



**B.E/B.TECH DEGREE EXAMINATIONS: NOV/DEC 2023**

(Regulation 2018)

Fifth Semester

**AUTOMOBILE ENGINEERING**

U18AUE0014: Off Road Vehicles

**COURSE OUTCOMES**

- CO1:** Categories Vehicles Based on their Specification.
- CO2:** Infer the different types of subsystem and its functioning used in the construction of special Purpose Vehicle.
- CO3:** Classify and Observe the application of special Purpose Vehicles in Construction activities.
- CO4:** Explain various safety systems used in utility and military vehicles.
- CO5:** Interpret Kinematics used in the off-road Vehicles to understand its operations.
- CO6:** Identify the design requirement of tracked vehicles.

**Time: Three Hours**

**Maximum Marks: 100**

**Answer all the Questions:-**

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

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

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|--|-----|-------------------|
| 1. Define Off-road Vehicle.  | CO1 | [K <sub>1</sub> ] |
| 2. Explain approach and departure angle of a vehicle.                  | CO1 | [K <sub>2</sub> ] |
| 3. Differentiate all wheel drive and 4X4.                              | CO2 | [K <sub>2</sub> ] |
| 4. Justify the need for differential locking mechanism.                | CO2 | [K <sub>2</sub> ] |
| 5. Compare Excavator and Back Hoe Loader.                              | CO3 | [K <sub>2</sub> ] |
| 6. Distinguish between dozer and grader based on its function.         | CO3 | [K <sub>2</sub> ] |
| 7. Define multi-axle vehicles and its purpose.                         | CO4 | [K <sub>2</sub> ] |
| 8. List out the Special purpose vehicles in constructional activities. | CO4 | [K <sub>2</sub> ] |
| 9. Mention the advantage of tracked vehicle system.                    | CO5 | [K <sub>2</sub> ] |
| 10. Brief PTO.   | CO3 | [K <sub>2</sub> ] |

**Answer any FIVE Questions:-**

**PART B (5 x 16 = 80 Marks)**

**(Answer not more than 400 words)**

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|--|----|-----|-------------------|
| 11. Write down the requirements and classification of off-road vehicles based on capacity Specified by ARAI. | 16 | CO1 | [K <sub>2</sub> ] |
|--|----|-----|-------------------|

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|-----|--|----|-----|-------------------|
| 12. | Construct the layout of off-road vehicles based on Engine location. Give examples for each type and explain its features | 16 | CO6 | [K <sub>2</sub> ] |
| 13. | Explain the constructional details and operations of Scrapper with neat sketch.  | 16 | CO3 | [K <sub>2</sub> ] |
| 14. | Explain the Braked differential and Double Differential Steering system for Tracked Vehicle.                             | 16 | CO5 | [K <sub>2</sub> ] |
| 15. | Explain the working of hydro pneumatic suspension system with required diagrams.   | 16 | CO4 | [K <sub>2</sub> ] |
| 16. | Describe the Operation of Excavator and explain the construction of Upper carriage and under carriage with neat sketch.  | 16 | CO2 | [K <sub>2</sub> ] |

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