

Code No: 157EH

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year I Semester Examinations, February/March - 2022

BASIC MECHANICAL ENGINEERING

(Common to EEE, CSE, IT)

Time: 3 Hours

Max. Marks: 75

Answer any Five Questions  
All Questions Carry Equal Marks

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- 1.a) Explain the heat engine with a neat sketch.  
b) Define path function and show that work and heat are path functions. [7+8]
- 2.a) Explain thermodynamic equilibrium in detail.  
b) Differentiate between mechanisms of heat transfer by free and forced convection. Mention some of the areas where these mechanisms are predominant. [6+9]
- 3.a) Explain the working of 4-stroke Petrol engine in detail.  
b) Write the differences between SI and CI engines. [8+7]
- 4.a) Differentiate the Relation between specific humidity and relative humidity and derive the relation between them.  
b) Discuss the working of vapour compression refrigeration system with neat sketch. [7+8]
5. Define the following:  
a) Circular pitch  
b) Diametral Pitch  
c) Module  
d) Pitch Circle  
e) Top land. [15]
- 6.a) What are the basic components used in a Pneumatic System explain the purpose component.  
b) Explain different types of gears in detail. [8+7]
- 7.a) What is the difference between ideal mechanical advantage and actual mechanical advantage?  
b) Construct the displacement diagram and the cam profile for a plate cam with an oscillating radial flat face follower that raises through  $30^\circ$  with cycloidal motion in  $150^\circ$  of counterclockwise cam rotation, then dwells for  $30^\circ$ , returns with cycloidal motion in  $120^\circ$ , and dwells for  $60^\circ$ . Determine the necessary length for the follower face, allowing 5 mm clearance at the free end. The prime-circle radius is 30 mm, and the follower pivot is 120 mm to the right. [6+9]
- 8.a) With the help of P-V diagram explain the working of multistage reciprocating air compressor with inter cooler and derive the work done for it.  
b) Explain the factors affecting the volumetric efficiency of a reciprocating air compressor. [8+7]

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