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Name of the College (Please tick, symbol is given)	:	COSS	CMES		COLS	
Program/Course	:	B.Tech/ Mechanical				
Semester	:	VI				
Name of the Subject	:	Alternate Energy Sources for Automobile				
Subject Code	:	ADEG 331				
Name of Question Paper Setter	:	Mr. Avilash Kumar				
Employee Code	:	40001486				
Mobile & Extension	:	991011706				

Note: Please mention additional Stationery to be provided, during examination such as Table/Graph Sheet etc. else mention "NOT APPLICABLE":

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Roll No: -----

**UNIVERSITY OF PETROLEUM
AND ENERGY STUDIES**



End Semester Examination, April, 2017

Program/course: B.Tech Mechanical
Subject: Alternate Energy sources for automobile
Code : ADEG 331
No. of page/s: 3

Semester – VIII
Max. Marks : 100
Duration : 3 Hrs

Note: (i) The question paper contains section A, B and C
(ii) Assume suitable data if required.

SECTION-A

Note: Answer all the questions. Each question carries 5 Marks.

[4×5=20]

Q1. Explain the advantages of Fuel cell.

Q2. State the characteristics of hydrogen fuel which makes ultra- lean combustion in hydrogen fueled SI engine.

Q3. Researcher in Cornell University tried to run a diesel engine to run on neat hydrogen. They tried a compression ratio upto 29 to achieve compression ignition of hydrogen, but were not successful. Why?

Q4. Fill in the Blanks

- a) Flammability limits of hydrogen are in the range of% to.....% by volume.
- b) Biodiesel has cetane number in the range of
- c) The only pollutant of major concerns in hydrogen operated S.I engine is.....
- d) LPG is predominantly a mixture ofand in different proportions.
- e) Gasohol is the mixture of % and%.

SECTION- B

Note: Answer all the questions. Each question carries 10 marks

[4×10 =40]

Q5. Describe important properties of Biodiesel and discuss its effect on the performance and emission of the engine.

Q6. Discuss the advantages and disadvantages of solar energy.

- Q7. Discuss the advantages and disadvantages of bio diesel.
- Q8. Explain the working of PEM fuel cell. List the types of fuel cell.

SECTION –C

Note: Q9 is compulsory and answer any one from Q10 & Q11. Each question carries 20 marks.
[2×20 =40]

- Q9. (a) Explain the constructional features and working principle of hybrid vehicle.
- (b) Discuss the economic and environmental impact of hybrid vehicle.
- Q10. (a) Discuss the advantages and disadvantages of ethanol and methanol.
- (b) In an air-standard Otto cycle, the compression ratio is 10. The condition at the beginning of the compression process is 100 kPa and 270°C. Heat added at constant volume is 1500 kJ/kg, while 700 kJ/kg of heat is rejected during the other constant volume process in the cycle. Specific gas constant for air = 0.287 kJ/kgK. Find the mean effective pressure (in kPa) of the cycle.

OR

- Q11. (a) Explain the performance and emission characteristics of ethanol fueled engine.
- (b) A gasoline engine working on the Otto cycle has a cylinder of diameter of 200 mm and stroke of 250 mm. the clearance volume is 1570 cc. Find the air standard efficiency assume $C_p = 1.005 \text{ kJ/kg K}$ and $C_v = 0.717 \text{ kJ/kgK}$.