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| 11507 | Roll No. _____ | Total No of Pages: 3 |
| | 11507 B. Tech. I - Sem. (Main) Exam., Dec. - 2018 ESC 1FY3 – 07 Basic Mechanical Engineering | |

Time: 2 Hours

Maximum Marks: 80

Instructions to Candidates:

Part – A: Short answer questions (up to 25 words) 5 × 2 marks = 10 marks. All five questions are compulsory.

Part – B: Analytical/Problem solving questions 4 × 10 marks = 40 marks. Candidates have to answer four questions out of six.

Part – C: Descriptive/Analytical/Problem Solving questions 2 × 15 marks = 30 marks. Candidates have to answer two questions out of three.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL

2. NIL

PART - A

- Q.1 Define Mechanical energy and Thermal energy. [2]
- Q.2 What are the basic functional differences between Refrigeration and Air Conditioning System? [2]
- Q.3 Define Impulse Turbine and Reaction Turbine. [2]
- Q.4 Differentiate between Soldering and Brazing. [2]
- Q.5 Compare High Carbon Steel with High Speed Steel. [2]

PART – B

- Q.1 What are the types of power plants? Explain and also enlist the name of power plant located in Rajasthan? [10]
- Q.2 Explain the parameters by which I.C. engines are classified. [10]
- Q.3 Derive the expression of tension ratio $\left(\frac{T_1}{T_2} = e^{\mu\theta}\right)$ for the belt drive where T_1 and T_2 are tight and slack side tension respectively, μ is coefficient of friction and θ is the angle of lap. [10]
- Q.4 Explain the following psychometric terms – [10]
- (i) Dry Bulb Temperature
 - (ii) Wet Bulb Temperature
 - (iii) Dew Point Temperature
 - (iv) Relative Humidity
 - (v) Degree of Saturation
- Q.5 In a constant speed compression ignition engine operating on four stroke cycle and fitted a brake, the following observations were taken – [10]
- Brake wheel diameter (D) = 60.5 cm, speed (N) = 450 rpm, load on band (w) = 21 kgf (206.01N), Spring balance reading (s) = 3 kgf (29.43N), Bore (d) = 10 cm, Stroke (L) = 15 cm, Mean Effective Pressure (Pm) = 7.3 kgf/cm² (716.13 kPa). Determine the BHP, IHP and mechanical efficiency.
- Q.6 Explain the principle of arc welding. List the various equipments and tools used in arc welding. [10]

PART – C

- Q.1 (a) Describe the construction and working of reciprocating pump with neat sketches. [5]
- (b) Compare the S.I. engines with C.I. engines. [5]
- (c) Explain the various types of engineering material's properties. [5]
- Q.2 Explain the following manufacturing processes in detail:
- (i) Forging [3]
- (ii) Rolling [3]
- (iii) Extrusion [3]
- (iv) Casting [3]
- (v) Drawing [3]
- Q.3 (a) Derive the expression for the length of belt of the following – [10]
- (i) For open belt drive
- (ii) For crossed belt drive
- (b) How the steam boilers are classified? Give the examples of each. [5]

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