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SEC B

Transportation Engineering

Summer Final Exam
2020

Question No 1

Given:-

60000 vehicles monthly (30 days)
Peak flow rate of 550 vehicles @ 15 mint.

Required:-

Number of vehicles moving per lane
per hour in each direction = ?

Peak hour factor PHF = ?

Sol:-

60000 vehicles moves in 30 days

So, vehicle per day = $60000/30 = 2000/\text{day}$

No vehicles per hour

So, $2000/24 = 83.3 \approx 84 \text{ veh/hr}$

Consider three lane in each direction
So that six total lane for
both directions-

So, $84/6 = 14$

Hence 14 vehicles are moving per
lane per hour in each direction-

$$\text{PHF} = \frac{\text{Hourly vol}}{4 \times \text{max min vol with in hour.}}$$

$$= \frac{14}{4 \times 550} \Rightarrow \text{PHF} = 0.0063$$

Question No 2

Vehical Number	Distance in meter	Travel time in minutes	Speed km/hr
1	1400	1.31	64.122
2	1400	1.51	55.629
3	1200	1.11	64.865
4	1500	0.90	100.000
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	1.13	63.717
11	1300	1.30	60.000
12	1400	1.20	70.000
13	1800	1.24	87.097
14	1700	1.11	91.892
15	1800	1.00	108.000
16	2100	1.12	112.500
17	1200	0.87	82.759
18	1700	1.40	72.857
19	1600	1.21	79.339
20	1700	0.55	185.455

Total 29725 23.28 1620.995

Average $\frac{29725}{20}$ $\frac{23.28}{20}$ $\frac{1620.995}{20}$
 = 1486.25 (meter) = 1.164 (mint) = 81.049 km/hr
 = 1.48625 (km) = 0.0194 (hr)

$$TMS = \frac{\sum \text{speed}}{n} = \frac{1620.995}{20} = 81.049 \text{ km/hr}$$

$$SMS = \frac{nx}{\sum T}$$

(x = Distance
 T = time)

$$= \frac{20 \times 1.48625}{0.388}$$

$$= \frac{29.725}{0.388}$$

$$= 76.61 \text{ km/hr}$$

Question NO 3

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 goods were carried as head loads or in cart drawn by men & animal.
- > 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 & 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 1825 developed the first steam locomotive used for traction on railways.
- The first public railway in the world was opened to traffic on 27th September 1825 between Stockton and Darlington in the United Kingdom.
- Simultaneously, other countries in Europe also developed such railway systems; most introduced trains for carriage of passenger traffic.
- The US operated its first railway line between Mohawk and Hudson in 1833.
- The railway line in Germany was operated from Nuremberg to Furth in 1835.

-> 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 the first railway line was opened for public traffic between Karachi City and Kotri, the distance of 105 miles (169 km).

-> Speed was 12 mph.

-> Speed is 375 mph.

Question No 4

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 connected from ground transportation to air transportation.

Airfield:-

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

Aerodromes:-

Is a defined area on land or water intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft.

History of Airtransport-

- > 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 Hawk, North Carolina.
- > 1911 - Post was carried by air in India from Allahabad to Naini crossing Ganga.
- > 1912 - Flight between Delhi and Karachi.
- > 1914 - Boeing Dash 80 type prototype, B707 First Flight.
- > 2006 - Airbus A328 made First flight.

The International Civil Aviation Organization (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 development of international air transport to ensure safe and orderly growth.

-> 1944-chicago establishing provisional ICAO.

Components of Airport.

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