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OEY-001

CERTIFICATE IN ENERGY TECHNOLOGY AND MANAGEMENT (CETM)

Term-End Examination 01642

June, 2011

OEY-001 : ENERGY RESOURCES AND CONVERSION PROCESSES

Time : 3 hours *Maximum Marks : 70*

Note : *There are two sections in this question paper, Section **A** and Section **B**. **Section A** is **compulsory**. Attempt **any eight** questions from **Section B**. Use of calculator is permitted.*

SECTION - A

(All questions are compulsory) **7x1=7**

1. Choose the correct answer from the given four alternatives.

(a) A chemical fuel is a substance which releases _____ on combustion.

(i) chemical energy

(ii) heat energy

(iii) sound energy

(iv) magnetic energy.

(b) For each mole of oxygen, number of moles of nitrogen required for complete combustion of carbon are :

(i) $\frac{20}{21}$ (ii) $\frac{2}{21}$

(iii) $\frac{77}{21}$ (iv) $\frac{79}{21}$

(c) Zeroth law of thermodynamics forms the basis of _____ measurement

(i) pressure (ii) temperature

(iii) heat exchange (iv) work

(d) Shiv kumar whose mass is only 40 kg, climbs up a 20 m long staircase to the top of a building 10 m high, what is the work done by him ?

(i) 3 kJ (ii) 6 kJ

(iii) 12 kJ (iv) 4 kJ

(e) A light and a heavy body have equal momentum. Which one has greater kinetic energy ?

(i) The light body

(ii) Both have equal kinetic energy

(iii) The heavy body

(iv) Data given is incomplete.

(f) Higher Calorific Value (HCV) is the heating value of the fuel _____.

(i) with water vapour which are formed by combustion

(ii) without water vapour which are formed by combustion

(iii) both (i) and (ii)

(iv) none of the above

(g) An electric motor is usually used to :

(i) Produce electricity

(ii) Produce mechanical energy

(iii) Produce light

(iv) Create energy

2. Fill in the blanks. **7x1=7**

(a) The SI unit of work is _____

(b) The power factor is the ratio of active power and _____

(c) The energy form contained in a wound up clock spring is _____

(d) Plants need energy from _____

(e) Energy from hot water or steam available deep inside the earth's crust is known as _____

(f) The energy supplied to a device is 160 MJ. If the energy conversion device is having 40% efficiency, then the energy converted into useful work is equal to _____

(g) Thermocouple is a device which converts thermal energy into _____

SECTION - B

(Answer ***any eight*** questions)

3. What are the advantages and disadvantages of generating electricity using nuclear power plants. 7

4. Describe in detail the merits and demerits of using wind power as a source of renewable energy. 7

5. A car of mass 2000 kg is lifted up a distance of 30 m by a crane in 1 minute. A second crane does the same job in 2 minutes. Do the crane consume the same or different amounts of fuels ? What is the power applied by each crane ? Neglect power dissipation against friction. 7

6. Enumerate the characteristics of a good fuel. 7

7. What are the types of energy sources ? State various forms of renewable and non-renewable energy sources. 7

8. Discuss in brief the advantages and disadvantages of liquid fuels. 7

9. "Hydrogen will be the main sources of energy in future"-- Justify the statement with suitable examples. 7

10. Explain how renewable energy use is more beneficial for the environment. 7

11. Explain how fuel switching to natural gas from coal based power production technologies help in cleaning up the environment. 7

12. List the biomass technologies and describe their applications. 7