

Plant Utilities

Paper - II

P. Pages : 2

Time : Three Hours



TKN/KS/16/7817

Max. Marks :80

- Notes :
1. All questions carry marks as indicated.
 2. Solve Question 1 OR Question No. 2.
 3. Solve Question 3 OR Question No. 4.
 4. Solve Question 5 OR Questions No. 6.
 5. Solve Question 7 OR Questions No. 8.
 6. Solve Question 9 OR Questions No. 10.
 7. Solve Question 11 OR Questions No. 12.
 8. Due credit will be given to neatness and adequate dimensions.
 9. Assume suitable data whenever necessary.
 10. Diagrams and chemical equations should be given whenever necessary.
 11. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) Explain the laws of thermodynamics. **6**
- b) Explain extensive properties and Intensive properties. **7**

OR

2. a) Define the followings: **6**
- i) Internal Energy ii) Enthalpy
- iii) Entropy
- b) Distinguish between reversible and irreversible process. **7**
3. a) What are the differentiating features between a water tube and a fire tube boiler. **6**
- b) Define equivalent evaporation and efficiency of boiler and discuss various factors affecting boiler efficiency. **7**

OR

4. a) Explain the necessity of boiler mountings and accessories. **6**
- b) Compare natural and artificial draughts. **7**
5. a) What are the application of the gas turbine plant? **7**
- b) Distinguish between impulse and reaction turbine. **7**

OR

6. a) Air enters the compression of a gas turbine plant operating on air standard cycle at 100kpa and 300K with a volumetric flow rate of $5 \text{ m}^3/\text{s}$. The compressor pressure ratio is 10. The turbine inlet temperature is 1400k. The turbine and compressor each has an isentropic efficiency of 80% Calculate i) Thermal efficiency ii) Net power developed in KW. **7**
- b) Explain the terms reheating and bleeding in connection with steam turbine. **7**
7. a) A four cylinder four stroke petrol engine develops indicated power of 14.7 KW at 1000rpm. The mean effective pressure is 5.5bar. Calculate the bore and stroke of the engine, if the stroke is 1.5 times the bore. **6**
- b) Write the classification of Internal combustion engines. **7**

OR

8. a) Compare two stroke and four stroke engine. **6**
- b) Why is the battery ignition system preferred on most of the automobiles. **7**
9. a) Explain with neat sketch the working of any one mechanical type cooling tower. **6**
- b) Give brief history of cooling water management. **7**

OR

10. a) Discuss various factors that are considered for designing of a cooling tower. **6**
- b) Explain the management and conditioning of cooling water. **7**
11. a) State the properties of a good refrigerant. What are the normal refrigerant used. **7**
- b) Write note on 'Applications of refrigeration'. **7**

OR

12. a) What is the difference between a refrigerator and a heat pump. **7**
- b) What is one tonne of refrigeration? What is the basic formula for calculation of tonnage of refrigeration. **7**
