UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
Examination, July-2020

Programme Name: **B. Tech ADE**   **Semester   : IV**
Course Name   : Vehicle Technology   **Time   : 24 hrs**
Course Code   :   MEAD-2003   **Max. Marks: 100**
Nos. of page(s)   :

Section A

It was done through MCQ (25 Marks)

Section B (15*5=75)

1. As an engineer you have been asked to select a component for your dreamed passenger car from the following list mention in table 1 and 2. Justify your selections. (You may select more than one component from any columns.)

Table 1

Frame	Clutch	Transmission

1. Ladder chassis
2. Tubular space-frame
3. Monocoque
4. ULSAB monocoque
5. Carbon-fiber monocoque
6. Aluminium space-frame
	1. Single plate with Diaphragm
	2. Single Plate with coil spring
	3. Multi plate with Diaphragm
	4. Multi plate with coil spring
	5. Centrifugal
	6. Semi-centrifugal
	7. torque Converter
	8. Dual Clutch (DCT)
		1. **Manual**
		  1. Sliding mesh
		  2. Constant mesh
		  3. Synchromesh
		  4. Combination of constant and synchromesh
		2. Continuous Variable Transmission
		3. Clutch less Manual Transmission
		4. Overdrive
		5. Differential gear box
		6. Limited Slip Differential gear box

Table 2

Drive	Front and Rear Suspension	Tyres

1. Hotchkiss Drive 2. Torque tube drive	1. Leaf Spring 3. Torsion Bar 5. Double wishbone parallel and equal length link 7. Trailing Arms 9. Panhard rods 11. Hydralastic	2. Coil Spring 4. Mac-pherson Strut 6. Double wishbone parallel and unequal length links 8. Hydraulic (telescopic double acting) 10. Hydragas	1. Radial tyre 2. Bias belted tyre

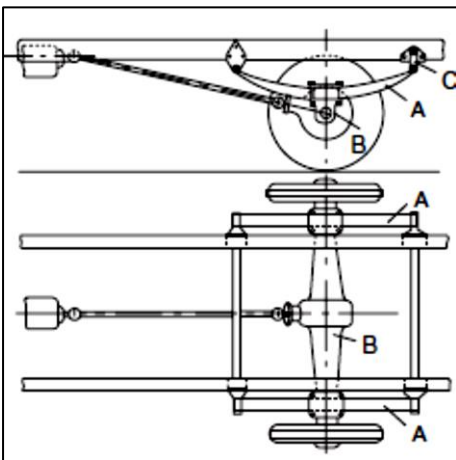2. From the following Figures 1 & 2, differentiate the Hotchkiss drive with Torque Tube drive.
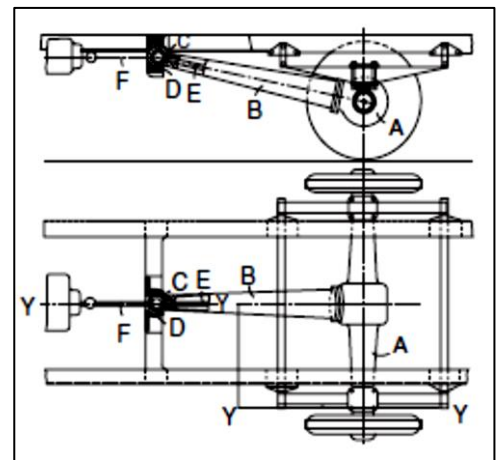

Figure 1

Figure 2

3. A) Explain in brief the Purpose of (10)

1. Air vent at the cap of reservoir of master cylinder

2. Piston holes on the piston of master cylinder.

3. Brake bleeding.

4. Brake (vacuum) booster and also mention its location in the braking system.

B) Identify the following braking circuits mention below and justify with reason which one should be preferable for the Automobile vehicle. (5)

Front   Rear   Front   Rear

Front/Rear Split System

A)   B)
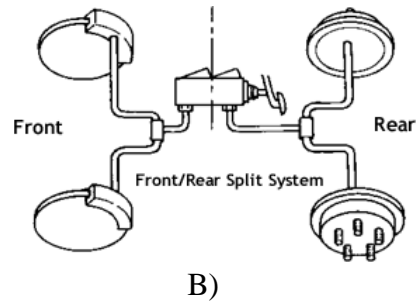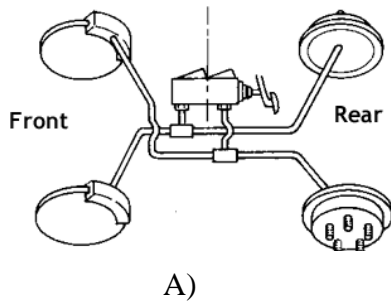
4. A) Analyze the different conditions for Roll steer of a RWD car. And Influence of Roll steer on Inner and outer wheels of suspension system. (5)

   B) Assume your vehicle is taking left turn at moderate speed. Accordingly, analyze Jounce and rebound condition of your vehicle suspension. And how you will design and assemble your car suspension to avoid the non-contact of wheels during rebound condition during this situation. (10)

5. A) Derive the equation of correct steering angle for the vehicle and also write the equations for inner and outer turning radius for front and rear wheels. (5)

   B) The Wheel Base of a Car is 2.7m and Pivot centers are at 1m. The Wheel track is 1.2m. Calculate the correct angle outside lock and turning circle radius of the outer front and inner rear wheels when the angle of inside lock is 400. (10)