

Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
**SEVENTH SEMESTER B.TECH DEGREE EXAMINATION(S), MAY 2019**

**Course Code: ME463**  
**Course Name: Automobile Engineering**

Max. Marks: 100

Duration: 3 Hours

**PART A**

*Answer any three full questions, each carries 10 marks.*

Marks

- |   |  |     |
|---|--|-----|
| 1 | a) Distinguish between supercharged engine and turbocharged engines with neat sketches.  | (6) |
|   | b) What is turbo lag, how can turbo lag be reduced in turbo charged engines?   | (4) |
| 2 | a) List out the functions of the following IC engine parts<br>(i) Piston (ii) Piston ring (iii) Flywheel (iv) Connecting rod (v) Crankshaft<br>(vi) Camshaft | (6) |
|   | b) What is the purpose of front wing and rear wing in F1 racing car?   | (4) |
| 3 | a) List out the factors affecting the maximum torque transmitting capacity of a friction clutch.   | (4) |
|   | b) With the help of a neat sketch explain the working of an overdrive unit used in automobiles.  | (6) |
| 4 | a) Explain the working of synchromesh gear box engaged in any gear using a neat diagram.   | (6) |
|   | b) List out the different resistive forces a vehicle must overcome to keep moving at different driving conditions.   | (4) |

**PART B**

*Answer any three full questions, each carries 10 marks.*

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|---|---|-----|
| 5 | a) Explain the working of rack and pinion steering mechanism with a neat sketch               | (6) |
|   | b) What are the advantages of power assisted steering system with the other systems?          | (4) |
| 6 | a) Derive for the perfect rolling condition in Ackerman steering mechanism with a neat sketch | (6) |
|   | b) What is 'Under Steer' and 'Over Steer' in automobiles?                                     | (4) |
| 7 | a) Explain the features of McPherson Strut suspension system with a sketch                    | (6) |
|   | b) What are the functions and advantages of independent suspension systems?                   | (4) |

- 8 a) Illustrate the working of swing arm rear wheel drive independent suspension (7)  
b) Define (i) Suspension roll centres (ii) Suspension roll axis (ii) Body roll stiffness (3)

**PART C**

*Answer any four full questions, each carries 10 marks.*

- 9 a) Explain the working of Front disc brakes in an automobile with a sketch (5)  
b) Discuss the function & working of a Master cylinder assembly in brake system with a sketch (5)
- 10 a) Derive an expression for brake applied for the rear wheels and front wheels? (6)  
b) What are the desirable properties of brake pad materials? (4)
- 11 a) Explain the working of vacuum brakes with a neat sketch (6)  
b) What is the need of ABS? (4)
- 12 a) What is the effect of 'aerodynamic drag' on the efficiency of a vehicle (5)  
b) Discuss the effect of 'Negative lift' of aerofoil wings on vehicles (5)
- 13 a) Discuss on the need and function of a rear end spoiler in a vehicle (5)  
b) Explain on the concept of "Hatch back Drag" (5)
- 14 a) What are the methods to control the aerodynamic lift? (5)  
b) How under body height affect the aerodynamic lift and drag? (5)

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