

**ANSWER ANY FIVE QUESTIONS ALL QUESTIONS CARRY EQUAL MARKS.**

**MARKS 16\*5=80**

1. (a) What are renewable energy source? Discuss the advantages and disadvantages of renewable and conventional energy sources.  
  
(b) What is Ocean Thermal Energy Conversion (OTEC)? With the help of a simple sketch explain how power can be obtained using OTEC plants.  
  
(c) 2 kg wet steam is heated at a constant pressure of 2 bar until its temperature increases to 150°C. The heat transferred is 2100kJ. Find the initial dryness fraction of steam. Assume  $C_{steam} = 2.1 \text{ kJ/kgK}$ . If required use the extract of the steam table provided below. EXTRACT OF SATURATION STEAM TABLE
2. (a) Bring out clearly the difference between fire tube and water tube boilers  
  
(b) With the help of a neat diagram explain briefly the working of a fire tube boiler.  
  
(c) How are water turbines classified?
3. (a) With the help of a neat sketch explain the working of a Francis Turbine.  
  
(b) How does an Open Cycle Gas turbine Power plant work? Explain briefly with a suitable diagram.  
  
(c) What are internal and external combustion engines? Give examples.
4. (a) With the help of a Pv diagram explain the working of a four stroke diesel Engine.  
  
(b) Define (i) Compression ratio and (ii) mean effective pressure of an IC engine.  
  
(c) A person conducted a test on a single cylinder two stroke petrol engine and found that the mechanical and brake thermal efficiencies of the engine were 0.7 and 0.2 respectively. The engine with a mean effective pressure of 6 bars ran at 300 fuel is 42, 500 kJ/kg and that the stroke to bore ratio of the engine cylinder is 1.2. Find the bore and stroke of the engine in cm. (10 marks)
5. (a) What is the difference between refrigeration and air conditioning? Explain.  
  
(b) Describe with a neat sketch the working of vapour absorption refrigeration system. (8 marks) (c) Explain with the sketch the principle of taper turning by swiveling the compound tool rest.
6. (a) Describe with a neat sketch the working of a radial drilling machine.  
  
(b) What are the different operations commonly performed on a milling machine?  
  
(c) Explain the different types bonding of grinding wheels and the materials used.
7. (a) Explain the difference between soldering, brazing and welding.  
  
(b) What are the advantages and disadvantages of ball and roller bearings over journal bearings?  
  
(c) Draw a neat sketch of a drop feed lubrication method and explain its working.
8. (a) What are the advantages and disadvantages of gear drives over belt drives

(b) In a belt drive, the velocity ratio is 3. The driving pulley runs at 400 rpm. The diameter of the driven pulley is 300 mm. Find the speed of the driven pulley and the diameter of the driving pulley.

(c) With the help of a block diagram explain the closed loop control system. Give examples.