

09 JAN 2023

Reg. No.

Question Paper Code

11599

**B.E./B.Tech. - DEGREE EXAMINATIONS, NOV/DEC 2022**

Fifth Semester

**Mechanical Engineering**

**20MEPC501 - AUTOMOTIVE SYSTEMS**

(Regulations 2020)

Duration: 3 Hours

Max. Marks: 100

Answer ALL Questions

**PART-A (10 × 2 = 20 Marks)**

- |  | <i>Marks,<br/>K-Level, CO</i> |
|--|-------------------------------|
| 1. List out the various materials used in the construction of chassis. | 2,K1,CO1                      |
| 2. What are the functions of piston rings?                             | 2,K1,CO1                      |
| 3. State the requirements of ignition system and mention its types.    | 2,K1,CO2                      |
| 4. Enumerate few differences between WGT and VGT.                      | 2,K2,CO2                      |
| 5. What is the function of gear box? State its types.                  | 2,K1,CO3                      |
| 6. What is the function of differential unit?                          | 2,K1,CO3                      |
| 7. What is meant by bleeding of brakes?                                | 2,K1,CO4                      |
| 8. Define 'castor' and 'camber'.                                       | 2,K1,CO4                      |
| 9. List the advantages of hydrogen fuel used in automobiles.           | 2,K1,CO5                      |
| 10. What are the main components of electric and hybrid vehicles?      | 2,K1,CO5                      |

**PART - B (5 × 13 = 65 Marks)**

Answer ALL Questions

11. a) Discuss the different types of frames with neat sketch. 13,K2,CO1
- OR**
- b) Write short notes on the following engine parts 13,K2,CO1
- a) Piston b) Cylinder head c) Piston ring d) Gudgeon pin  
e) Flywheel f) Exhaust valve g) Lubrication pump.
12. a) Explain the following with suitable sketches:
- (i) Rotary distributor type 6,K2,CO2
- (ii) Common rail direct injection system. 7,K2,CO2
- OR**
- b) (i) Enumerate the differences between the Bharat stage and Euro stage norms. 8,K3,CO2
- (ii) Why our Indian Government adapted BS-VI skipping BS-V? 5,K3,CO2  
Comment on your views.

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create

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13. a) (i) Explain the working of multi-plate clutch with a neat sketch. 10,K2,CO3  
(ii) What are the types of rear axle? 3,K2,CO3

**OR**

- b) (i) Explain the working of a torque converter with a neat diagram. 8,K2,CO3  
(ii) Discuss about the working principle of a differential with a neat diagram. 5,K2,CO3

14. a) With a neat sketch explain the working of air suspension system. 13,K2,CO4

**OR**

- b) With a neat sketch explain the working of an antilock braking system. 13,K2,CO4

15. a) (i) Compare the performance, emission and cost aspects of alternate fuels with conventional fuels for automobiles. 6,K2,CO5

- (ii) Explain the engine modification required to use alternate fuels in automobiles. 7,K2,CO5

**OR**

- b) (i) Explain any one type of hybrid vehicle with a neat sketch. 7,K2,CO5

- (ii) Explain solid polymer fuel cell with a neat sketch. 6,K2,CO5

**PART - C (1 × 15 = 15 Marks)**

16. a) Describe the construction and working of hydrogen operated vehicle. 15,K3,CO6  
In what way this type of vehicles is effective in reducing the emissions? Also comment on the suitability to adopt this vehicle in India.

**OR**

- b) Explain in detail about the engine emission control by three way catalytic converter with a neat sketch. 15,K2,CO6