Enrollment No: _____ Exam Seat No: _____

C.U.SHAH UNIVERSITY

Summer Examination-2017

Subject Name: Hybrid Vehicles

Subject Code: 4TE08HYV1 Branch: B.Tech (Automobile)

Semester: 8 Date: 15/04/2017 Time: 02:30 To 05:30 Marks: 70

Instructions:

(1) Use of Programmable calculator & any other electronic instrument is prohibited.
(2) Instructions written on main answer book are strictly to be obeyed.
(3) Draw neat diagrams and figures (if necessary) at right places.
(4) Assume suitable data if needed.

Q-1 **Attempt the following questions:** **(14)**

a) The predication of vehicle performance is based on the relationship between
1) Tractive effort and Vehicle speed 2) Gradeability and Acceleration
3) Tractive effort and Acceleration 4) None of the above.

b) The rolling resistance is because of the friction between the
1) Wheel rim and tyre 2) Tyre and the road surface
3) Wheel rim and road surface 4) None of the above.

c) Which hybrid is able to run in electric-only mode, with larger batteries and the ability to recharge from the electric power grid?
1) Medium hybrid 2) micro hybrid 3) Plug-in hybrid 4) None of the above.

d) The double connection between the engine and the drive axle: mechanical and electrical is observed in
1) Series hybrid drive train. 2) Parallel hybrid drive train.
3) Complex hybrid drive train. 4) Combined hybrid drive train.

e) A Tractor that uses a diesel to drive a generator, which in turn drives several electrical motors for all-wheel drive
1) is a hybrid vehicle 2) is an Electric vehicle
3) is a Hybrid-Electric vehicle 4) is not a hybrid

f) The ability to recover significant amounts of braking energy is called.
1) Anti-Lock braking system. 2) Regenerative braking system
3) Traction Control system. 4) Reduction Braking system.

g) A _____ hybrid vehicle uses hydraulic and mechanical components instead of electrical ones.
1) Pneumatic 2) Hydraulic 3) Human Powered 4) Electric.

h) To control speed in AC motors _____ drives is used
1) variable frequency 2) Constant frequency 3) None of the above.

i) In which electric motor torque is produced by the tendency of its moveable part to

move to a position where the inductance of the excited winding is maximized.
1) DC motor Series Wound 2) Induction AC motor
3) Brushless DC motor 4) Reluctance motor

j) The chemical reaction between the electrodes and the electrolyte which generates
1) DC electricity. 2) AC electricity 3) AC or DC depending on electrolyte

k) The instrument used to check specific gravity of acid in a battery is
1) hydrometer 2) hygrometer 3) voltmeter 4) multimeter

l) _____is amount of electrical energy stored for every kilogram of battery mass
1)Specific power 2) Energy efficiency 3) Energy density 4) Specific energy

m) The SI unit of energy stored in a battery is
1) Joule 2) W / hr 3) A hr 4) A / hr

n) A rotating flywheel stores energy in the _____ form
1) Kinetic 2) Potential 3) Gravitational 4) None of the above

Attempt any four questions from Q-2 to Q-8

Q-2 **Attempt all questions**

a) Explain various resistances to motion of a vehicle and explain their effect on performance of a vehicle. **(07)**

b) Discuss Operating Fuel Economy and explain Basic Techniques to Improve Vehicle Fuel Economy. **(07)**

Q-3 **Attempt all questions**

a) Define Hybrid vehicles and discuss classification of Hybrid vehicle. **(07)**

b) Discuss Series Hybrid Electric Drive Train with operating modes. **(07)**

Q-4 **Attempt all questions**

a) Discuss use of torque convertor in parallel Hybrid Electric Drive Train. **(07)**

b) Define mild-hybrid and discuss Parallel Mild Hybrid Electric Drive Train. **(07)**

Q-5 **Attempt all questions**

a) Discuss Electric vehicle with its advantages, disadvantages and application. **(07)**

b) Give types of DC motor and explain any one in detail. **(07)**

Q-6 **Attempt all questions**

a) Discuss AC induction motors with its advantages and disadvantages. **(07)**

b) Discuss Use of Batteries in combination of Flywheel. **(07)**

Q-7 **Attempt all questions**

a) Discuss Electric motor sizing. **(07)**

b) Discuss different types of battery used in hybrid-electric vehicles. **(07)**

Q-8 **Attempt all questions**

a) Explain briefly flywheel technology. **(07)**

b) Discuss pneumatic hybrid engine system. **(07)**