



B.E.DEGREE EXAMINATIONS:NOV/ DEC 2023

(Regulation 2018)

Seventh Semester

AUTOMOBILE ENGINEERING

U18AUE0016: Vehicle Testing and Validation

COURSE OUTCOMES

- CO1:** Outline the basic measurement systems.
CO2: Examine the vehicle body strength using crash tests.
CO3: Explain the various engine performance testing methods.
CO4: Estimate the different vehicle test parameters and its influence on fuel economy.
CO5: Summarize the tests performed on steering, suspension and its impact on driving stability.
CO6: List the tests conducted to analyse the transmission, brakes and wheel performance.

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. Distinguish direct and indirect comparison of measurements. | CO1 | [K ₄] |
| 2. Explain the term Hysteresis. | CO1 | [K ₂] |
| 3. Explain crashworthiness of a vehicle. | CO2 | [K ₂] |
| 4. Outline the possible occurrence of tripped rollover in the vehicle. | CO2 | [K ₃] |
| 5. Illustrate the Willian's line graph to predict friction power of an engine. | CO3 | [K ₃] |
| 6. Indicate the conditions to be followed in testing vehicle for unladen conditions. | CO4 | [K ₂] |
| 7. Briefly explain the constant radius test. | CO5 | [K ₂] |
| 8. Identify the sensors used in measurement of shock absorber characteristics. | CO5 | [K ₃] |
| 9. Identify the test which is used to test parking brake in a vehicle. | CO6 | [K ₃] |
| 10. Summarize Type 1 and Type 2 test for vehicle testing? | CO6 | [K ₂] |

Answer any FIVE Questions:-

PART B (5 x 16 = 80 Marks)

(Answer not more than 400 words)

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| 11. a) Indicate the types of errors in an instrument and also provide optimum solutions to control the errors. | 10 | CO1 | [K ₂] |
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| | b) | Compare Closed and Open loop measurement system. | 6 | CO1 | [K ₄] |
| 12. | a) | Briefly explain the procedure and types of NCAP crash test made to evaluate crashworthiness of a vehicle. | 10 | CO2 | [K ₂] |
| | b) | Illustrate about the dolly roll over test with a neat sketch. | 6 | CO2 | [K ₂] |
| 13. | a) | Elaborately explain the types of dynamometers used for engine testing. | 8 | CO3 | [K ₂] |
| | b) | Enumerate Constant volume Sampling and its procedure. | 8 | CO3 | [K ₂] |
| 14. | a) | Explain the constant steer angle test and constant speed variable radius test. | 8 | CO5 | [K ₂] |
| | b) | Briefly explain the road hazard impact test for testing wheel and tyre assemblies. | 8 | CO5 | [K ₂] |
| 15. | a) | Illustrate dynamic cornering fatigue test with a neat sketch. | 8 | CO6 | [K ₂] |
| | b) | Briefly explain the bumpers test procedure and mention its types. | 8 | CO6 | [K ₂] |
| 16. | a) | List down and explain various static characteristics of an instrument. | 10 | CO1 | [K ₂] |
| | b) | Briefly explain type 1 field test for automotive vehicles. | 6 | CO4 | [K ₂] |
