



SHRI S. H. KELKAR COLLEGE OF ARTS, COMMERCE & SCIENCE, DEVGAD
SEMESTER III EXAMINATION, OCTOBER 2023

Class: S. Y. B.Sc

Thermodynamics and temp. transducers (USPH301)

Duration: 2.5 hrs

Marks: 75

Q.1) A) Attempt any one of the following

(08)

1. Explain the terms:
 - i. Isothermal process ii. Adiabatic process
 - iii. Isochoric process iv. Isobaric process
2. Explain construction and working of steam engine.

B) Attempt any one of the following

(08)

1. Describe working of diesel engine with neat labelled diagram.
2. State and explain first part of Carnot Theorem.

C) Attempt any one of the following

(04)

1. Write a note on reversible and irreversible process.
2. In a double acting steam engine, the average pressure of steam is 10^5 N/m^2 . The length of stroke is 0.8 m and the area of piston is 0.25 m^2 . Find the power of the engine if it makes 5 strokes per second.

Q.2) A) Attempt any one of the following

(08)

1. Using T-S diagram explain concept of heat transfer.
2. Draw diagram of vapor compression machine and write it's working..

B) Attempt any one of the following

(08)

1. Write principle of increase in entropy. Write features of entropy in cyclic process.
2. Show that in the Kelvin's absolute scale of temperature the ratio of any two temperatures is equal to the ratio of quantities of heat taken in and rejected by a reversible engine working between the same two temperatures.

C) Attempt any one of the following

(04)

1. Find efficiency of Carnot engine working between 127°C and 27°C . It absorbs 80 cal of heat. How much heat is rejected?
2. Write a short note on superfluidity of helium.

Q.3) A) Attempt any one of the following

(08)

1. What is a temperature transducer? Explain the working principle of the same.
2. What is ultrasonic transducer? Write its working principle with a neat labeled diagram.

B) Attempt any one of the following

(08)

1. What are different types of temperature transducers? Explain those with diagrams.
2. Write details on resistance thermometer. Explain its working principle.

C) Attempt any one of the following

(04)

1. State advantages and disadvantages of ultrasonic transducers.
2. What materials are used for resistance thermometers?

Q.5) Attempt any four

(15)

1. Temperature of source of Carnot engine is 400 K which takes up 500 cal. of heat and rejects 400 cal. to sink. What is temperature of the sink? What is efficiency of the engine?
2. List out methods of liquefaction of gases.
3. Compare the internal combustion engines: Otto engine and Diesel engine.
4. Write properties of liquid Helium.
5. What are the criterion for a process to be reversible.
6. Write properties of sensing elements used in temperature transducers.