Total No. of Questions : 8]

SEAT No. : _____

P6488

[Total No. of Pages : 2

[5868]-104
F.E.
SYSTEMS IN MECHANICAL ENGINEERING
(2019 Pattern) (Semester - II) (102003)

Time : 2½ Hours] ***[Max. Marks : 70***

Course Outcome :

CO 3 : List down the types of road vehicles and their specifications.
CO 4 : Illustrate various basic parts and transmission system of a road vehicle.
CO 5 : Discuss several manufacturing processes and identify the suitable process.
CO 6 : Explain various types of mechanism and its application.

Instructions to the candidates:

1) ***Solve Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.***
2) ***Assume suitable data if necessary.***
3) ***Figures to the right indicate full marks.***

Q1) a) Define Vehicle Specification. Explain following Engine specification. **[7]**

i) Power of Engine

ii) Cylinder Capacity

iii) Type of Transmission

b) Explain Electric Vehicle with neat diagram. **[7]**

c) Draw four stroke S I Engine diagram and labeled engine component on it. **[4]**

OR

Q2) a) Write short note on hybrid vehicle. Name any one example. **[7]**

b) Classify Automobile, Compare specification of two wheeler and LMV (two points). **[7]**

c) Write short note cost analysis of Vehicle. **[4]**

Q3) a) Expalain ABS system with neat diagram. **[7]**

b) Draw and Explain layout of an Automobile. **[7]**

c) Draw neat diagram of Single Plate Clutch. **[3]**

OR

P.T.O.

Q4) a) Explain water cooling used in vehicle with neat diagram. **[7]**

b) Explain Rear Engine Rear Wheel Drive System with neat diagram. **[7]**

c) Draw neat diagram of Drum Brake. **[3]**

Q5) a) Define and casting process. Write any two advantages, disadvantages and application each. **[7]**

b) Define sheet metal operation. Explain punching and blanking with neat diagram. **[7]**

c) Write short note on CNC Machine. **[4]**

OR

Q6) a) Define Machining operation. Explain turning and drilling operation principal with neat diagram. **[7]**

b) Explain Shielded metal arc welding with neat diagram. Write any one application. **[7]**

c) Write short note on IOT. **[4]**

Q7) a) Explain working of washing machine with neat diagram. **[7]**

b) Explain working of Solar Heater with neat diagram. **[7]**

c) Draw neat diagram of Water Tap. **[3]**

OR

Q8) a) Explain with neat diagram working of vaccum cleaner. **[7]**

b) Explain brake paddle with neat diagram. **[7]**

c) If Refrigerator is used to maintain temperature of 4ºC by removing 60kJ/sec of heat from inside with help of compressor of capacity 30kW. Compute COP of refrigerator. **[3]**

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Total No. of Questions : 8]

SEAT No. :

P3921

[Total No. of Pages : 3

[6001]-4004
F.E.
SYSTEMS IN MECHANICAL ENGINEERING (SME)
(2019 Credit Pattern) (Semester - I) (102003)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answer 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.***
2) ***Neat Diagram must be drawn wherever necessary.***
3) ***Figures to the right indicates full marks.***

Q1) a) Classify automobiles based on various considerations. **[7]**

b) Define vehicle specification, Explain following engine specifications - **[7]**

i) Torque

ii) Power and

iii) Stroke

c) Compare vehicle specifications for two-wheeler and three-wheeler vehicles. **[4]**

OR

Q2) a) Explain various components of S. I engine with neat sketch. **[7]**

b) Explain hybrid vehicle with neat sketch. Mention its components. **[7]**

c) State difference between electric and hybrid vehicle with examples. **[4]**

Q3) a) Explain the working principle of ABS system in vehicle with neat sketch. State its importance over conventional braking system. **[7]**

b) Explain construction and working of disc brake system with neat sketch. **[7]**

c) Define Gear Ratio for gear box. Determine gear ratio, if a pinion 110 mm with pitch circle diameter meshes with a gear of 450 mm pitch circle diameter. The number of teeth on pinion is 20 and it rotates at 1550 rpm. **[3]**

OR

P.T.O.

Q4) a) State types of steering system? Explain Ackerman steering mechanism with neat sketch. **[7]**

b) Explain construction and working of single plate clutch with neat sketch. **[7]**

c) Why safety arrangements needed in vehicle? Explain the importance of seat belts and air bags in the vehicle. **[3]**

Q5) a) State the importance of sheet metal working in manufacturing. Explain Punching and Blanking with neat sketch. **[7]**

b) State significance of Metal Cutting process in industry. Explain following metal cutting processes: **[7]**

i) Turning

ii) Milling and

iii) Drilling operation with neat sketch.

