled position without any obstruction on it

The runway depend 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. Bitumen is economic but concrete runways have long span and requires less maintenance cost.

2. Taxi way -

Taxi way is the path which connect each end of the runway with terminal area, apron & hanger etc.

These are laid with asphalt or concrete like runway. In modern airport taxiway are laid at a angle of 20 degree to the runway so that aircraft

Can use it to change from one runway to the other easily.

3- Apron :-

Apron is a place which is used to as parking place for aircrafts. Apron is generally paved and is located in front of terminal building or adjacent to hangars.

The size of area to be allotted for apron and design of apron is generally governed by the number of aircrafts and the characteristic the aircrafts.

4- Terminal Building :-

Terminal building is a place where airport administration facilities take place. In the building pre-journey and post journey checkings of passenger take place.

The terminals can house cafes and lounges to serve as waiting area for passenger. Ticket counters, Luggage check-in or transfer, Security checks and Customs are the basics of all airport terminal.

5. Control Tower:-

The Control tower is a place where aircrafts under a particular zone is controlled whether they are in 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 aircrafts is done.

Taxiway connect the hanger with runway so, when a repair needed for an aircraft it can be moved

to hanger easily .

it is constructed in the form of large shed using steel trusses and frame. Large area should be provided for hanger for comfortable movement of aircrafts.

7. parking :-

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 .
