



**B.E DEGREE EXAMINATIONS: MAY 2017**

(Regulation 2015)

Fourth Semester

**MECHANICAL ENGINEERING**

U15METPE11: Automobile Engineering

**COURSE OUTCOMES**

**CO1:** Explain the vehicle structures, lubrication, cooling and emission control systems.

**CO2:** Summarize the various fuel injection, ignition and electrical systems of an automobile.

**CO3:** Describe the working principle of various components in transmission systems.

**CO4:** Discuss the various steering mechanisms and suspension systems.

**CO5:** Compare the conventional and antilock braking systems.

**CO6:** Discuss the usage of various alternate energy sources in automobiles.

**Time: Three Hours**

**Maximum Marks: 100**

**Answer all the Questions:-**

**PART A (10 x 1 = 10 Marks)**

1. Matching type item with multiple choice code

CO1 [K<sub>1</sub>]

List I	List II
A. Air cooling	i. Ambassador car engine
B. Water cooling	ii. Hero Honda bike engine
C. Lift and Drag force	iii. Forging
D. Crank shaft	iv. Aerodynamic forces

- |    |     |    |     |     |
|----|-----|----|-----|-----|
|    | A   | B  | C   | D   |
| a) | ii  | i  | iv  | iii |
| b) | iii | iv | ii  | i   |
| c) | ii  | iv | iii | i   |
| d) | iii | i  | ii  | iv  |

2. In four stroke engines, the cam shaft connected to the crankshaft by gears or chain rotates at

CO1 [K<sub>1</sub>]

- |                                 |                                      |
|---------------------------------|--------------------------------------|
| a) Half the crank speed         | b) Three-fourth the crankshaft speed |
| c) Double the crank shaft speed | d) Equal to the crank shaft speed    |

3. Braking systems in vehicles are used to CO4 [K<sub>1</sub>]
1. Control the speed of vehicle
  2. Control the direction of vehicle
  3. Decelerate the motion of vehicle
- a) 1,3 b) 2,3  
c) 1,2 d) 1,2,3
4. In tractor the springs provided for the rear wheels are CO4 [K<sub>1</sub>]
- a) helical springs b) leaf spring  
c) either a or b d) no springs are provided
5. Assertion (A): The torque transmitted by the multi plate clutch is more than the single plate clutch. CO3 [K<sub>1</sub>]
- Reason (R): In multi plate clutch the contact area of the clutch facing is more.
- a) Both A and R are Individually true and R is the correct explanation of A b) Both A and R are Individually true but R is not the correct explanation of A  
c) A is true but R is false d) A is false but R is true
6. The frame may get distorted to a parallelogram shape due to CO1 [K<sub>1</sub>]
- a) Weight of vehicle b) Weight of passengers  
c) Cornering force d) Wheel impact with road obstacles
7. The sequence of power transmission to the rear wheel in vehicle is CO4 [K<sub>1</sub>]
1. Engine
  2. Propeller shaft
  3. Gear box
  4. Wheel
- a) 2-3-4-1 b) 1-3-2-4  
c) 3-4-2-1 d) 4-1-3-2
8. Where is the Hook's joint used in an automobile car? CO3 [K<sub>1</sub>]
- a) Between gear box and propeller shaft b) Between flywheel and clutch  
c) Between differential gear and wheels d) Between clutch and gear box
9. Assertion (A): Hybrid vehicle is more advantages than electric vehicle. CO5 [K<sub>1</sub>]
- Reason (R): The hybrid vehicle can be driven by either engine or battery mounted on the same vehicle.
- a) Both A and R are Individually true and R is the correct explanation of A b) Both A and R are Individually true but R is not the correct explanation of A  
c) A is true but R is false d) A is false but R is true

10. Air brakes are mostly used in case of CO4 [K<sub>1</sub>]  
a) cars b) jeeps  
c) trucks d) three wheelers

**PART B (10 x 2 = 20 Marks)**

**(Answer not more than 40 words)**

11. List the aerodynamic forces acting on the vehicle. CO1 [K<sub>2</sub>]  
12. What are the various types of chassis? CO1 [K<sub>2</sub>]  
13. Discuss the function of carburetor in petrol vehicles. CO2 [K<sub>2</sub>]  
14. Explain multi point fuel injection systems. CO2 [K<sub>2</sub>]  
15. Give the different types of clutches used in automobiles. CO3 [K<sub>2</sub>]  
16. What is meant by slip joint? CO3 [K<sub>2</sub>]  
17. Name the types of springs used for suspension in heavy vehicles. CO4 [K<sub>2</sub>]  
18. What is meant by power steering? CO5 [K<sub>2</sub>]  
19. State the advantages of hybrid vehicles. CO6 [K<sub>2</sub>]  
20. Differentiate fuel cell and battery. CO6 [K<sub>2</sub>]

**Answer any FIVE Questions:-**

**PART C (5 x 14 = 70 Marks)**

**(Answer not more than 300 words)**

**Q.No. 21 is Compulsory**

21. Draw layout of petrol injection system and mention its advantages and disadvantages. CO2 [K<sub>2</sub>]  
22. Explain the working of any two types of steering gear box with neat diagram. CO4 [K<sub>2</sub>]  
23. Draw and explain the working of multi plate and cone clutch mention and its advantages. CO3 [K<sub>2</sub>]  
24. Draw and explain Hydraulic braking system and mention its relative merits CO5 [K<sub>2</sub>]  
25. What is steering geometry and explain in detail the factors influencing steering geometry. CO4 [K<sub>3</sub>]  
26. Explain in detail about various alternative fuels used in engine CO6 [K<sub>2</sub>]  
27. Explain in detail about the working of turbo chargers and catalytic converters CO1 [K<sub>2</sub>]

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