Total No. of Questions—**8**] [Total No. of Printed Pages—**2**

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# [5558]-110

## F.E. EXAMINATION, 2019

## BASIC MECHANICAL ENGINEERING

## (2015 PATTERN)

**Time : 2 Hours** **Maximum Marks : 50**

***Instructions to the candidates:***

i) Neat diagrams must be drawn whenever necessary.
ii) Black figures to right indicate full marks.
iii) Assume suitable data, if necessary.
iv) Use of non-programmable electronic calculator is permitted.
v) Attempt four questions out of eight.: Q. No. 1 or Q. No. 2, Q. no. 3 or Q. No. 4, Q. No. 5 or Q. No. 6, Q. No. 7 or Q. No. 8.

Que.1) a) What is function of clutch? Explain the working of a single plate clutch with the help of neat sketch. **06**

b) What is Kinematic chain? Explain four bar mechanism and identify the types of kinematic pairs used in it. **06**

OR

Que.2) a) Explain steps involved in design process. **06**

b) How Engineering Materials are classified? Explain Plain Carbon Steel. **06**

Que.3) a) Draw block diagram of lathe machine. Explain function of headstock, tailstock and carriage. **07**

b) Explain Punching, piercing, perforating, notching operations in sheet metal working. **06**

**OR**

Que.4) a) Compare Welding soldering and brazing process. **06**

b) Explain working principle of drilling machine with block diagram and explain any three operations performed on it. **07**

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Que.5) a) Explain Following terms: **04**

i. System, Surrounding and Boundary.
ii. kelvin Plank Statement of second law of thermodynamics.

b) Explain measurement of pressure using simple U Tube manometer. **04**

c) A heat engine operates between source and sink temperatures of 235°C and 30°C respectively. If heat engine receives 35 KW from the source, find: (i) the net work done by the engine, (ii) the heat rejected to the sink by the engine and (iii) the efficiency of engine. Draw the sketch of system. **05**

**OR**

Que. 6 a) State any two statements and limitations of first law of thermodynamics. **04**

b) With neat sketch explain Open system, closed system and isolated system. **04**

c) A U Tube manometer is used to measure a pressure of a gas in the pipe. The level of liquid in the manometer arm open to the atmosphere is 170mm lower than level of liquid connected to the gas pipe. The liquid in the manometer has specific gravity of 0.8. Find the absolute pressure of the gas, if barometer reads 76 cm of mercury. Take the density of mercury as 13600 kg/m$^3$. Draw the sketch of system. **05**

Que.7 a) Draw Layout of Hydroelectric Power plant and explain the energy conversion process and its limitations. **06**

b) Explain working of Four Stroke cycle CI engine with neat sketch. **06**

**OR**

Que.8 a) With neat sketch explain working of Vapour compression refrigeration process. **06**

b) Compare : **06**

(i) Water tube and Fire tube Boiler
(ii) Impulse and Reaction turbine

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