

CS/B.Tech/AUE/Odd/Sem-7th/AUE-704B/2015-16



MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY,
WEST BENGAL

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.
All symbols are of usual significance.*

GROUP A
(Multiple Choice Type Questions)

1. Answer all questions. 10×1 = 10
- (i) Toyota Hybrid Vehicles
- (a) provide reduced CO₂ emissions
 - (b) equipped with petrol engine and diesel engine
 - (c) use a power split device with a planetary gear in their transmission
 - (d) work on sterling heat cycle
- (a) and (c) (B) (b) and (c) (C) (a) and (d) (D) (a), (c) and (d)
- (ii) Keeping in view of cleaner environment and to cut down vehicular noise passenger cars uses
- (a) stratified charge engine
 - (b) battery powered vehicle
 - (c) electric propulsion with cable
 - (d) hydrogen fueled vehicle
 - (e) hybrid vehicle
- (A) (a) (b) and (c) (C) (d) (D) (e)

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- (iii) 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
- (iv) Name the Indian Car model in which Stratified Engine is used?
- (A) ESTEEM
 - (B) FORD IKON
 - (C) SANTRO
 - (D) HONDA CITY
- (v) What is the weakest link in any electric car?
- (A) The Potentiometers
 - (B) The Batteries
 - (C) Transmission
 - (D) The Driver
- (vi) 42 Volt System used in Automobiles
- (A) lower electrical system cost
 - (B) reduced mass and volume
 - (C) to meet more power requirement
 - (D) all of these
- (vii) EGR is the most effective way of reducing
- (A) NO_x
 - (B) HC
 - (C) CO
 - (D) CO and HC
- (viii) Evaporative emission in SI engine accounts for emission of
- (A) 50%
 - (B) 70%
 - (C) 40%
 - (D) 25%
- (ix) The information provided by the oxygen (O₂) sensor to the feedback control system is about the
- (A) air flow speed
 - (B) air fuel ratio
 - (C) air temperature
 - (D) exhaust gas volume

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- (x) The function of antilock brake system (ABS) is that it
- (A) maintains directional control during braking by preventing the wheels from locking
 - (B) minimizes the brake fade
 - (C) reduces the stopping distance
 - (D) prevents nose dives during braking and thereby postpone locking of the wheels

GROUP B
(Short Answer Type Questions)

Answer any three questions.

3 × 5 = 15

- 2. Write a short note on 42 volt-system used in Automobile. 5
- 3. What is unit Injector? How the electronic unit injector works? 2+3
- 4. What is DTS-Fi technology? Compare between DTS-i and DTS-Si technology. 2+3
- 5. How regenerated braking systems reduce CO₂ emission? 5
- 6. Why wheels lock? What are the benefits of Anti lock Brake System? 2+3

GROUP C
(Long Answer Type Questions)

Answer any three questions.

3 × 15 = 45

- 7. (a) What is a Hybrid Vehicle? Write down the needs of Hybrid Vehicle and name various Indian models operating now. 6
- (b) Explain with sketch various methods of combining IC Engine with Electric Motor to drive a passenger vehicle. 9

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8. A car weighs 813 kg, and its engine develops 20 HP at 2500 r. p. m. At this engine speed, the road speed of the car on the top gear is 64.37 kmph. Bottom gear ratio is 3.5: 1 and the efficiency of transmission are 88% and 80% on top and bottom gear respectively. The diameter of tyres is 0.762 m and the projected area of the vehicle is 1.116 m². The co-efficient of air resistance is 0.0032 and road resistance is 0.023. Calculate
- (i) Speed of the car in bottom gear-
 - (ii) Tractive Effort available of the wheels on top and bottom
 - (iii) Gradient which it can climb on the bottom gear
 - (iv) The Tractive Effort of Wheels required to start the car on load and attain a speed of 38.28 kmph in 10 secs.

2+4+4+5

- 9. (a) How the Electronic Diesel Control System works? 7
- (b) What is Common Rail fuel Injection System? Why is it used? 5+3
- 10. (a) Write the necessity of regenerative braking system.
- (b) What are the basic elements required for regenerative braking system?
- (c) Explain different types of regenerative braking system.
- 11. (a) Write advantages and disadvantages of camless engine. 5+6+4
- (b) Describe the construction and operation of oxygen sensor.
- (c) Differentiate between semi active and full active suspension system.