

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI (NEW) EXAMINATION – SUMMER 2022****Subject Code:3160207****Date:03/06/2022****Subject Name:Alternative Fuels and Power Systems****Time:10:30 AM TO 01:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

MARKS

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| Q.1 | (a) Explain the need for alternate fuel in brief. | 03 |
| | (b) Describe the method of production of methanol in short. | 04 |
| | (c) Explain the suitability of algae fuel in brief and discuss the process for separating algae fuel from it in detail. | 07 |
| Q.2 | (a) Define: (i) Emulsification (ii) Esterification (iii) Pyrolysis | 03 |
| | (b) Explain the properties of jatropha seed oil in detail. | 04 |
| | (c) Enlist the numerous Synthetic Fuel and explain the plastic fuel production method in detail. | 07 |
| | OR | |
| | (c) Enlist the vegetable oils available as alternate fuel and discuss the performance and emission characteristics of any vegetable oil. | 07 |
| Q.3 | (a) Discuss the cost and safety of CNG fuel for vehicles in short. | 03 |
| | (b) Explain the physical properties of hydrogen fuel. | 04 |
| | (c) Explain the process of biogas formation with neat sketch in detail. | 07 |
| | OR | |
| Q.3 | (a) Explain the comparison of LPG and CNG fuel in short. | 03 |
| | (b) Discuss the factor affecting the biogas formation. | 04 |
| | (c) Discuss the method of biomass gasification and enlist the merits and demerits of it. | 07 |
| Q.4 | (a) Explain the principal of fuel cell technology with neat sketch in brief. | 03 |
| | (b) Explain the possible drive train configuration for Electric Vehicle. | 04 |
| | (c) Explain the various configuration of Hybrid vehicle in detail with neat diagram. | 07 |
| | OR | |
| Q.4 | (a) Discuss comparison between Electric and Hybrid vehicle in brief. | 03 |
| | (b) Give the detailed classification of various electric motors used in electric vehicle powertrain. | 04 |
| | (c) For electric vehicle, what are the parameters affecting the battery storage capacity? – discuss them in detail. | 07 |
| Q.5 | (a) Define the following Motor characteristics: | 03 |
| | (i) Nominal voltage | |
| | (ii) Rated torque | |
| | (iii) Base speed | |
| | (b) Explain the layout of solar powered vehicle in brief. | 04 |

- (c) Explain working of the stratified charge engine in detail with neat sketch. **07**

OR

- Q.5** (a) Define the following Battery characteristics: **03**
- (i) Energy Density
 - (ii) Power Density
 - (iii) State of Charge
- (b) Discuss the advantages and limitations of solar powered vehicles. **04**
- (c) Discuss the working of the Wankel engine in details. **07**
