[4]

Calculate the efficiency of the following ideal cycles when undergone by a perfect gas with a Y 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.

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BE-203

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.

BE-203

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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.

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