

**B.Tech. - VIEP - MECHANICAL ENGINEERING
(BTMEVI)**

Term-End Examination

00323

June, 2018

BIME-013 : TURBO MACHINES

Time : 3 hours

Maximum Marks : 70

*Note : Answer any **seven** questions. All questions carry equal marks. Use of scientific calculator is permitted. Assume missing data, if any, suitably.*

1. Define and explain the terms : geometric similarity, kinematic similarity, and dynamic similarity applied to model analysis. 10

2. The force exerted by a flowing fluid on a stationary solid body depends upon the length (L) of the body, velocity (V) of fluid, the density (ρ) of fluid, viscosity (μ) of fluid and acceleration due to gravity (g). Find an expression for the force using dimensional analysis. 10

3. Differentiate between turbines and pumps. What do you mean by gross head, net head and efficiency of turbine ? Explain the different types of the efficiency of a turbine. 10

4. A Pelton wheel has a mean bucket speed of 10 metres per second with a jet of water flowing at the rate of 700 litres/s under a head of 30 metres. The buckets deflect the jet through an angle of 160° . Calculate the power given by water to the runner and the hydraulic efficiency of the turbine. Assume co-efficiency of velocity as 0.98. 10
5. Explain why it is usually not wise to arrange two (or more) dissimilar pumps in series or in parallel. 10
6. What is priming ? Why is it necessary ? Also define net positive suction head and required net positive suction head, and explain how these two quantities are used to ensure that cavitation does not occur in a pump. 10
7. What is a centrifugal compressor and what are its advantages ? Where do centrifugal compressors find application and why ? 10
8. Air enters an axial flow compressor at 1 bar and 20°C at low velocity. It is compressed through a pressure ratio of 11. Find the final temperature and pressure at outlet from the compressor. Take the compressor efficiency as 85%. 10
9. Define a steam turbine and state its field of application. How are the steam turbines classified ? 10
10. Explain with a neat sketch the details for a simple gas turbine power plant. 10