DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY,
LONERE – RAIGAD -402 103
Semester Winter Examination – Dec. - 2019

Branch: Mechanical Engineering.   **Sem.:- V**
Subject: - Applied Thermodynamics – I (BTMEC502)   **Marks: 60**
Date:- 11/12/2019   **Time:- 3 Hr.**

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Instructions to the Students
1. Each question carries 12 marks.
2. Attempt **any five** questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly

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Q.1 a) What is meant by term fuel? Classify fuels in detail. --- (6)
     b) Explain briefly, the method used to determine the higher calorific value of the liquid. -------- (6)

Q 2 a) Describe with neat diagram, the construction and working of a Babcock and Wilcox water tube boiler.
     --- (6)
     b) The following observations were made in a boiler trial:
     Coal used 250kg of calorific value 29800kJ/kg, water evaporated 2000kg, steam pressure 11.5 bar, dryness fraction of steam 0.95 and feed water temperature 34^0C Calculate the equivalent evaporation "from and at 100^0C" per kg of coal and the efficiency of the boiler. ------------------------------- (6)

Q.3 a) With pv and Ts diagram explain Carnot vapour cycle in detail. ------------------------------- (6)
     b) Show the Rankine cycle on p-v and T-s diagrams and explain the processes involved. ----------- (6)

Q4   a) Dry saturated steam at a pressure of 15 bar enters in a nozzle and is discharged at a pressure – of 1.5 bar. Find the final velocity of steam, when the initial velocity of steam is neglible. If 10% of the heat drop is lost in friction, find the percentage reduction in the final velocity. --- (6)
     b) With h-s graph explain effect of friction between nozzle surface and steam. - (6)

Q.5 a) In a De- lavel turbine , the steam enters the wheel through a nozzle with a velocity of 500 m/s and at an angle of 20^0 to the direction of motion of blade. The blade speed is 200m/s and the exit angle of moving blade is 25^0 Find the inlet angle of moving blade, exit velocity of steam, and its direction and work done per kg of steam. --- (6)
     b) What do you mean by compounding of the turbine. Draw the neat sketch of the 3 stage velocity compounding with variation of pressure, velocity and specific volume. (6)

Q.6 a) With neat sketch and cycle representation explain the working of the centrifugal compressor. (6)

     b) With neat sketches explain construction, working of Reciprocating air compressor with applications. (6)

Paper End _____