Roll No. .....

Total No. of Questions : 6] [Total No. of Printed Pages : 8

B.E. Ist Semester (CGPA) Examination, 2017

EFS–313

CIVIL ENGG.
(Basic Machanical Engg.)
Paper : CE-104

Time : 3 Hours] [Maximum Marks : 60

Note :– Answer all questions. Question No. 1 is compulsory. Marks are provided against each question. There is internal choice from question Number 2 to 6. Use of steam table and non-programmable scientific calculator are permitted. Assume missing/misprint data suitably.

1. This question contains of eight sub-questions. For each of these sub-questions, four possible answers are given, out of which only one is correct. Choose the correct answer.

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(i) Which one of the following is not a boiler accessory ?

(a) Superheater

(b) Feed-check valve

(c) Economiser

(d) Air-preheater

(ii) For dry-saturated steam, the quality is :

(a) equal to 1

(b) greater than 1

(c) less than 1

(d) less than 1 but greater than 0

(iii) How many crank shaft rotation/rotations are required to complete a cycle in a two-stroke cycle engine ?

(a) 1 (b) 2

(c) 3 (d) 4

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(iv) In which of the following system, only energy transfer takes place between the system and surroundings ?

(a) open system

(b) isolated system

(c) closed sytem

(d) flow system

(v) The mode of heat transfer in which the heat transfer takes place between a solid surface and adjacent moving fluid is known as :

(a) Conduction

(b) Convection

(c) Radiation

(d) Mass transfer

(vi) The plasticity is the property of material, which allows to :

(a) resist the fracture

(b) machining

(c) absorb energy and resist shocks

(d) retain deformation

(vii) In which one of the following operation, the tool rotates ?

(a) Turning

(b) Shaping

(c) Broaching

(d) Milling

(viii) TIG welding is :

(a) Spot welding

(b) Gas welding

(c) Arc welding

(d) None of these $1\frac{1}{2} \times 8 = 12$

2. (a) State the function of feed check valve, blow-off cock and superheater in a boiler.

(b) Determine the heat required to convert 5 kg of wet steam at 10 bar and 0.90 dry into superheated steam at 250°C. Also determine the degree of superheat. 3,7

Or

(a) Define the following :

(i) Triple point of water

(ii) Quality of steam

(iii) Critical point of water

(b) Differentiate between the following :

(i) Fire tube boiler and water tube boiler

(ii) Mountings and accessories of the boiler

(iii) Sensible heat and latent heat 3,7

3. (a) State the Kelvin-Planck and Clausius statement of the second law of thermodynamics.

(b) An engine working on Otto cycle is supplied with air at 0.1 MPa, 35°C. The compression ratio is 8. Heat supplied is 3100 kJ/kg. Calculate the net work output and the cycle efficiency. 3,7

Or

(a) Give a comparison between S.I. and C.I. engines.

(b) A mass of 8 kg gas expands within a flexible container so that the p-v relationship is of the form $pv^{1.2}$ = constant. The initial pressure and the initial volume are 1000 kPa and 1 m^3 respectively. The final pressure is 5 kPa. If the specific internal energy of the gas decreases by 40 kJ/kg, find the heat transfer in magnitude and direction. 3,7

4. (a) How does heat transfer take place in conduction mode of heat transfer ? Explain. Also state the Fourier's law of heat conduction.

(b) Determine the following, when the dry bulb temperature is 20°C and the specific humidity is 0.0095 kg/kg of dry air :

(i) Partial pressure of vapour and (ii) Relative humidity. 3,7

Or

(a) Define the following with reference to air-conditioning :

(i) Relative humidity

(ii) Degree of saturation

(iii) Specific humidity

(b) The thermal conductivity of a 40 cm thick brick wall is 0.70 W/m-k. The inside and outside surface temperatures of the wall is 37°C and 7°C respectively. What would be the rate of heat transfer through this wall if it is 50 m long and 3 m high ? 3,7

5. (a) Explain the following mechanical properties of materials :

(i) Elasticity

(ii) Plasticity

(iii) Hardness

(b) Give details of composition, properties and use of mild steel. 3,6

Or

(a) How a lathe machine is specified ? Explain.

(b) With the help of a neat diagram, describe the principle, construction and applications of a micrometer. 3,6

6. (a) What is a Core ? What is its use ?

(b) What are the different types of patterns used ? Explain sweep pattern and match plate pattern with the help of neat sketches. 3,6

Or

(a) Write the function fluxes used in welding.

(b) Write a short note on Tungsten Inert Gas (TIG) welding. 3,6