Scheme – I

Sample Question Paper

Program Name : **Diploma in Chemical Engineering**
Program Code : **CH**
Semester : **Third**
Course Title : **Plant Economics and Energy Management**
Marks : **70** **Time: 3 Hrs.**

22312

Instructions:

(1) All questions are compulsory.
(2) Illustrate your answers with neat sketches wherever necessary.
(3) Figures to the right indicate full marks.
(4) Assume suitable data, if necessary.
(5) Preferably, write the answers in sequential order.

Q.1) Attempt any FIVE of the following. **10 Marks**

a) List the issues addressed by energy policy.
b) List any four applications of solar energy.
c) Define primary energy sources.
d) State importance of Economics in Market evaluation.
e) Describe concept and types of market..
f) List various types of costs with example.
g) List any four instruments used for energy audit.

Q.2) Attempt any THREE of the following. **12 Marks**

a) Explain the construction and working of flat plate collector.
b) Describe the objectives of energy policy in chemical industry.
c) Explain the importance of energy security of nation.
d) Describe the significance of Interest rate with respect to market demand.

Q.3) Attempt any THREE of the following. **12 Marks**

a) Explain the construction and working of fixed roof biogas plant.
b) Classify new energy sources with their industrial applications.
c) Explain working of hydropower plant with block diagram.
d) Discuss the concept of energy audit.

Q.4) Attempt any THREE of the following. 12 Marks

a) A steam boiler in chemical plant is using 800 kg coal per hour. If boiler fuel is switched from coal to oil calculate oil mass flow rate required for boiler using following data-

Calorific value of coal : 8000 kcal/kg

Calorific value of oil : 10200 kcal/kg

Operational efficiency based on coal : 70%

Operational efficiency based on oil : 80%

b) Illustrate the benefits of hydrogen energy as a future energy.

c) Describe major solar thermal energy applications.

d) Illustrate with example the importance of energy conservation in energy intensive industry.

e) Classify energy audits based on procedure and explain walk through audit

Q.5) Attempt any TWO of the following. 12 Marks

a) Describe the concept of excise tax, income tax.

b) Sketch tree diagram showing cash flow for Chemical industrial operation.

c) It is desired by the firm to borrow Rs. 2 lakh to make a financial obligation. The money can be borrowed from a loan agency at a monthly interest rate of 3 %. Determine total amount of principle plus simple interest due after 2 years if no intermediate payment are made and effective interest rate when interest is compounded monthly.

Q.6) Attempt any TWO of the following. 12 Marks

a) Sketch tree diagram showing cash flow for Chemical industrial operation.

b) 8.A piece of equipment having a negligible salvage value is estimated to have a service life of 08 years. The original value of equipment if Rs. 50,000/- . Find the depreciation charges for 5^{th} Year using

1] Straight line method

2] Sinking fund method

3] Sum of the digit method.

c) A heat exchanger costs Rs. 50 Lakhs is fabricated in India. The exchanger is estimated to have useful life of 10 years and a salvage value of Rs. 5 lakhs. If the same unit is imported, it shall cost Rs. 150 lakhs and would have an useful life of 20 years and a salvage value of 40 lakhs. Suggest which among the two would be a better option of purchase and why (I = 8 % p.a.)

Scheme – I

Sample Test Paper - I

Program Name : **Diploma in Chemical Engineering**

Program Code : **CH**

22312

Semester : **Third**

Course Title : **Plant Economics and Energy Management**

Marks : **20** **Time: 1 Hour**

Instructions:

(1) All questions are compulsory.

(2) Illustrate your answers with neat sketches wherever necessary.

(3) Figures to the right indicate full marks.

(4) Assume suitable data, if necessary.

(5) Preferably, write the answers in sequential order.

Q.1 Attempt any FOUR. **08 Marks**

a) List any four fossil energy sources available in nature.

b) List any four clean energy technologies.

c) List environmental benefits of wind energy.

d) List the types of biomass digesters.

e) Enlist primary energy sources.

f) List any four instruments used for energy audit.

Q.2 Attempt any THREE. **12 Marks**

a) Describe the various fractions available from crude oil.

b) Classify energy sources based on availability, cost, environmental impact and renewability

c) Explain the concept of tidal energy.

d) Describe solar thermal energy applications with examples

e) Explain the procedure of detailed energy audit.

f) Illustrate with example the importance of energy conservation in energy intensive industry.

Scheme – I

Sample Test Paper - II

Program Name : **Diploma in Chemical Engineering**

Program Code : **CH**

22312

Semester : **Third**

Course Title : **Plant Economics and Energy Management**

Marks : **20** **Time: 1 Hour**

Instructions:

(1) All questions are compulsory.

(2) Illustrate your answers with neat sketches wherever necessary.

(3) Figures to the right indicate full marks.

(4) Assume suitable data, if necessary.

(5) Preferably, write the answers in sequential order.

Q.1 Attempt any FOUR. **08 Marks**

a) List the types of taxes.

b) State the benefit of insurance.

c) State laws of demand and supply.

d) Define term Interest.

e) Enlist factors affecting cost estimation

f) List different methods for calculation of profitability.

Q.2 Attempt any THREE. **12 Marks**

a) Describe straight line method and sinking fund methods of depreciation with formula and application.

b) Differentiate Net present worth method and pay out period method (at least four points)

c) 8.A piece of equipment having a negligible salvage value is estimated to have a service life of 08 years. The original value of equipment if Rs. 50,000/- . Find the depreciation charges for 5th Year using

1] Straight line method

2] Sinking fund method

d) Identify advantages of balance sheet in accounting.

e) Sketch tree diagram showing cash flow for Chemical industrial operation.

f) Describe the concept of excise tax, income tax.