R16

Code No: AM403ES

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year II Semester Examinations, 2019
ALTERNATE FUELS FOR AUTOMOBILES

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.

Part A (25 marks)		
Q.No	**Question**	**Bloom's Level**
1 a	Mention the advantages of CNG as a fuel for engines.	L1
b	Is it possible for an existing LPG vehicle to run on CNG? Justify your answer.	L2
c	Enlist the various methods used to store LNG fuel.	L1
d	Discuss the modifications that are required to convert an existing SI engine to run on LPG.	L2
e	Listout the factors affecting biogas generation.	L1
f	Explain the various methods of hydrogen transportation.	L2
g	Enlist the major components of hybrid vehicle.	L1
h	Explain the working principle of an electric vehicle.	L2
i	What are the main benefits of hydrogen fuel cells?	L1
j	Outline the transesterification process of manufacturing biodiesel.	L2
Part B (Marks 50)		
2	In view of the depleting reserves of fossil fuel the government intends to take initiatives to address this issue. What are your observations on the alternative options to fossil fuels in relation to fuel properties? Discuss comparative properties of natural gas, PNG, CNG and LPG to be used as fuel substitutes.	L3
OR		
3	The manufacturer of SI engine specifies the use of gasoline as fuel. Explore the possibilities to run this engine on CNG as a pollution mitigation measure. Provide technical justification for changes in performance with CNG as fuel in SI mode.	L3
4	The city of New Delhi was facing a serious threat due to automotive related pollution menace. The initiative to curb the pollution was replacement of diesel and petrol with LNG operated vehicles. Analyze its properties that qualify it as a suitable substitute engine fuel.	L3
OR		
5	The energy liberated by combustion of fuel and the subsequent pollutant formation depends on the existing conditions of fuel and air supply. In this context examine the parameters related to the performance, combustion and emission characteristic of an engine operated in dual fuel mode using LPG and diesel as constituent fuels.	L3
6	The vegetable oils are derived from carbon-neutral sources composed of flora and fauna. Elaborate the use of vegetable oils as fuel in engines highlighting their favorable features over the fossil fuels.	L6
OR		

7	The Bio-fuels when used in engines produce noticeably small amount of pollutants as compared to fossil fuels. However they are treated as carbon-neutral owing to their source of generation. Justify their use as an alternate to fossil fuel used in engines.	L5
8	The use of fossil fuels contributes to environmental degradation due to addition of pollutants. Identify role of hydrogen-gas as a suitable contender as an ideal future fuel to IC engines.	L3
	OR	
9	Electric vehicles are the future replacement to conventional IC engines. Discuss and justify their usage in place of existing engine operating on fossil fuels.	L3/L5
10 a	What types of batteries are available for electric vehicles? Contrast their relative merits.	L2
b	The present research in automotives is focusing on hydrogen fuel cell and battery operated electric vehicles. Compare performance of a hydrogen fuel cell operated vehicle with an electric vehicle.	L2
	OR	
11 a	Explain the working of a vehicle powered by a fuel cell.	L2
b	Fuel cell technology transforms gaseous fuel in to electricity through direct energy conversion process. In view of this identify challenges in fuel cell implementation for vehicle traction.	L3