

Calculate the efficiency of the following ideal cycles when undergone by a perfect gas with a γ value of 1.4

- i) A sterling cycle operating between a hot reservoir at 600k and a cold reservoir at 300k
- ii) An Otto cycle with a compression ratio of 9
- iii) A Diesel cycle with a compression ratio of 12 and a cut-off ratio of 2.

Roll No

BE-203

B.E. I & II Semester

Examination, June 2016

Basic Mechanical Engineering

Time : Three Hours

Maximum Marks : 70

- Note:*
- i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.
 - ii) All parts of each question are to be attempted at one place.
 - iii) All questions carry equal marks, out of which part A and B (Max. 50 words) carry 2 marks, part C (Max. 100 words) carry 3 marks, part D (Max. 400 words) carry 7 marks.
 - iv) Except numericals, Derivation, Design and Drawing etc.
 - v) Assume missing data suitably, if any.
 - vi) Draw neat and clean sketches\diagrams\figures\ wherever required.
1. a) What is cast iron? State its composition.
 - b) State various alloy steels with applications.
 - c) Define hardness. How it can be measured?
 - d) Draw an iron carbon diagram for steel.

OR

Explain the following

- i) Hooks law
- ii) Modulus of elasticity
- iii) Tensile test of steel.

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2. a) What are dial gauges? State its applications.
- b) How will you measure flow? Name instruments used.
- c) Briefly describe the concept of measurement errors.
- d) Draw a neat sketch of lathe machine showing essential components. State functions of three major components.

OR

Write brief about drilling machine

- i) Sketch.
 - ii) Types of drilling machines.
 - iii) Operations performed.
3. a) What do you mean by fluid? Define any three properties of fluid.
 - b) State Bernoulli's equation for incompressible fluids.
 - c) Describe the working principle of fluid coupling with neat sketch.
 - d) Discuss important steps for developing hydro-electric power with neat sketch.

OR

Discuss the following (any three)

- i) Base load plants
- ii) Peak load plants
- iii) Pumped storage plants
- iv) Types of water turbines.

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4. a) What is Refrigeration? State its unit.
- b) State the classification of boiler.
- c) Compare forced and induced boiler draught.
- d) Describe the working of vapour compression refrigeration system with neat sketch.

OR

Calculate the following :

- i) The kinetic energy of a body which has a mass of 5kg and a velocity of 10m/s.
 - ii) The change in potential energy of a mass of 5kg when it is raised a height of 3m.
 - iii) The strain energy stored in a spring compressed by 18mm from its free length if the spring constant is 1.50MN/m.
5. a) State the function of steam engine. State its applications.
 - b) State the operation of four stroke petrol engine.
 - c) Compare Otto and Diesel cycles.
 - d) Explain the following related to steam engine
 - i) Hypothetical indicator diagram
 - ii) Actual indicator diagram.

OR