

Name :

Reg. No:

THIRD SEMESTER B.TECH. DEGREE EXAMINATION- NOVEMBER 2012**EE 09 306 – MECHANICAL ENGINEERING****Time: 3 hours****Max. Marks 70 marks****PART – A***(Answer All questions)*

- I
1. What is meant by dryness fraction?
 2. Define specific steam consumption
 3. State Fourier law of heat conduction
 4. What is surface tension? Give an example
 5. Define specific speed of a pump

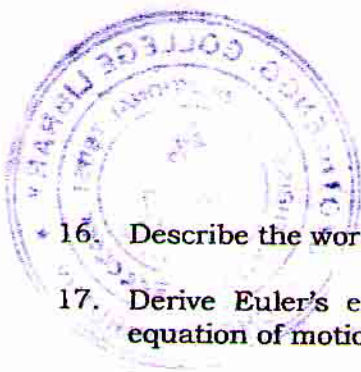
(5 x 2 Marks = 10 Marks)**PART – B***(Answer any FOUR questions)*

- II
6. A simple Rankine cycle works between 30 bar and 0.04 bar. The initial condition of steam being dry saturated. Calculate the cycle efficiency, work ratio and specific steam consumption
 7. A surface at 250°C exposed to the surroundings at 110°C convects and radiates heat to the surroundings. The convection coefficient and radiation factor are 75W/m²K and unity respectively. If the heat is conducted to the surface through a solid conductivity of 10W/m²K, what is the temperature gradient at the surface in the solid?
 8. Derive the equation for effective thermal conductivity for a three component composite wall for series as well as parallel arrangement and for a three component composite cylinder for series arrangement
 9. The reducing end of a conical vessel is connected to a U-tube manometer. The base diameter of the conical vessel is 2m and height is 3m. The reading of the manometer is 20cm of mercury when the conical vessel is empty. Find the reading of the manometer when the conical vessel is completely filled with water.
 10. An oil of specific gravity 0.8 is flowing through a venturimeter having inlet diameter 20cm and throat diameter 10cm. The oil mercury differential manometer shows a reading of 25cm. Calculate the discharge of oil through the horizontal venturimeter. Take $C_d = 0.98$
 11. Derive the expression for work done in a centrifugal pump?

(4 x 5 Marks = 20 Marks)**PART – C**

- III
12. Explain Rankine cycle with neat diagram. Also draw P-V and T-S diagrams. Find out expression for efficiency and pump work
Or
 13. Explain regenerative Rankine cycle with neat sketch. Also draw the T-S diagram for mixing type regenerative cycle.
 14. Explain different modes of heat transfer with proper examples.
Or
 15. Explain the classification of heat exchangers based on fluid flow with neat sketch. Describe the LMTD diagram for parallel flow and counter flow arrangement.

Turn over



16. Describe the working of any two flow measuring instruments with neat sketch.
Or
17. Derive Euler's equation of motion. Also obtain Bernoulli's equation from Euler's equation of motion. State the assumptions used.
18. Explain the working of reciprocating pump with neat diagrams.
Or
19. Describe the working principle of any reaction turbine with neat sketch and necessary graphs.

(4 x 10 marks = 40 marks)
