**VS-1831**

### B. E. (Eighth Semester) Examination, 2020

**(For Regular/ATKT Students)**

**(Mechanical Engg. Branch)**

**(801-A)**

### ENERGY MANAGEMENT and AUDIT

*Maximum Marks : 70*

*Note : Attempt all parts. Each part carries equal marks.*

1. (a) Discuss duties and responsibilities of energy managers.

   (b) Write a note on energy demand and supply.

2. (a) What do you mean by optimization of input energy requirement, in respect of fuel and energy substitution.

   (b) Write a note on following :

      (i) Bench marking

      (ii) Energy performance

3. (a) Describe diagram and its uses in material energy balance.

   (b) Describe key element of energy action planning.

4. (a) Explain energy conservation techniques in electrical pump and fan system.

   (b) Define monitoring and targeting. Discuss data and information analysis.

5. (a) How energy can be conserved in Boilers? Discuss briefly.

   (b) Write a note on :

      (i) Application of FBC

      (ii) Thermal insulation

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# VS-1832

## B. E. (Eighth Semester) Examination, 2020

**(For Regular/ATKT Students)**

**(Mechanical Engg. Branch)**

**(ME-802)**

**MACHINE DESIGN**

*Paper : Second*

*Maximum Marks : 70*

*Note :* *Attempt all questions. All questions carry equal marks.*

1. (a) Explain the design procedure for flat belt drive.

   (b) What is belt slip and creep? Clearly explain both.

2. Design a pair of bevel gears for two shafts whose axes are at right angles, speed of the pinion shaft is 300 rpm and that of gear shaft is 120 rpm. The power transmitted is 80 kW at gear shaft.

3. (a) Write the design procedure for crankshaft.

   (b) What are the basic considerations for the design of connecting rod for an IC engine?

4. (a) A 0.25 m diameter diesel engine cylinder is subsected to an explosion pressure of 3.15 MPa. The casting is made of closed grained cast iron having an ultimate tensile stress of 245 MPa. Use factor of safety 10 and determine thickness of the bored cylinder.

   (b) Explain the stress distribution in case of thick cylindrical shells.

5. (a) Give some engineering applications of optimization.

   (b) Name and discuss random search methods of unconstrained optimization.

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# VS-1833

## B. E. (Eighth Semester) Examination, 2020

**(For Regular/ATKT Students)**

**(Mechanical Engineering Branch)**

**REFRIGERATION and AIR-CONDITIONING**

*Paper : (ME-803)*

*Maximum Marks : 70*

*Note :* *Attempt all questions. All questions carry equal marks.*

1. (a) Describe with a sketch a bootstrap cycle of air refrigeration system.

   (b) Describe with a sketch regeneratives air cooling system.

2. (a) Explain sub cooling and superheating with the help of FS and P-4 diagram why is superheating considered to be good in certain care?

   (b) The following data refer to a two stage compression ammonia refrigerating system with water intercooler. Condenser pressure is 16 bar, Evaporator pressure is 3 bar, Intercooling pressure is 6 bar and load on the evaporator is 2TR, If the temperature of the de-superheated vapour and sub-coded liquid refrigerant are limited to 30 °C.

   Find :

   (i) The power required to drive the system and

   (ii) C.O.P. of the system

3. (a) Describe the refrigerating of ammonia for use in domestic and commercial type of refrigerating appliances.

   (b) Explain thermodynamic and chemical properties of refrigerants.

4. (a) Describe the basic psychrometric processes?

   (b) 900 m³/min of recirculated air at 25°C DBT and 10°C dew point temperature is to be mixed with 300 m³/min of fresh air at 35°C DBT and 60% RH.

   Determine the enthalpy specific volume, humidity ratio and dew point temperature of the mixture.

5. (a) Describe unitary and central air conditioning system?

   (b) The amount of air supplied to an air conditioned hall is 350 m³/min. The atmospheric conditions are 35°C DBT and 50% RH. The required conditions are 20°C DBT and 60% RH. Find out the sensible heat and latent heat removed from the air per minute. Also find sensible heat factor for the system.

**VS-1834**

**B. E. (Eighth Semester) Examination, 2020**

(For ATKT Students)

(Mechanical Engg. Branch)

*Paper : ME-804*

**CAD/CAM/CIM**

*Maximum Marks : 70*

*Note : Attempt all parts. Each part carries equal marks.*

1. (a) Explain Lead time. How it changes with the Concurrent Engineering practices.

   (b) Discuss and compare product design in conventional and CIM environment. Also, explain product life cycle.

2. (a) Show that translation is commutative. Describe some important features of an Engineering Data Management system (EDM).

   (b) A point 'P' lies originally at the position $\left(\sqrt{2}, 0\right)$. Find its coordinates if it is rotated 45° clockwise about the origin. If it is given a subsequent rotation of 45°, what will its coordinate be?

3. (a) Explain Wire Frame modeling and NURBS. What are the design techniques using Bezier curve.

   (b) A Cubic Bezier curve is defined by the control points as (20, 20), (40, 60), (80, 80), (120, 30). Find the equation of the curve and its mid point.

4. (a) Discuss about Zero-Offsetting, Cutter radius and Length compensation in CNC.

   (b) Write the NC part programming using G, M, N, F, S codes for the following turning operation :
   Work material : Mild Steel, Blank length = 125 mm, Dia. = 32 mm, Depth of cut = 1 mm per pass, Feed 0.02 mm per revolution, Spindle speed = 400 rpm, Coolant required.



(All dimensions are in mm)
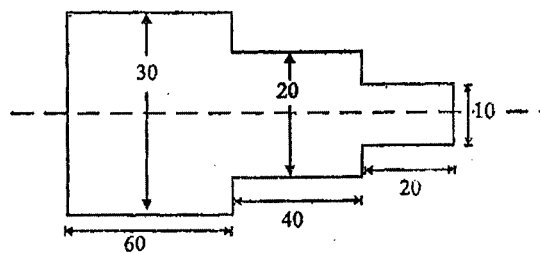
5. Write short technical notes on following (any **two**) :

   (a) DCLASS Coding

   (b) Product Flow Analysis (PFA)

   (c) AGVs traffic management

   (d) Agile Manufacturing