# INTERNATIONAL CENTRE FOR APPLIED SCIENCES
# MAHE, MANIPAL

**B.Sc. (Applied Sciences) in Engg.**

**End – Semester Theory Examinations – Nov./ Dec. 2020**

**VI SEMESTER - AUTOMOBILE ENGINEERING (ME 306)**

**(Branch: Mechanical)**

**Time: 3 Hours** **Date: 30 November 2020** **Max. Marks: 50**

- ✓ **Answer ALL the questions.**
- ✓ **Missing data, if any, may be suitably assumed**

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| **1.** | a. | A vehicle has pivot pins 1.65m apart. Length of each track arm is 0.25m and track rod is behind front axle and is 1.35m long. Determine the wheel base which will give true rolling for all wheels when the vehicle is turning so that inner wheel stub axle is $50^0$ to the centerline of the vehicle. | **05** |
| | b. | With a neat sketch explain the working principle of twin tube hydraulic shock absorber. | **05** |
| **2.** | a. | With a neat sketch explain the working principle of vacuum ignition advance mechanism. | **05** |
| | b. | A car has kerb weight of 9700N and wheel base of 2520mm. Its C.G. is 1350mm in front of the rear axle and 700mm above the level road. The coefficient of road wheels adhesion is 0.65. If the car is moving upward on a road inclined at an angle $30^0$ with the horizontal, calculate the load distribution on the front and the rear axles, the retardation and the stopping distance while moving at 65kmph when all the four wheel brakes are applied. The seating capacity of the vehicle is for 5 persons including the driver. Take weight of each person as 550N. | **05** |
| **3.** | a. | List the classification of engines based on the location of valves. Draw any of the three sketches. | **05** |
| | b. | Sketch and explain the working of wax type thermostat valve. | **05** |
| **4.** | a. | With a neat sketch explain the working of sliding caliper disc brake. | **05** |
| | b. | List five differences between Hotchkiss and torque tube drive system. | **05** |
| **5.** | a. | Draw a neat labeled sketch of single plate clutch. | **05** |
| | b. | With a neat sketch explain the working principle of constant mesh gear box system. | **05** |

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