



PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

MID TERM EXAM

Semester & AY: Even Sem 2021-22

Course Code : PET-1006

Course Name: Overview of Energy Industry

Program & Sem : B.Tech (Petroleum Engineering) & II

Date: 13-05-2022

Time: 01.30pm to 03.00pm

Max Marks: 50

Weightage: 25%

Instructions:

- (i) *Read the question carefully and answer all the questions*
 - (ii) *Scientific calculator is allowed*
-

Part A [Memory Recall Questions]

Answer all the Questions. Each Question carries 2 marks

(5Qx2M=10)

- Q.NO.1. What is renewable energy resources? (C.O.NO 1) [Knowledge]
- Q.NO.2. Give any two examples of coal mines in India. (C.O.NO 2) [Knowledge]
- Q.NO.3. What is the function of boiler in steam turbine? (C.O.NO 2) [Knowledge]
- Q.NO.4. What do you mean by adiabatic and constant pressure process? (C.O.NO 2) [Knowledge]
- Q.NO.5. Write any two uses of coal. (C.O.NO 1) [Knowledge]

Part B [Thought Provoking Questions]

Answer all the Question. Questions carries 10 marks.

(2Qx10M=20)

Q.NO.6 Nuclear energy is the energy in the nucleus, or core, of an atom. Radioactive substances are used in Nuclear power station. What do you mean by radioactive substances? Draw a flow diagram and explain how electricity can be generated in Nuclear power station.

(C.O.NO 2) [Comprehension]

Q.NO.7 "Hydrocarbon is considered to be a nonrenewable energy resources." Justify this statement. Mainly crude oil and natural gas are considered to be hydrocarbon resources. Explain the different process of formation of Crude oil and natural gas with diagram. (C.O.NO 2) [Comprehension]

Part C [Problem Solving Questions]

Answer all the Questions. Question carries 10 marks.

(2Qx10M=20)

Q.NO.8. To meet the power requirement in Presidency University, suppose steam turbine is installed at University. Air enters the compressor of an ideal air standard Brayton cycle at 100 kPa and 300K with a volumetric flow of 6 m³/sec. The compressor pressure ratio is 10. The turbine inlet temperature is 1400 K. Assume $\gamma=1.4$ for air, $\gamma=1.3$ for gas, C_p [air] = 1.005 kJ/(kg.K), and C_p [gas] = 1.1 kJ/(kg.K), determine

a. Thermal efficiency of the cycle

b. back work ratio

(C.O.NO 2) [Application]

Q.NO.9. In your class room there are 8 fans, each having 80 watt power consumption and 8 tube light, each having 55 watt power consumption. All the fans and tube lights are switch on from 9 AM to 5 PM and number of working days in the month of April are 20. Find the electricity bill for the month of April if the rate of electricity in Karnataka state is 11 Rs/ unit.

(C.O.NO 1) [Application]

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**PRESIDENCY UNIVERSITY
BENGALURU**

SCHOOL OF ENGINEERING

END TERM EXAM

Semester & AY: Even Sem 2021-22

Course Code : PET-1006

Course Name: Overview of Energy Industry

Program & Sem : B.Tech (Petroleum Engineering) & II Sem

Date: 1st July 2022

Time: 01.00 PM to 04.00 PM

Max Marks: 100

Weightage: 50%

Instructions:

- (i) ***Read the question carefully and answer all the questions***
 - (ii) ***Scientific calculator is allowed***
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Part A [Memory Recall Questions]

Answer all the Questions. Question carries THIRTY marks.

