B.E DEGREE EXAMINATIONS: MAY/JUNE 2014

(Regulation 2013)

Second Semester

ELECTRICAL AND ELECTRONICS ENGINEERING

U13MET204**:** Thermal Engineering and Fluid Mechanics

Time: Three Hours   **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1.   The function of an economizer in a steam power plant is to
   a)   increase the temperature of air supplied   b)   increase the enthalpy of feed water
        to a boiler
   c)   heat the fuel before combustion   d)   condense the exhaust steam from the
                                                    turbine

2.   In fuel cell, the _____ energy is converted into electrical energy.

3.   Scavenging operation is
   a)   Burning the fuel with fresh air   b)   Cleaning the exhaust gases with
   c)   Sending the air fuel mixture into the   d)   sweeping the exhaust gases out with fresh
        engine cylinder   incoming air

4.   Impulse turbine consists of nozzle and --------------

5.   A reciprocating compressor handles
   a)   Large volume for high pressure ratio   b)   Large volume for low pressure ratio
   c)   Small volume for high pressure ratio   d)   Small volume for low pressure ratio

6.   One Ton of refrigeration means that the heat removing capacity is ---------- KJ/min

7.   The fluid property, due to which, mercury does not wet the glass is
   a)   surface tension   b)   viscosity
   c)   cohesion   d)   adhesion

8.   Laminar flow of a Newtonian fluid ceases to exist, when the Reynolds number exceeds--------

9.   The head loss in turbulent flow in a pipe varies
   a)   as velocity   b)   inversely as the square of diameter
   c)   as (velocity)^2 d)   inversely as the velocity

10. Most commonly used joint in the underground pipe lines is the -------------

PART B (10 x 2 = 20 Marks)

(Not more than 40 words)

11. State the purpose of surge tank in the hydro electric power plant.

12. What is the basic difference between the water tube and fire tube boiler?

13. Compare 4 stroke and 2-stroke engine.

14. Mention the function of cam shaft in an engine.

15. What is meant by positive displacement compressors?

16. Name some of the refrigerants used commercially.

17. Write the continuity equation.

18. What is meant by viscous flow?

19. Discuss about the Hydraulic grade line.

20. Define slip of a reciprocating pump.

PART C (5 x 14 = 70 Marks)

(Not more than 400 words)

Q.No. 21 is Compulsory

21. a)   With a neat layout, explain the working of steam power plant.

22. a) (i)   Compare petrol and diesel engine.   (4)
        (ii) Explain the working of 4-stroke diesel engine with the diagrams.   (10)

                                   (OR)

     b) (i)   With the principle of working, explain the operation of impulse and reaction (8)
              turbine.
        (ii) Write short note on Pelton turbine.   (6)

23. a) (i)   Compare rotary and reciprocating compressors.   (4)
        (ii) Explain the construction and working principle of centrifugal compressor.   (10)

                                   (OR)

     b) (i)   What is the basic difference between refrigeration and air-conditioning?   (4)
        (ii) With a neat sketch briefly describe the ammonia absorption refrigeration   (10)
              system.

24. a) (i)   Write briefly about the different types of fluid flow.   (7)
        (ii) Write short note on 1) Continuity equation 2) Euler's equation   (7)

b) (i) State Bernoulli's theorem for steady flow of an incompressible fluid. (4)

(ii) A gas is flowing through a horizontal pipe at a temperature of 4°C. The diameter of the pipe is 8cm and at section 1-1 in this pipe, the pressure is 30.3N/cm^2 (gauge). The diameter of the pipe changes from 8cm to 4cm at the section 2-2,where pressure is 20.3N/ cm^2 (gauge). Find the velocities of the gas at these sections assuming an isothermal process. Take R=287.14Nm/kg k, and atmospheric pressure =10N/ cm^2.

25. a) What are major and minor losses in pipe? Elaborate on each type of losses in detail.

(OR)

b) (i) Explain the principle of working of double acting reciprocating pump with a diagram. (10)

(ii) Differentiate centrifugal and reciprocating pump. (4)

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