

# Birla Institute of Technology and Science, Pilani

## ME F433 Solar Thermal Process Engineering

### Comprehensive Exam (Closed Book)

Time: 3 hrs

Marks: 40

Date: 17 / 05 / 2022

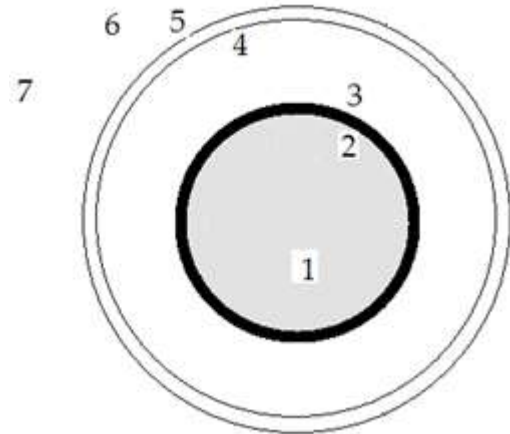
---

Note: Assume suitable data wherever necessary.

Underline the answers and the assumptions you make.

---

- Q.1. The figure shows the cross section of heat collector element (HCE) of parabolic trough collector. Draw the figure in answer book and a) label the various points mentioned in the figure b) represent one-dimensional heat transfer processes on the same, b) draw its thermal resistance circuit c) write one dimensional steady state energy balance equations at each surface. Include all thermal resistances. [13]



- Q.2. What is Compound parabolic collector (CPC)? How is it better than Cylindrical parabolic collector? Explain with neat sketch. [4]
- Q.3 Explain with neat sketch solar tower based power generation systems operating with different cycles, giving temperature ranges and the type of HTF used? [8]
- Q.4. Explain with neat sketch the working of parabolic trough solar thermal power plant which is to be operated round the clock. Also explain the basic thermodynamic cycle for such plant with T-s plot. [6]
- Q.5 India One solar thermal power plant is being installed recently in India. This is one of its kind power plant with direct steam generation and thermal storage. At which location this plant is installed. Explain with neat sketch it's working. [6]
- Q.7. Explain Solar thermal energy storage systems with a neat sketch. [3]

\*\*\*\*\*BEST LUCK\*\*\*\*\*