Q1)

a) Any three press machine operations (2 marks each) ………………………………….6 M

b) What is casting --2 M

  Diagram of sand casting……………………………………..2 M

  Explanation of sand casting……………………………….2 M

c) Diagram of surface grinding ……………………………………….2 M

  Explanation of surface grinding……………………………2 M

OR

Q2)

a) Explanation of facing……………………………………..2 M

  Explanation of turning ……………………………………………….2 M

  Explanation of knurling ……………………………………….2 M

b) Sketch of electric arc welding ---2 M

  Explanation of electric arc welding -- 4 M

c) Labeled diagram of Radial drilling machine…………………………….4 M

Q3)

a) Minimum six points of classification of Boilers……………………………..6 M

b) Definition of one ton of refrigeration---2 M

  Definition of C.O.P --------------------------------------2 M

c) Sketch of Centrifugal pump with all labelled………………………………4 M

OR

Q4)

a) Sketch of domestic refrigerator---2 M

  Explanation of domestic refrigerator-----------------------------------4 M

b) Sketch of centrifugal compressor--2 M

  Explanation of centrifugal compressor------------------------------------2 M

c) Minimum four points of Comparison of petrol and diesel engines……………..4 M

Note - Solution of MCQ is marked as in **bold letters.**

Q.5) Attempt following multiple choice questions:

01. During a Cycle consisting of 4 processes, the heat transfers are 50 kJ, -10 kJ, -30 kJ and 20 kJ. Determine the net work for the cycle [2]
    a) 12 kJ   b) **30 kJ**   c) 50 kJ   d) 24 kJ

02. What will be the maximum efficiency of a heat engine operating between 600 K and 300 K_____ [2]

    a) 30%   b) 40%   c) 20%   d) **50%**

03. A Carnot cycle heat engine has a efficiency of 40 %. If the heat engine receives 425 kJ of heat from the source, the net work done is --------------- [2]
    a) 180 kJ   b) 190 kJ   c) **170 kJ**   d) 160 kJ

04. Two parallel shafts, about 600 mm apart are to be connected by spur gears. One shaft is to run at 360 r.p.m. and the other at 120 r.p.m. The speed ratio is ------- [2]
    a) 4   b) **3**   c) 5   d) 6

05. The First law of thermodynamics gives the concept of_____ [2]

    a) Pressure   b) Temperature

    c) **Internal Energy**   d) None of these

06. The following material is used for manufacturing of tubes, wires and cables_____ [2]

    a) Steel   b) Cast iron   c) Ceramic   d) **Copper**

07. The material used for aircraft and missile applications is_____ [2]
    a) Steel   b) Cast iron   c) **Aluminum**   d) Copper

08. The Percentage of carbon in high carbon steel is ------------ [2]

    a) 0.3 - 0.6   b) **0.6 -1.5**   c) 0.05 - 0.3   d) 0.1 - 0.3

09. Spur gears are used to transmit motion between ------------ shafts. [1]
    a) two perpendicular   b) to inclined   c) **two parallel**   d) all of above

10. The following is non metallic material [1]
    a) **Ceramic**   b) Tin   c) Brass   d) Cast iron

11. Which among the following is correct relation between COP of heat pump and COP of refrigerator? [1]
    a) **$[COP]_{H.P.} = 1 + [COP]_{ref}$** b) $[COP]_{H.P.} = 1 - [COP]_{ref}$

    c) $[COP]_{H.P.} = [COP]_{ref}$ d) none of the above

12. The following belt have no slip----------------- [1]
    a) Flat   b) Vee   c) Rope   d) **Timing**