

## TEST 2

MRSF1233

The close loop circuit hydraulic system is used to drive a hydraulic crane. The load is 10 ton metric and its constant velocity is about 0.85 m/s. Specifications for the hydraulic components are as follows:

Hydraulic pump :  $\eta_v = 0.85$        $\eta_m = 0.95$

Hydraulic motor :  $\eta_v = 0.80$        $\eta_m = 0.90$

Drum diameter :  $d = 0.60$  m

System pressure = 200 bar

Pressure loss in hydraulic circuit = 20 bar

Prime mover rotational speed,  $N = 1450$  rpm

- a. Draw the closed hydraulic circuit with velocity control and load control. [5 marks]
- b. Label all hydraulic component. [5 marks]
- c. Determine
  - i. Motor displacement and the suitable type of motor.
  - ii. Pump displacement and the suitable type of pump.
  - iii. Power of the prime mover if the transmission efficiency = 0.95 [15 marks]