c) Draw a block diagram of 3D printer with all its components. **[4]**

OR

Q6) a) Explain sand casting process with neat sketch. State its advantages and disadvantages. **[7]**

b) With neat sketch explain the shielded metal arc welding. State its applications. **[7]**

c) Write a short note on open and closed die forging. **[4]**

Q7) a) Using block diagrams, write a short note on **[7]**

i) Electric Geyser and

ii) Electric iron State specifications for Electric Geyser. **[7]**

b) Explain with block diagram, working of a refrigerator, state its domestic and industrial applications. **[7]**

c) An electric motor driven pump fills an over headed tank placed at a height of 20 m from the ground level. The mass of the water pumped per second is 5.56 kg. Input power of the motor is 2200 W. Calculate the efficiency of the motor. (Use $g = 9.81\ m/s^2$) **[3]**

OR

Q8) a) Using block diagram, explain the application of blower in kitchen chimney and vacuum cleaner. **[7]**

b) State various applications of springs in domestic appliances. With neat sketch, explain any one mechanism making use of spring. **[7]**

c) A refrigerator has working temperatures in the evaporator and condenser coils as - 30°C and 32°C. What is the maximum COP of the system? Draw its block diagram. **[3]**

Total No. of Questions—**8**] [Total No. of Printed Pages—**3**

Seat No.	

[5667]-1003

F.E. (I Semester) EXAMINATION, 2019

SYSTEMS IN MECHANICAL ENGINEERING

(2019 PATTERN)

Time : 2½ Hours **Maximum Marks : 70**

***Course Outcome* :—**

(CO3) List down the types of road vehicles and their specifications.

(CO4) Illustrate various basic parts and transmission system of a road vehicle.

(CO5) Discuss several manufacturing processes and identify the suitable process.

(CO6) Explain various types of mechanism and its application.

***N.B.* :—** (*i*) Solve 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**.

(*ii*) Assume suitable data, if necessary.

(*iii*) Figures to the right indicate full marks.

1. (*a*) Classify automobiles and explain any *two*. [7]

(*b*) Define specification of vehicle and compare specification of LMV and Multi-axel vehicles (*three* points). [7]

(*c*) Explain the following Engine Specification : [4]

(1) Torque

(2) Cubic Capacity.

P.T.O.

Or

2. (*a*) List specification of vehicle and explain any *three* specifications for two wheeler. [7]

(*b*) Explain working of Electric Vehicle with neat diagram. [7]

(*c*) Explain Cost analysis of vehicle. [4]

3. (*a*) Explain working of Disc Brake with neat line diagram. [7]

(*b*) Explain telescopic supension system with neat diagram. [7]

(*c*) A two stage spur gear assembly is having teeth number of input gear as 30, intermediate gear as 60 and output gear as 120. If input speed is 1000 rpm, compute speed ration and output speed. [3]

Or

4. (*a*) Explain with neat diagram Front Engine Front Wheel Drive. Write any *two* advantages. [7]

(*b*) Explain working of single plate clutch with neat diagram. [7]

(*c*) Write a short note on safety arrangement in vehicles. [3]

5. (*a*) Explain sand casting manufacturing process with neat diagram. [7]

(*b*) List type of joining process and compare welding and soldering process (*three* points). [7]

(*c*) Write a short note on 3D-Printing technology. [4]

Or

6. (*a*) Define Machining operation and explain turning and drilling operation principal with neat diagram. [7]

(*b*) Define forging process. Explain open and close forging process with neat diagram. [7]

(*c*) Write a short note on micromachining. [4]

7. (*a*) Explain working of split AC with neat diagram. [7]

(*b*) Explain working of Solar Heater with neat diagram. [7]

(*c*) Write a short note on use of gear in Clock. [3]

Or

8. (*a*) Explain working of printer with neat diagram. [7]

(*b*) Explain concept of open belt pulley drive with neat diagram and list two applications. [7]

(*c*) Write a short note on Electric iron. [3]

Total No. of Questions : 4]

SEAT No. : [ ]

P-5370

[Total No. of Pages : 2

[6185]-53
F.E. (Insem.)
SYSTEMS IN MECHANICAL ENGINEERING
(2019 Pattern) (Semester - I) (102003)

Time : 1 Hour] ***[Max. Marks : 30***

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4.***
2) ***Figures to the right indicate full marks.***

Q1) a) In a thermal power plant, the work done by the steam turbine is 900 J/kg. The work consumed by the pump is 50 J/kg. The heat supplied by the boiler to the system is 2800 J/kg. Find i) Net Work done and ii) Efficiency of the plant. **[4]**

b) Explain construction and working of hydropower plant with neat sketch. **[6]**

c) With neat sketch, explain the working of reciprocating compressor. **[5]**

OR

Q2) a) Draw a layout of nuclear power plant and mention all its components. **[4]**

b) A steam powerplant has an efficiency of 62.443 %, with a coal consumption of 16200 kg/hr. If the speed of the turbine is 1000 rpm and generated torque is 477464.8293 N-m. Find i) Input Power ii) Output Power and iii) Calorific value of coal in kJ/kg. **[6]**

c) With neat sketch, explain the working of Pelton turbine. **[5]**

Q3) a) Explain working of 4 stroke petrol engine with neat sketch. **[6]**

b) Provide comparison between water tube and fire tube boilers. **[4]**

c) The condenser and evaporator temperatures in a refrigerator are 42°C and - 3°C respectively. Determine COP and refrigerating effect in kW, if the power required to run the refrigerator is 7.5 kW. **[5]**

P.T.O.

