

201703103

B. Tech.
(Electrical Engineering)
Even Semester
Minor Test 2017-2018

FUNDAMENTALS OF MECHANICAL ENGINEERING

Time: 2 Hour

NOTE: Answer all questions.

Max. Marks: 20

1. Attempt any **THREE** parts of the following. **Q.1(a) is compulsory.**
 - (a) What will happen when diesel fuel is accidentally filled to a petrol car? Also Explain (4)
the working of a 4-stroke S.I. engine with neat diagrams.
 - (b) In a Diesel cycle, the compression ratio is 15. Compression begins at 0.1 Mpa, 40°C. (2)
The heat added is 1.675 MJ/kg. Find (a) the maximum temperature in the cycle, (b)
work done per kg of air (c) the cycle efficiency (d) the temperature at the end of the
isentropic expansion (e) the cut-off ratio.
 - (c) What are different sensors used in industrial applications? Write a note on temperature (2)
sensors used in industry.
 - (d) How the absolute instruments are different from secondary instruments? Enlist at least (2)
three errors that could be occur during measurement.

2. Attempt any **TWO** parts of the following. **Q.2(a) is compulsory.**
 - (a) Differentiate in between comfort and industrial refrigeration system with suitable (4)
working cycle diagram and explanation. Also explain the C.O.P. of respective air
conditioners.
 - (b) (i) What are the two statements that describe the Second Law of Thermodynamics? (2)
Explain any one of them with suitable diagram.
(ii) What type of circulation used in boilers? Explain in brief.
 - (c) A reversible heat engine operates between two reservoirs at temperature of 600°C and (2)
40°C. The engine drives a reversible refrigerator which operates between the reservoir
at temperature of 40°C and -20°C. The heat transfer to the heat engine is 2000kJ and
the net work output of the combined engine refrigerator plant is 360 kJ.

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- i. Evaluate the heat transfer to the refrigerant and the net heat transfer to the reservoir at 40°C .

3. Attempt any **TWO** parts of the following. **Q.3(a) is compulsory.**

(a) Explain the working of different measuring instruments with suitable diagram and applications; (4)

- (i) Sine Bar
- (ii) Thermocouple
- (iii) Dial Gauge

(b) Define Transducer. What is its role in instrumentation? Also explain the classification of transducers. (2)

(c) Define an alloy with suitable composition, properties that used for making an electrical appliance. (2)