J C Bose University of Science and TechnologyYMCA Faridabad, (Deptt of Mech. Engg.)

Subject – AT Sessional Test-I , (2026) MM- 30

Class IVth SM Mech. Engg. (M41&M42) Time- 90 Min

Attempt any three questions. All questions carry equal marks

1. Explain the boiler draught, their types and applications. Differentiate between Loeffler boiler and Velox boilers in their construction and uses. (10) (CO=1).

2. Explaine the boiler mountings and accessories. The following data refer to a boiler trial. The analysis of coal gives C - 81 %, H_2=4.5%, 02- 8%, and remainder incombustible. The analysis of dry flue gas gives CO_2-8.3%, CO-1.4%, N2-80.3% and 02= 10%. Calculate (a) the mass of air supplied per kg of fuel (i.e. Air-fuel ratio) (10) (CO) = 2

3. Explain the Rankine vapour cycles. A steam turbine receives steam at pressure 20 bar and superheated to 88.6 degC. The exhaust pressure is 0.07 bar and the expansion of steam takes place isentropically. Using steam table, calculate the following (a) Heat supplied (b) Heat rejected (c) Net work done. (10) (CO=2)

4. Write the steady flow energy equation (SFEE) for a nozzle. A nozzle expands steam from 14 bar and 300^0C to 6 bar the flow rate is 1 kg/s, find the throat area and exit area. What should be the coefficient of velocity if the exit velocity is 550m/s? (10) (CO=2)