

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

Term-End Examination

00264

June, 2017

BIME-002 : THERMAL ENGINEERING – I

Time : 3 hours

Maximum Marks : 70

Note : Attempt any seven questions. All questions carry equal marks. Use of steam tables is permitted. Use of calculator is allowed.

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1. (a) Why is combustion in a C.I. engine difficult compared to an S.I. engine ?
(b) What is meant by swirl ratio ? How is turbulence created during combustion in C.I. engines ? 5+5

 2. (a) What is the condition for exact differentials ? Explain with the help of suitable examples.
(b) Derive Maxwell's equations. 5+5

3. (a) Describe a steam power plant with the help of a block diagram.
- (b) What is the reversible cycle that represents a simple steam power plant ? Draw the flow T-S diagram of this cycle. 5+5
4. In a reheat cycle, the initial steam pressure and the maximum temperature are 150 bar and 550°C respectively. If the condenser pressure is 0.1 bar and the moisture at the condenser inlet is 5%, assuming ideal processes, determine
- (a) the reheat pressure,
- (b) the cycle efficiency, and
- (c) the steam rate. 10
5. (a) What are a nozzle and a diffuser ?
- (b) Explain the effect of area change in subsonic and supersonic flows. 5+5
6. (a) How are condensers classified ? Explain the working of a surface condenser with a neat sketch.
- (b) Briefly explain air leakage of a condenser. 5+5
7. What is the effect of regeneration on Brayton cycle efficiency ? Define the effectiveness of a regenerator. 10
8. What is a rocket ? How is it propelled ? 10

9. (a) How are steam turbines classified ?
Explain the working principle of an impulse turbine.
- (b) Discuss the difference between impulse and reaction turbines. 5+5
10. (a) What is the function of a safety valve ?
State the minimum number of safety valves to be used on a boiler.
- (b) What is a fusible plug ? State where it is located in a boiler. 5+5
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