

CS/B.Tech/AUE/odd/Sem-7th/AUE-704B/2014-15

CS/B.Tech/AUE/odd/Sem-7th/AUE-704B/2014-15

AUE-704B

MODERN VEHICLE TECHNOLOGY

Time Allotted: 3 Hours

Full Marks: 70

*The questions are of equal value.
The figures in the margin indicate full marks.*

Candidates are required to give their answers in their own words as far as practicable.

GROUP A (Multiple Choice Type Questions)

1. Answer all questions. 10×1 = 10
- (i) A traction control system (TCS) in automobiles controls the
- (A) vibrations on the steering wheel
 - (B) engine power during acceleration
 - (C) torque that is transmitted by the tyres to the road surface
 - (D) stopping distance in case of emergency
- (ii) The information provided by the oxygen (O₂) sensor to the feedback control system is about the
- (A) air-fuel ratio
 - (B) air temperature
 - (C) air flow speed
 - (D) exhaust gas volume
- (iii) The function of antilock brake system (ABS) is that it
- (A) reduces the stopping distance
 - (B) minimises the brake fade
 - (C) maintains directional control during braking by preventing the wheels from locking
 - (D) prevents nose dives during braking and thereby postpones locking of the wheels

- (iv) The most accurate ignition system of a spark ignition engine is
- (A) magneto system
 - (B) battery system
 - (C) electronic control unit system
 - (D) magneto and electronic system
- (v) The fuel pump of a programmed fuel injection (PFI) system operates for two seconds when the ignition is turned to the start position to
- (A) enable the pump's fault-diagnosis function to operate
 - (B) warm up and lubricate the pump
 - (C) supply a large amount of fuel and thereby create a choke effect
 - (D) pressurise the fuel system before the engine is started
- (vi) Lambda sensor is used to monitor
- (A) Nitrogen
 - (B) Oxygen
 - (C) CO₂
 - (D) CO
- (vii) Toyota Hybrid Vehicles
- (i) provide reduced CO₂ emissions
 - (ii) are equipped with petrol engine and diesel engine
 - (iii) uses a power split device with a planetary gear in their transmission
 - (iv) work on Sterling Heat Cycle
- (A) (i) and (iii)
 - (B) (ii) and (iii)
 - (C) (i) and (iv)
 - (D) (i), (ii) and (iii)
- (viii) Keeping in view of cleaner environment and to cut down vehicular noise, passenger cars use
- (i) stratified charge engine
 - (ii) battery power vehicle
 - (iii) electric propulsion with cable
 - (iv) hydrogen fuelled vehicle
 - (v) hybrid vehicle
- (A) (i)
 - (B) (ii) and (iii)
 - (C) (iv)
 - (D) (v)

CS/B.Tech/AUE/odd/Sem-7th/AUE-704B/2014-15

- (ix) Energy density of Hydrogen fuel as liquid is
 (A) double that of petrol (B) half that of petrol
 (C) one-fourth that of petrol (D) almost same that of petrol
- (x) 42-volt System used in Automobiles
 (A) lowers electrical system cost (B) reduces mass and volume
 (C) meets more power requirement (D) all of these

GROUP B
(Short Answer Type Questions)

Answer any *three* questions.

3×5 = 15

2. What is Regenerative Braking System? How effective are Regenerative Braking System and why are they so important for electric and hybrid vehicles?
3. Write a short note on 42-volt system used in Automobile.
4. What is traction control system (TCS)? Describe the operating condition of TCS.
5. What are DTS-i, DTS-Si, and DTS-Fi systems? How do they work in Motorbike?
6. What is Unit Injector? How the Electronic Unit Injector works?

GROUP C
(Long Answer Type Questions)

Answer any *three* questions.

3×15 = 45

7. What is VVT-i (Variable Valve Timing-intelligent) System? Explain the construction and operation of VVT-i system. 15
8. (a) How the Electronic Diesel Control System works? 7
 (b) What is Common Rail Fuel Injection System? Why is it used? 8

CS/B.Tech/AUE/odd/Sem-7th/AUE-704B/2014-15

9. Describe the system components and operating condition of electronic controlled pneumatic (air) suspension for on and off road use (with neat sketch). 1
- 10.(a) Discuss the Function of a Sensor, Actuator and Control System?
 (b) Indicate the different types of Sensors used in automobiles and their uses. 6+
11. Write short notes on any *three* of the following: 3×5
 (a) Active suspension
 (b) Camless Engine
 (c) Antilock braking system (ABS)
 (d) X-by-wire technology
 (e) Hybrid vehicle.