OR

Q4) a) A wall of furnace is constructed from 15 cm thick fire brick having constant thermal conductivity of 1.7 W/mK. The two sides of the wall are maintained at 1400 K and 1150 K respectively. What is the rate of heat loss through the wall which is 50 cm × 3 m on a side. **[5]**

b) Provide comparison between heat pump and refrigerator. **[4]**

c) State the statements and mathematical expression for laws associated with each mode of heat transfer. **[6]**

□□□

Total No. of Questions : 4]

SEAT No. : ____

P1271

[Total No. of Pages : 2

OCT/FE/INSEM-4
F.E. (Semester - I)
SYSTEMS IN MECHANICAL ENGINEERING
(2019 Pattern)

Time : 1 Hour] ***[Max. Marks : 30***

CO 1 : Describe and compare the conversion of energy from renewable and non renewable energy.

CO 2: Explain basic laws of thermodynamic, heat transfer and their applications.

Instructions to the candidates:

1) ***Solve Q. 1 or Q. 2, Q.3 or Q.4.***
2) ***Assume suitable data if necessary.***
3) ***Figures to the right indicate full marks.***

Q1) a) Explain working of hydroelectric power plant with neat labeled diagram. Write two advantages of hydroelectric power plant. **[8]**

b) A coal fired power plant uses 5000 tons of coal per day. The average power output from plant is 200MW. Compute the efficiency of power plant. Take calorific value of coal as 15000kJ/kg. Write two advantages and disadvantages of thermal power plant. **[7]**

OR

Q2) a) Explain working of Centrifugal Pump with neat labeled diagram and its application. **[8]**

b) Compare Conventional and non conventional energy source. Draw neat labeled diagram of solar steam power plant. **[7]**

Q3) a) Describe the concept of Heat Pump and Refrigerator with diagram and write expression for COP. Compare Heat Engine & refrigerator. **[8]**

b) State Stefan Boltzman's law of radiation. A body having $5m^2$ of surface area is maintained at 227°C. It exchanges the heat with another surface enclosing it at 27°C by radiation. Its emissivity is 0.1, $\sigma = 5.67 \times 10^{-8}$ W/ m^2K^4. Compute the rate of heat lost by radiation. **[7]**

P.T.O.

OR

Q4) a) Explain the working of Four Stroke CI Engine with line diagram. Write Advantages. **[8]**

b) State Second law of thermodynamics. A refrigerator with COP of 1.6 removes heat from freezer at the rate of 400 kJ/min. Draw block diagram of system. Compute the power consumed by compressor and heat rejected to the surroundings. **[7]**

Total No. of Questions : 4]

SEAT No. : [ ]

PA-1681

[Total No. of Pages : 2

[5931]-1004

F.Y. Engineering

SYSTEMS IN MECHANICAL ENGINEERING

(2019 Pattern) (Semester - I) (102003)

Time : 1 Hour] ***[Max. Marks : 30***

Instructions to the candidates :

1) ***Answer Q1 or Q2, Q3 or Q4.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***

Q1) a) Write difference between renewable and non-renewable sources of energy. **[4]**

b) Explain construction and working of Hydrogen Fuel Cell with neat sketch. State its advantages and disadvantages. **[6]**

c) A small generating plant of 100 kW capacity uses gas of a calorific value of 4000 kJ/m^3. The volume of gas required per hour when the plant is running at full load condition is 450 m^3/hr. Find: i) Input Power and ii) Overall Efficiency of the plant. **[5]**

OR

Q2) a) Draw a layout of Steam Power Plant and mention all its components. **[4]**

b) Explain different ways of extracting energy from biomass and applications of biomass energy. **[6]**

c) A wind mill of 41.28 % efficiency produces 1200 kW of power, when it receives the wind at the speed of 12 m/s. Find the blade diameter of the wind mill, Consider density of air as 1.19 kg/m^3. **[5]**

P.T.O.

Q3) a) Explain i) Heat Engine ii) Refrigerator and iii) Heat Pump with neat block diagram. **[6]**

b) Explain Fourier's law of heat conduction. A plane wall has a thermal conductivity of 1.15 W/mK. If the inner surface is at 1100ºC and outer surface is at 350ºC, then What should be thickness (in meter) of the wall to maintain a steady heat flux of 2500 W/m^2? **[4]**

c) Differentiate between 4-stroke S.I and C.I engine. **[5]**

OR

Q4) a) Explain with examples, classification of steam generators. **[5]**

b) Differentiate between different modes of heat transfer. **[4]**

c) A heat engine operates between sources and sinks temperatures of 235ºC and 30°C respectively. If heat engine receives 35 kW from the source, Find, i) The net work done by the engine ii) Heat rejected to the sink by the engine and iii) Efficiency of the engine. Draw the sketch of the system. **[6]**