Question Paper

Exam Date & Time: 13-Mar-2021 (09:00 AM - 12:00 PM)

MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
(A constituent unit of MAHE, Manipal)

FIRST SEMESTER B.TECH END SEMESTER EXAMINATIONS,MARCH 2021

BASIC MECHANICAL ENGINEERING [MME 1051 - 2020 -PHY]

Marks: 50 **Duration: 180 mins.**

Instructions to Candidates: Answer ALL questions Missing data may be suitably assumed

1) A) Feed water enters the boiler at a temperature of 30°C. It leaves the boiler as 85 % dry and enters the super heater where it is superheated to a temperature of 300°C. Determine the heat supplied per Kg of steam in the Boiler and in the super heater if the pressure is 1.5 N/mm^2. From the super heater if the steam is led to a heat exchanger for process heating where it loses 88.7% of enthalpy, determine the condition and related parameter of the steam at the exit point of heat exchanger Assume the specific heat of water as 4.187 kJ/KgK and that of superheated steam as 2.25 kJ/KgK. (5)

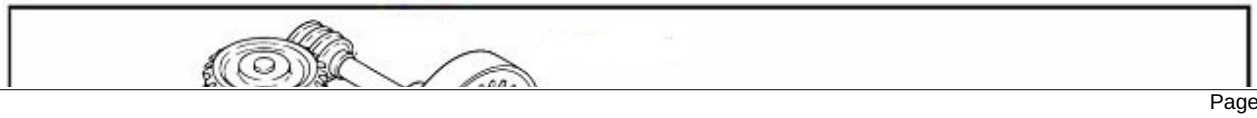
B) Why do we need preheating of feed water and air in a boiler? (3)

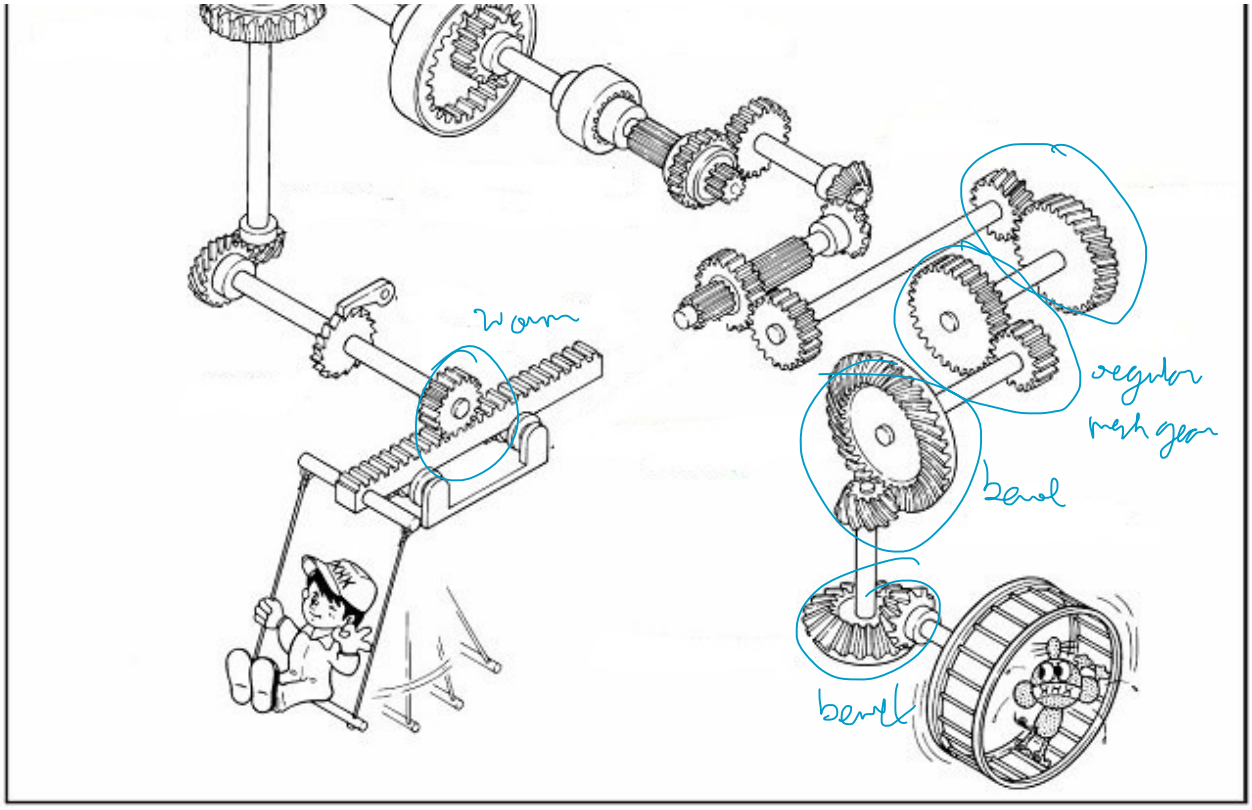
C) Discuss the usefulness of steam trap in a steam boiler. (2)

2) A) A 80 mm wide belt transmitting power between two pulleys rotating in opposite directions with a speed reduction ratio of 5 has permissible tension per meter of the width as 8kN. The speed and diameter of the larger pulley are 150 rpm and 400 mm respectively. Determine the power transmitted by the belt drive and the length of the belt if the centre distance is 2 meters and the coefficient of friction is 0.3**.** (4)

B) Explain the concept of slip and creep in a belt drive. (3)

C) With reference to the figure given below, identify, name and depict by circling in sketch the different type of gears used in the mechanism. Briefly explain the type of gear used for connecting two intersecting axes shafts. (3)





3)	Explain with a neat sketch, the working of 4-stroke petrol engine.	(4)
A)		
B)	A single cylinder diesel engine generating power in every revolution of the crank shaft has a cylinder bore of 150 mm and a stroke length of 200 mm. The engine fires at the rate of 500 cycles per minute and the mean effective pressure is 1600 kPa. If the load on brake drum is 100 kg and its diameter is 100 cm. Calculate the indicated power, brake power and mechanical efficiency of the engine.	(4)
C)	Explain any four differences between four stroke and two stroke engine.	(2)
4)	With a neat sketch explain the working of a radial drilling machine and list the various operations that can be performed by using drilling machine.	(5)
A)		
B)	Show a neat sketch of schematic diagram, force diagram and pressure-velocity diagram for impulse steam turbine.	(3)
C)	Discuss any two desirable thermal properties of refrigerant.	(2)
5)	With neat sketches explain the steps involved in preparing a green sand mould using a split pattern.	(4)
A)		
B)	Which type of welding would you suggest to join two thin section at a point in equal distance Briefly elaborate with suitable sketch.	(4)
C)	Give an example for positive pattern allowance and outline its importance.	(2)

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