(1Qx30M=30M)

Q.NO.1. Answer all the questions

- i. What is clastic and non clastic rock? Give example.
- ii. Full form of OPEC is -----? Write the functions of OPEC.
- iii. How does gas turbine produce electricity? What are the fuels for thermal power plant?
- iv. How will you get the different products from crude oil? What are the main products from crude oil?
- v. What do you mean by upstream, midstream and downstream sectors in oil and gas industries?
- vi. Select the correct option
 - (a) Solar cooker is a device which converts solar energy to ----- energy.
 - a. Electrical
 - b. Thermal
 - c. Sound
 - d. all the above
 - (b) Largest producer of crude oil is -----
 - a. USA
 - b. Russia
 - c. China
 - d. Saudi Arabia
 - (c) Largest wind energy station India is located in
 - a. Gujrat
 - b. Rajasthan

vii. (1) Assertion (A) : Fossil fuel resources are normally formed from the remains of dead plants and animals. Reason (R) : They are often referred to as fossil fuels and are formed from hydrocarbon.

- (a) A and R are correct and R explains A
- (b) A and R are correct but R does not explain A
- (c) A is incorrect but R is correct
- (d) Both A and R are incorrect

(2) Assertion (A): Natural gas is found with petroleum deposits. Reason

(R): it can be used as a domestic and industrial fuel.

- (a) A and R are correct and R explains A
- (b) A and R are correct but R does not explain A
- (c) A is incorrect but R is correct
- (d) Both A and R are incorrect

viii. What are the main properties of reservoir rock?

ix. Fill in the blanks

- (a)..... are resources that exist without action of humankind.
- (b)..... resources harvested and used rationally will not produce pollution.
- (c) Hydro electric power is a resource.

x. Match the following.

Column A	Column B
a. Hydro power	i. Sun
b. Renewable energy	ii. Turbine
c. Solar panel	iii. Tidal energy

Part B [Thought Provoking Questions]

Answer all the Questions. Questions carries TEN marks.

(4Qx10M=40)

Q.NO.2 Renewable energy resources has advantage over nonrenewable energy. List minimum two renewable energy resources and two non-renewable energy resources. Discuss how you can produce energy from these resources? . (C.O.NO 2) [Comprehension]

Q.NO.3 "Coal is considered to be a nonrenewable energy resources." Justify this statement. Classify the coal based on time of deposit and calorific value. How can you use coal to produce thermal power station to produce electricity. (C.O.NO 2) [Comprehension]

Q.NO.4 Semiconductors are used for solar panels. What do you mean by semiconductor? Which Semiconductor is broadly used? What are the different types of semiconductors? Explain the formation of different types of semiconductors with proper diagram. (C.O.NO 3) [Comprehension]

Q.No.5 Briefly explain the stages of oil and gas life cycle. What are the methods available for oil and gas exploration? Which method is mostly used for oil and gas exploration and why?

(C.O.NO 4) [Comprehension]

Part C [Problem Solving Questions]

Answer all the Questions. Questions carries TEN marks.

(3Qx10M=30)

Q.NO.6. To meet the power requirement in Presidency University, suppose steam turbine is installed at University. Air enters the compressor of an ideal air standard Brayton cycle at 120 kPa and 320K with a volumetric flow of 5 m³/sec. The compressor pressure ratio is 10. The turbine inlet temperature is 1450 K. Assume $\gamma=1.37$ for air, $\gamma=1.25$ for gas, C_p [air] = 1.005 kJ/(kg.K), and C_p [gas] = 1.05 kJ/(kg.K), determine

- Thermal efficiency of the cycle
- Compressor work done
- Turbine work
- work ratio

(C.O.NO 2) [Application]

Q.NO.7. In your class room there are 10 fans, each having 80 watt power consumption and 10 tube light, each having 55 watt power consumption. All the fans and tube lights are switch on from 9 AM to 5 PM and number of working days in the month of April are 20. Find the electricity bill for the month of April if the rate of electricity in Karnataka state is 10 Rs/ unit. (C.O.NO 1) [Application]

Q.NO.8 (i) To meet the power requirement of Presidency University, solar cells of size (10 cm x 10cm) are installed. Each solar cell produces a voltage of 0.5 V and a current up to 2.5 A. If the solar insulation is 800 W/m², find the efficiency of the solar cell.

(ii) If the efficiency of the solar cell is 16% and power requirement is 500 MW, find the space requirement for the solar cells. (C.O.NO 3) [Application]



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(C.O.NO 1) [Application]