

ME-704 (Automobile Engg.)

1.

1. (a) How do you classify chassis? What are main criteria? Give advantages & disadvantages. (10)
- (b) What kind of aerodynamics consideration are carried out in body profiling of vehicle? Explain in brief. (10)

2.

- (a) Explain different angles related to wheel alignment with neat sketches. Also explain the front wheel assembly. (10)
- (b) Discuss basic consideration of automobile safety in detail. (10)

3.

Explain the following (any four): (20)

- (a) Centre point steering
- (b) Power steering
- (c) Ackermann's principle of steering.
- (d) Backlash in steering gears.
- (e) Directional stability of vehicle.

4.

- (a) What is under - steering & oversteering? Discuss their effects on steering characteristics of a vehicle. (10)
- (b) Explain steering ratio. Describe different types of steering gears. (10)

5.

A conical friction clutch with cast iron contact surface transmits 130 H.P. at 1500 rpm. The cone angle is 20° & the coefficient of friction 0.20. If the mean dia of the bearing surface is 37.5cm. & the intensity of normal press is not to exceed 30 N/cm^2 , find the breadth of the conical surface & the axial load required. (20)

6.

What are hydraulic brakes? On what principle this braking system works? Describe its construction & working with the help of suitable diagram. (10)

7.

A multiplate friction clutch is required to transmit 72KW at 3600 rpm. The plates are alternately steel & phosphor bronze & they run in oil. The coefficient of friction is 0.071. The mean axial press is 0.14 N/mm^2 & the internal radius of the friction surface is 0.8 of the external radius, which is 125 mm. Find out the no. of plates required. (10)

8.

- (a) What is independent suspension system? Describe any one independent suspension system employed to modern day automobiles. (10)
- (b) On a downward slope of 1 in 30, a 50 KN bus rolls - down at 18kmph with its engine closed (non - operative) road resistance at this speed is just sufficient to prevent any acceleration. If the effective width & height of the bus front is 2.0m.& 2.35 respectively, determine :-
- (i) Road resistance
 - (ii) Power of the engine to run up the same slope at double the speed, when road resistance remains the same. (10)

9.

Write short notes on :-

(20)

- (a) servo action of brakes.
- (b) self energization brakes.
- (c) shackles.

10.

Explain the following :-

(20)

- (a) Solenoid switch.
- (b) Provision of windscreen nozzle on an automobile
- (c) Emission control of automobile.
- (d) Catalytic convertors.

11.

What is fuel pump? Explain in detail about the following with neat sketch :-

(20)

- (a) Mechanical fuel pump.
- (b) Electrical fuel pump.

12.

- a) Explain briefly the steel section used in chassis frame?
- b) Give classification of chassis with respect of engine fitting?

13.

- a) What do you understand by front wheel and rear wheel drive, four wheel drive explain briefly?
- b) What are the Indian standards for automotive vehicles Bharat I and II, Euro I and II norms?

14.

Give the layout of steering system and label the various parts. Also explain the working of the steering system?

15.

Define and explain following:-

- i) Camber angle
- ii) Caster angle
- iii) King-pin-inclination

16.

What are the functions of a clutch? Explain briefly the principle operation of a clutch.

17.

Explain briefly any two:-

- i) Sliding mesh gear box
- ii) Constant mesh gear box
- iii) Synchromesh gear box.

18.

- a) Describe briefly the working of a hydraulic torque converter?
- b) Name the components of an automatic transmission and advantages also?

19.

Give the simplified diagram of a independent front suspension?

20.

Describe briefly

- i) Torsion Bass
- ii) Air and Gas springs
- iii) Rubber springs

21.

- a) Explain with neat sketch a 'Hydraulic Braking System'?
- b) Describe briefly "Self energizing brakes"?

22.

- a) What are the major components of the automotive electrical system?
- b) Briefly describe the construction of a lead-acid battery with the help of neat sketch?

23.

Discuss the construction and working of starting motors of automobiles?

