



Reg. No. :

Name :

**Combined First and Second Semester B.Tech. Degree
Examination, October 2014
(2013 Scheme)
13.107 : BASIC MECHANICAL ENGINEERING (ACEFRT)**

Time : 3 Hours

Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **2** marks.

1. What is the concept of entropy ?
2. Distinguish between efficiency and coefficient of performance.
3. Differentiate between steady and unsteady flows of fluid.
4. Under what situation, two stroke cycle engine is preferred to four stroke cycle engine ?
5. Comment on fluidized bed combustion.
6. What are the precautions to be taken before starting a centrifugal pump ?
7. Based on compression ratio, differentiate a blower, a compressor and a fan.
8. Define turbine efficiency and compressor efficiency of a gas turbine.
9. What is the function of a clutch in an automobile ?
10. What is the working principle of a grinding machine ? (2×10=20 Marks)

PART – B

Answer **any one** full question from **each** Module. **Each** question carries **20** marks.

Module – I

11. a) State the law of thermodynamics which defines the property called internal energy. Apply this law to
 - i) Adiabatic process 12
 - ii) Isothermal process
 - iii) Isobaric process.
- b) How do you determine whether a process is reversible or irreversible ? State the factors on which reversible work depends. 8

OR





12. a) What is the effect of temperature on viscosity of liquids and gases ? 6
b) Distinguish between dynamic and kinematic viscosities. Give their SI units. What is Newton's law of viscosity ? 8
c) State the continuity theorem for compressible and incompressible fluids. Give its application. 6

Module – II

13. a) Give atleast eight points of difference between petrol and diesel engines. 8
b) A four stroke engine having a swept volume of 0.13 m^3 operates on Otto cycle. The compression ratio is 6. Conditions at the beginning of compression are 1 bar and 60°C . The heat supplied is 919 kJ/kg . Determine the air standard efficiency and the temperatures at the beginning and end of expansion. Take $C_v = 0.7 \text{ kJ/kgK}$. 12

OR

14. a) With a neat sketch, explain the working of a Cochran boiler. 10
b) Describe :
i) Air system and
ii) Fuel system in SI and CI engines. 10

Module – III

15. a) Compare Pelton, Francis and Kaplan turbines. 6
b) Explain the working of the following rotary compressors :
i) Roots blower
ii) Vane type blower. 6
c) Discuss the methods of improving the work ratio and cycle thermal efficiency by employing multistage system gas turbines with intercooling and reheating. 8

OR

16. a) Explain the working of a thermal power plant, with suitable sketch. 10
b) With sketches, explain
i) summer air conditioning system and
ii) winter air conditioning system. 10



Module – IV

17. a) A belt drive transmits 100 kW power at 13m/s. Coefficient of friction is 0.25 and angle of contact is 160° . Determine the tensions in the tight and slack sides of the belt. 8
- b) Classify clutches. Give the application of each. 6
- c) Define milling. Describe the basic principle of milling machine. 6

OR

18. a) Describe the following: 10
- i) Die casting
 - ii) Centrifugal casting.
- b) Explain the compound rest method of taper turning. 10
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