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## **32153-AUTOMOBILE CHASSIS AND TRANSMISSION**

### **DETAILED SYLLABUS**

#### **I CHASSIS FRAME, FRONT AND REAR AXLE**

Introduction of Chassis frame – classifications of chassis based on engine location - Layout of the Chassis and its main components - Functions of the Chassis frame - Types of Chassis frames – Various loads acting on the frame. Front axle construction – live and dead axle – beam and tubular construction- stub axle types – Elliot and reverse Elliot – Lemoine and Lemoine inverted –rear axle construction — floating axles – semi-floating – three quarter floating and full floating.

#### **II CLUTCH and GEAR BOX**

Clutch – function – clutch actuating mechanism – Mechanical and hydraulic types – clutch material – single plate dry clutch – dual plate dry clutch – multi plate wet clutch – semi centrifugal and centrifugal clutch – motor cycle clutch – Diaphragm clutch – fluid coupling and torque converter - Trouble shooting of Clutch. Gear Box – purpose – resistance offered to the motion of the vehicle – air resistance – rolling resistance – Resistance offered to the motion of the vehicle – gradient resistance – tractive effort – gear ratio – types of gear boxes – sliding mesh – constant mesh – synchromesh device – epicyclic – over drive – under drive and transfer cases – 4 wheel drive – gear shifting mechanism – floor shifting and steering column shifting – Automatic Gear box (CVT) - Trouble shooting of gear box.

#### **III UNIVERSAL JOINT, PROPELLER SHAFT, DIFFERENTIAL**

Universal Joints – variable velocity joint – constant velocity joints – cross or spider type – Rzeppa joints – Bendix Weiss type – tracta – centre joint –construction for heavy vehicles – propeller shaft two piece and three piece construction– Hotchkiss, torque tube, Torque arms – Shackles types – final drive-function – types – Spiral, bevel, Hypoid – worm and worm wheel – Differential function – differential action – non slip differential – differential lock – Trouble shooting of final drive and differential.

#### **IV STEERING SYSTEM and SUSPENSION SYSTEM**

Steering system – Ackerman principle of steering – front end geometry – castor, camber, king pin inclination, toe-in, toe-out on turns – steering gear box – types – Marles cam and roller – cam and peg – recirculating ball – rack and pinion – power steering, linkage booster type, integral type – power steering pumps. Suspension system – rigid axle and independent suspension – function of spring and shock absorber – coil, leaf spring, torsion bar – Rubber spring- solid and laminated leaf spring

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types – air suspension – rear independent suspension antiroll bar – principle of knee action – shock absorbers – Telescopic type -Trouble shooting in suspension & steering systems.

## **V BRAKES AND TYRES**

Brakes – function – stopping distance – Braking system – mechanical, hydraulic and air brake systems – brake shoes, primary and secondary shoes – servo action of brake shoes – drum and disc brakes – construction and operation master cylinder – single and Tandem master cylinder – wheel cylinders – bleeding of brakes – brake shoe adjustment mechanism – Micram adjusters – Snailcam, screw adjuster. Tyres and tubes – cross ply and radial ply – tubeless tyres – wheels – types –disc, split type, spoked and magna – purpose of tandem rear axle – trouble shooting of braking system and tyres – power brakes – Air and Air assisted Brake systems-Anti-lock brake system(ABS)- Exhaust Braking system

### **Text Book**

- 1 Automotive Transmission & Power Train – William H. Grouse.
- 2 Automotive Chassis and Body-William H. Grouse
- 3 Modern Transmission systems, Judge, A.W., Chapman and Hall Ltd., 1990.