



B.E DEGREE EXAMINATIONS: APRIL 2018

(Regulation 2014)

Eighth Semester

AUTOMOBILE ENGINEERING

U14AUTE25: Modern Automobile Accessories

COURSE OUTCOMES

CO1: Understand the Engine & Chassis Management system

CO2: Understand the Heating and Air-Conditioning

CO3: Understand the Comfort, Convenience, Safety & Security Systems

Time: Three Hours

Maximum Marks: 100

Answer all the Questions: -

PART A (10 x 1 = 10 Marks)

1. Match the type of speakers in a car with its appropriate role in a car entertainment system. CO3 [K₃]

Types of Plastics	Automotive Components
1. Sub - Woofers	A. Low Frequency Reproduction
2. Woofers	B. Treble
3. Mid-Range Speakers	C. Bass
4. Tweeters	D. High Frequency Reproduction

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

2. The refrigerant used in many air conditioning systems is CO2 [K₂]

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| a) R134A | b) CFC |
| c) 26.3C | d) Ozone |

3. Use of gasoline injection system is limited because of CO1 [K₂]

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|------------------------------------|------------------------------|
| i. high initial cost | iv. misdistribution |
| ii. complex design | v. maintenance requirements. |
| iii. loss of volumetric efficiency | |
| a) ii, v | b) ii, iv, v |
| c) ii, iv | d) i, ii, v |

4. Body Control Module uses _____ communication protocol. CO1 [K₂]
 a) CAN b) AFDX
 c) FLEX RAY d) D2B
5. Assertion: *Dynamic pressure has to be high for a carburetor's working* CO1 [K₃]
 Reason: *Faster the air moves lower the static pressure*
 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 automotive air conditioning system is also works on the CO2 [K₁]
 a) Otto Cycle b) Brayton Cycle
 c) Carnot Cycle d) Rankine Cycle
7. Identify the correct sequence in automotive painting process. CO2 [K₁]
 1. Compressor
 2. Accumulator
 3. Condenser
 4. Evaporator
 5. Expansion Valve
 a) 3 – 1 – 4 – 2 - 5 b) 1 – 5 – 4 – 2 – 3
 c) 1 – 3 – 2 – 5 – 4 d) 5 – 1 – 3 – 4 – 3
8. The two-way converters have an inability to control CO1 [K₁]
 a) Soot Particles b) Sulphur
 c) NO_x d) HC
9. Assertion: *the threshold for triggering the airbag is reached, 15 ms after the impact.* CO3 [K₃]
 Reason: *the vehicle gets strongly decelerated after an impact*
 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. An adjustable strap that goes over the shoulder of an occupant is CO3 [K₁]
 a) sash belt b) belt in seat
 c) lap belt d) 3-point seat belt

PART B (10 x 2 = 20 Marks)
(Answer not more than 40 words)

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| 11. Define Carburation. | CO1 | [K ₁] |
| 12. Differentiate between timed and continuous injection. | CO1 | [K ₂] |
| 13. Construct a free body diagram of an active suspension system. | CO1 | [K ₃] |
| 14. Outline the major functions of Body Control Unit. | CO1 | [K ₂] |
| 15. List any 4 basic requirements of an automotive HVAC system | CO2 | [K ₁] |
| 16. Illustrate the working of an automotive heating system. | CO2 | [K ₂] |
| 17. Demonstrate the method used to cancel out the original noise by using sound. | CO3 | [K ₃] |
| 18. How will you regain the stability in a rolling car? | CO3 | [K ₁] |
| 19. Even a correctly cut duplicate key will not start the Ford engine – Justify. | CO3 | [K ₃] |
| 20. Calculate the capacitor value in a door lock system, | CO3 | [K ₃] |
| Time delay = 15 s ; Relay coil = 120Ω | | |
| Supply voltage = 12V ; Relay drop out = 8V | | |

Answer any FIVE Questions:-

PART C (5 x 14 = 70 Marks)
(Answer not more than 300 words)

Q.No. 21 is Compulsory

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|---|-----|-----------------------|
| 21. Review any 3 Modern Trends in Thermal Management of Vehicles. | CO2 | [K ₂] |
| 22. (i) Categorize the electronically controlled SI & CI Engine Fuel Injection Systems. | (6) | CO1 [K ₃] |
| (ii) Elucidate the difference between D – MPFI & L – MPFI | (8) | |
| 23. Discuss in details about the pneumatic suspension system with neat sketches. | CO1 | [K ₂] |
| 24. A driver uses a cruise control system where he has to speed up or slow down on various occasions in a traffic upon which he is intended to set/reset his speed.
Develop a system to reduce the driver's fatigue for this scenario. | CO3 | [K ₃] |
| 25. (i) Build a system to allow fresh air into the vehicle for circulating inside the cabin. | (6) | CO2 [K ₄] |
| (ii) Device a system to control the temperature of a car cabin without manual intervention. | (8) | |

26. Identify the components involved in a supplementary restraint system of a car and Explain the sequence of events in the case of a frontal impact at about 35 km/h. CO3 [K₂]
27. Describe the advancements towards the comfort and convenience found in the following automotive sub systems. CO3 [K₂]
- i. Windows (5)
 - ii. Steering (5)
 - iii. Seats (4)
