

ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)  
ORGANISATION OF ISLAMIC COOPERATION (OIC)  
DEPARTMENT OF MECHANICAL AND PRODUCTION ENGINEERING

Mid Semester Examination

Summer Semester : A.Y. 2022-2023

Course No: ME 4805

Time : 1 Hour 30 mins

Course Title: Power Plant Engineering

Full Marks : 75

*There are 3 Questions. Answer all questions. The right column also indicates the course objective (CO) and Program outcome (PO) addressed by each question.*

1. (a) Draw a *Schematic and T-s diagram of a double stage real Regenerative Rankine cycle*. How does the *feed water boil in a supercritical boiler?* **10**  
(CO1)  
(PO1)
- (b) Draw an *elementary boiler unit illustrating all the auxiliary components along with flue gas path through the stack.* **5**  
(CO1)  
(PO1)
- (c) Discuss the principle of operation of *recuperative and regenerative air heater with a schematic diagram.* **7**  
(CO1)  
(PO1)
2. (a) What are different arrangements of *burners used in the combustion chamber for burning a wide variety of fuels? Discuss their working principle with schematic diagrams.* **10**  
(CO2)  
(PO1)
- (b) Write short definition on: *Ultimate analysis, Proximate analysis, cloud point, and Octane number* **5**  
(CO2)  
(PO1)
- (c) How does the *Flame Stability* affect the burner performance? What *requirements* must be complied with while designing *modern water-cooled furnaces?* **7**  
(CO2)  
(PO1)
3. (a) Distinguish between *bin system and direct firing system* used for processing, distributing, and burning of *pulverized coal* with appropriate figures. **10**  
(CO3)  
(PO1)
- (b) Upon defining the *fluidized bed combustion*, elaborate its transition from *fixed bed to turbulent fluidized bed* with appropriate figures. **8**  
(CO3)  
(PO1)
- (c) With neat diagrams, distinguish between *bubbling fluidized bed and circulating fluidized bed.* **7**  
(CO3)  
(PO1)