

**NJR/KS/18/4609**

Time : Three Hours



Max. Marks : 80

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|----|----|--|---|
| 1. | a) | Explain working principle of 4-stroke S.I. Engine using P-V and valve timing diagram.                        | 7 |
|    | b) | Draw a neat sketch of chassis layout and its components. Write the function of any five components in brief. | 7 |

**OR**

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|----|----|---|---|
| 2. | a) | State the necessity of cooling an engine. Explain with neat sketch thermostatically controlled cooling system.      | 7 |
|    | b) | What is the necessity of lubrication system in an automobile? Explain with neat sketch wet sump lubrication system. | 7 |
| 3. | a) | State the functions of clutch. Explain single plate clutch with a neat sketch.                                      | 7 |
|    | b) | Explain the need of gear box. Discuss with a neat sketch construction and working of constant mesh type gear box.   | 6 |

**OR**

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|----|----|---|---|
| 4. | a) | Explain with a neat sketch working of fluid flywheel and state its advantages.  | 6 |
|    | b) | Classify gear boxes. Used in automobile transmission system. Explain with neat sketch construction and working of sliding mesh type gear box. | 7 |
| 5. | a) | Discuss the necessity of differential in an automobile. Explain its construction and working with neat sketch.                                | 6 |
|    | b) | Describe with a neat sketch construction and working of hydraulic brake system with its advantages.   | 7 |

**OR**

6. a) Explain the working principle of propeller shaft with a neat sketch. 6

- b) Explain the requirement of good braking system describe with a neat sketch. Working of Disc brake system. 7
7. a) Define and explain the following. 7
- 1) Camber angle. 2) Caster angle. 3) King pin inclination.  
4) Toe in. 5) Toe out.
- b) Explain with neat sketch Macpherson stud suspension system. 6

**OR**

8. a) Explain the principle of steering with neat sketch. Also explain worm and worm wheel type steering gear box. 7
- b) Explain briefly the independent type front suspension. Also state its salient features. 6
9. a) Write short note on automobile air conditioning. 6
- b) State the essential requirement of wheels in case of automobile explain briefly various types of automobile wheels. 7

**OR**

10. a) What are the different instruments used on the panel board? Explain any one with neat sketch. 6
- b) Explain the battery ignition system used in automobile with neat sketch also state its salient features. 7
11. a) Explain with neat sketch. ABS (Antilock Braking system). 7
- b) Write short note on electronic power steering. 7

**OR**

12. Write short note on **any three**. 14
- i) Navigational aids. ii) Intelligent vehicle highway system.  
iii) Collision avoidance system. iv) Intelligent lighting.  
v) Active suspension.

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