M.E/M.TECH Degree Examination, December 2020

Third Semester

MS18018 – AUTOMOTIVE ELECTRONICS

(Regulation 2018)

Time: Three hours Maximum : 80 Marks

Answer **ALL** questions

PART A - (8 X 2 = 16 marks)

1. In ignition coil, the ratio between the number of turns of primary and secondary windings is about
   (A) 1 to 50
   (B) 1 to 100
   (C) 1 to 200
   (D) 1 to 400
2. In Magneto Ignition system:
   A) No battery is required
   B) Engine starting is rather difficult
   C) used in high speed engines
   D) All the above.
3. Match the following:

Column 1	Column 2
A) Innermost gear	i) Planet gear
B) Gear connected to transmission	ii) Sun gear
C) Connects sun and ring gears	iii) Ring gear

   1. A)-i), B)-ii), C)-iii)
   2. A)-i), B)-iii), C)-ii)
   3. A)-ii), B)-iii), C)-i)
   4. A)-ii), B)-i), C)-iii)
4. Indicate true/ false:
   (i)Adaptive cruise control works on controlling two variables.
   (ii) Power steering is harder to operate than normal steering.
5. Why carburetor is replaced by fuel injector in S.I engine?
6. Suggest suitable sensor to estimate the amount of fresh air supplied to the engine.
7. How the secondary air management is used to improve the performance of catalytic converter?
8. State the need for each automobile to meet the requirements of OBD II regulations.

PART B - (4 X16 = 64 marks)

09. (a) (i) Make a table listing in one vertical column each of the following aspect: Completion of cycle, Flywheel, valve mechanism, cooling requirement, volumetric efficiency, thermal efficiency, power produced and Lubrication requirement. Then make two adjacent vertical columns, labeling them: four stroke, two stroke. Attempt to fill every blank space in the table. **(8)**

(ii) With variable valve timing, power and torque can be optimized across a wide rpm band. Justify with neat sketch. **(8)**

(OR)

(b) (i) With reference to maintaining stoichiometric A/F ratio, explain the direct fuel injection in detail with neat sketch. **(10)**

(ii) The problem in the existing system states that the amount of fuel deliver to the cylinder is not the same for all of them. One cylinder receives more fuel than the other. Suggest a suitable solution? **(6)**

10. (a) (i) How the fuel efficiency is optimized, when replacing contact breaker with electronic system? Justify with anyone type with neat sketch. **(10)**

(ii) Why crankshaft angular Position is an important variable in automotive control systems, particularly for controlling ignition timing and fuel injection timing. Justify? **(6)**

(OR)

(b) Why stepper motors become the ideal choice for automation systems that require precise speed control and positioning or both? Justify with neat sketch. **(16)**

11. (a) The engine control system is responsible for controlling fuel and ignition for all possible engine operations condition. In that there are a number of distinct operating mode for the engine control system. Explain them detail. **(16)**

(OR)

(b) With neat sketch explain in detail about mild hybrid and full hybrid vehicle. **(16)**

12. (a) (i) Braking steerability and vehicle stability is possible in ABS. Justify with neat sketch? **(8)**

(ii) Greater safety and controllability under critical situations are possible in EHPS. Justify with neat sketch? **(8)**

(OR)

(b) (i) Why ACC is a best example of the type of electronic feedback control system? Explain in detail with neat sketch? **(8)**

(ii) Explain how the crash detection sensor useful for SRS safety system. **(8)**