**Course: Elements of Mechanical Engineering**

**Assignment-I (Dec 2020- March 2021)**

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|  | Describe with a neat sketch, the working of a Babcock-Wilcox boiler. Indicate clearly the direction of flow of flue gases. |
|  | With necessary diagrams, explain the working principle of a Compression Ignition [CI] engine in which crankshaft makes two revolutions to complete one cycle. |
|  | How are water turbines classified? With a neat sketch, explain the working principle of a radial flow type water turbine with medium specific speed and head. |
|  | 3 kg of steam is generated at 5 bar from water at 340C. Determine the quantity of heat required when, (a) steam is wet, having dryness fraction 0.8, (b) steam is dry saturated, and (c) steam is superheated to 2400C. Assume Cps = 2.25kJ/kg K and Cpw = 4.187kJ/kg K |
|  | The following observations were obtained during a trial on four stroke diesel engine. Cylinder diameter= 30cm, stroke of the piston=55cm, crank shaft speed=300rpm, brake load=80kg, Brake drum diameter =1.8m, mean effective pressure=8 Bar, diesel consumption is 0.1 liter / minute, specific gravity of Diesel=0.78, calorific value of Diesel=43,000 KJ/Kg. Find Brake power, Indicated Power, Frictional power, mechanical efficiency, frictional power, Mechanical efficiency, brake thermal efficiency and Indicated thermal efficiency. |
|  | The following are the details of a 4-Stroke petrol engine: Diameter of brake drum=60.03cm, Full brake load on drum=250, Brake drum speed=450rpm, Calorific value of petrol=40MJ/kg, Brake thermal efficiency=32%, mechanical efficiency=80%, specific gravity of petrol=0.82. determine:   1. brake power 2. indicated power 3. fuel consumption in litres per second 4. Indicated thermal efficiency |
|  | A single cylinder 4-S diesel engine has the following data. Area of indicator diagram = 300mm2, length of diagram = 40mm, spring constant of the indicator used = 1000 bar/m, engine speed = 400rpm, load on brake drum 380N, spring balance reading = 50N, diameter of brake drum = 1.2m, fuel consumption 2.8 kg/hr, heat value of fuel 40 MJ/kg, bore 160mm and stroke 200mm. Find IP, BP, Mechanical efficiency, Indicated thermal efficiency and Brake thermal efficiency. |
|  | Draw a neat sketch of vapour compressor refrigeration system. Indicate the state of the refrigerant at all salient points and direction of flow of refrigerant. |
|  | Draw a neat sketch of radial drilling machine and explain its working |
|  | Explain the construction and working of sensitive drilling machine. |

**Note:**

1. **Keep front sheet on top and write your details**

**(Assignment I, your Name, USN, Course Name and Code, Section)**

1. **Write in A4 white Sheet**
2. **Answer all questions without fail**
3. **Draw Diagram neatly and give the explanation**
4. **Write the given data Clearly with units**
5. **Last date for submission 25-03-2021**