

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/  
COMMERCIAL PRACTICE , APRIL – 2023**

**POWER PLANT ENGINEERING**

(Maximum Marks : 100)

(Time : 3 hours)

**PART – A**  
(Maximum Marks : 10)

Marks

**I.** Answer **all** questions in one or two sentences. Each question carries 2 marks.

1. List 3T factors affecting combustion of fuels.
2. What is bleeding of steam turbine?
3. Define condenser efficiency.
4. State any two applications of gas turbine.
5. What is nuclear fusion?

(5x2=10)

**PART – B**  
(Maximum Marks : 30)

**II.** Answer any **five** of the following questions. Each question carries 6 marks.

1. Differentiate between HCV and LCV of fuels.
2. Explain the working of Counter flow Jet condenser with figure.
3. What are the factors affecting vacuum efficiency of condenser?
4. Draw flow diagram and P-V diagram of constant pressure closed type gas turbine and mark all processes.
5. Illustrate the working of Turbo jet engine with sketch.
6. Explain chain reaction of  $U^{235}$  nucleus with suitable sketch.
7. Describe the working of Bio gas plant with sketch.

(5x6=30)

**PART – C**

(Maximum Marks : 60)

(Answer **one full** question from each unit. Each full question carries 15 marks)

**UNIT – I**

- III.** (a) Explain pressure compounding in steam turbines with pressure and velocity graphs. (8)  
(b) List the requirements of good fuel. (7)

**OR**

- IV.** (a) Explain with sketch Bomb calorimeter and show how HCV of solid fuel is determined. (8)  
(b) Explain the working of Parson's reaction turbine with sketch. (7)

**UNIT – II**

- V.** (a) Illustrate condensing steam power plant with line diagram. (8)  
(b) Find the vacuum efficiency of a surface condenser having condensate temperature 31°C while vacuum gauge reads 705 mm Hg. Barometer reading is 760 mm of Hg. (7)

**OR**

- VI.** (a) Draw and explain Induced draught cooling tower. (8)  
(b) Determine the thermal efficiency of Carnot cycle operating with boiler pressure of 12 bar abs and condenser pressure 0.1 bar abs. Steam is dry and saturated at 12 bar. (7)

**UNIT –III**

- VII.** (a) A simple closed cycle gas turbine plant receives air at 1 bar and 15 °C and compresses to 5 bar and then heats it to 800 °C in the heating chamber. The hot air expands in turbine back to 1 bar. (i) Draw T-S diagram of the cycle. Calculate (ii) Temperature of air at the end of compression (iii) Temperature of air at the end of expansion and (iv) Work done by the turbine/kg of air. Take  $C_p$  for air as 1KJ/kg K. (8)  
(b) Explain the working of hydro-electric power plant with the aid of sketch. (7)

**OR**

- VIII.** (a) Illustrate the working of Turbo propeller engine with sketch. (8)  
(b) List the advantages of gas turbines over IC engines. (7)

**UNIT – IV**

- IX.** (a) Explain the principal parts of a Nuclear reactor. (8)  
(b) Illustrate the working of Solar cooker with suitable figure. (7)

**OR**

- X.** (a) Explain Fast Breeder Reactor power plant with diagram. (8)  
(b) Explain Flat plate solar collector with suitable figure. (7)

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