SILVER OAK COLLEGE OF ENGINEERING & TECHNOLOGY

BE - SEMESTER-VI • MID SEMESTER-I EXAMINATION – SUMMER 2016

SUBJECT: DYNAMICS OF MACHINERY (2161901) (ME)

DATE: 22-02-2016         TIME:02:00 pm to 03:15 pm         TOTAL MARKS:30

Instructions:
1. All the questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data if required.

Q.1 (a) Define Following Terms: [04]
   (1) Resonance
   (2) Damping Factor
   (3) Logarithmic Decrement
   (4) Dynamic balancing
(b) Find the natural frequency of vibration of the system shown in fig 1. [04]
   Use following data: $K_1 = 1200$ N/m, $K_2 = 900$N/m, $K_3 = 1900$N/m, $m=10$kg.

Q.2 (a) What do you mean by balancing and its needs? [04]
(b) A rotating shaft has four revolving unbalanced masses connected to it rigidly and revolving with it. The magnitude of unbalance masses are 20kg, 10kg, 25kg and 16kg respectively. The eccentricity of these masses are 20mm, 10mm, 25mm and 16mm respectively. The distance of planes from masses B, C and D are from A are 130mm, 320mm and 500mm respectively. Angular position of masses B, C and D measured from 60°, 260° and 45° respectively measured anticlockwise. Find the magnitude and position of two balance weight revolving at 50mm radius in plane L and M such that their planes are at distances of 50mm and 400 respectively measured from plane A.

OR

Q.2 (a) Four masses A, B, C and D as shown below are to be completely balanced.

<table>
<thead>
<tr>
<th>Mass(kg)</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radius (mm)</td>
<td>180</td>
<td>240</td>
<td>120</td>
<td>150</td>
</tr>
</tbody>
</table>

The planes containing masses B and C are 300mm apart. The angle between planes containing B and C is 90°. B and C make angles of 210° and 120° respectively with D in the same sense. Find:
1. The magnitude and the angular position of mass A; and
2. The position of planes A and D.
(b) Four masses A, B, C and D carried by a rotating shaft are at radii 110, 140, 210 and 160mm respectively. The planes in which the masses revolve are spaced 600mm apart and the masses of B, C and D are 16kg, 10kg and 8kg respectively. Find the required mass A and the relative angular positions of the four masses so that shaft is in complete balance.

Q.3 (a) List the five main causes of vibrations with their all good & bad effects on the system.

(b) Find the natural frequency of the system shown in fig 2.

OR

Q.3 (a) Discuss any one method of vibration analysis of free undamped vibrating system.

(b) Find the differential equation of motion and the natural frequency of vibration for a system shown in fig 3.

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Fig:1

Fig:2

Fig:3
SILVER OAK COLLEGE OF ENGINEERING & TECHNOLOGY

BE - SEMESTER-VI• MID SEMESTER-I EXAMINATION – SUMMER 2016

SUBJECT: INTERNAL COMBUSTION ENGINE (2161902) (ME)

DATE: 23-02-2016 TIME: 02:00pm to 03:15 pm TOTAL MARKS: 30

Instructions:
1. All the questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data if required.

Q.1 (a) What do you mean by I.C. Engine? How are they classified? [04]
(b) Explain with neat sketch the working of two stroke Diesel Engine. Also explain the term Scavenging. [04]

Q.2 (a) Discuss the difference between theoretical and actual valve timing diagrams of four stroke petrol engine with sketch. Specifically draw the valve timing diagram of low speed four stroke petrol engine. [07]
(b) Derive an expression for change of internal energy and enthalpy during a process with variable specific heats. [04]

OR

Q.2 (a) A petrol engine using a compression ratio 8 and air fuel ratio of 16:1 has the pressure and temperature at the end of suction stroke as 1 bar and 60°C respectively. The fuel used has a calorific value of 43000kJ/kg. Compression follows the law $PV^{1.32} = \text{constant}$ and specific heat at constant volume is given by the relation $C_v = 0.718 + (1.9\times10^{-4})T$, where ‘$T$’ is in Kelvin. Determine the maximum pressure and temperature in the cylinder and compare this value with that of constant specific heat $C_v = 0.718$. [07]
(b) List down the factors considered for the analysis of fuel-air cycles and explain “Effect of Dissociation”. [04]

Q.3 (a) Explain the stages of combustion in SI engine with the help of $p-\phi$ diagram. [7]
(b) Define following terms: (i) Ignition Limit (ii) Self Ignition Temperature. [4]

OR

Q.3 (a) Explain “Abnormal Combustion in SI Engine (Knocking)” in detail. [7]
(b) Explain in detail factors affecting ignition lag in SI Engine. [4]
SILVER OAK COLLEGE OF ENGINEERING & TECHNOLOGY

BE - SEMESTER-VI • MID SEMESTER-I EXAMINATION – SUMMER 2016

SUBJECT: COMPUTER AIDED DESIGN (2161903) (ME)

DATE: 24-02-2016  TIME: 2:00 pm to 3:15 pm  TOTAL MARKS: 30

Instructions:
1. All the questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data if required.

Q.1  (a) Explain Product Cycle with CAD/CAM tools. [05]
      (b) Explain different types of co-ordinate system. [03]

Q.2  (a) Explain DDA line Drawing Algorithm. [06]
      (b) Generate a straight line connecting two points (21, 11) and (26, 15) using Bresenham’s Algorithm. [05]

OR

Q.2  (a) Explain Bresenham’s Algorithm for line. [06]
      (a) Identify the pixel locations that will be chosen by the DDA Algorithm while scan converting a line from screen co-ordinate (10, 30) to (19, 36). [05]

Q.3  (a) Derive parametric equations for line, circle and ellipse. [06]
      (b) Explain Bresenham’s Circle Drawing Algorithm. [05]

OR

Q.3  (a) Explain any two continuity condition for synthetic curves. [06]
      (b) Write a parametric equation of a Circle having centre at (3, 3, 0) and radius of 3 units. Calculate co-ordinates of points on a circle, if it is divided in eight parts. [05]
SILVER OAK COLLEGE OF ENGINEERING & TECHNOLOGY

BE - SEMESTER-VI • MID SEMESTER-I EXAMINATION – SUMMER 2016

SUBJECT: INDUSTRIAL ENGINEERING (2161907) (ME)

DATE: 25-02-2016 TIME:02:00 pm to 03:15 pm TOTAL MARKS:30

Instructions: 1. All the questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data if required.

Q.1 (a) Describe different factors affecting the selection of a factory layout. [04]
(b) What is productivity? Differentiate between production and productivity. [04]

Q.2 (a) Which are the major factors affecting plant location of any thermal power plant? [06]
(b) Define Method Study and explain technique with its various steps? [05]

OR

Q.2 (a) Explain different methods of factory layout in detail. [04]
(b) What is Work measurement? List the various techniques of work measurement and also explain how the Standard time is calculated. [07]

Q.3 (a) Write a note on (Any Two) [06]
1. Flow process chart
2. String Diagram
3. Two handed process chart
(b) What is entrepreneur and explain its major characteristics. [05]

OR

Q.3 (a) What is therbligs? State the importance of micro motion study. [07]
(b) Describe the role of entrepreneur in the economic development of a country. [04]

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Q.1 (a) Define the following: [02]
1. One Tonne refrigeration
2. Volumetric efficiency

(b) A refrigerating plant works between temperature limits of -5°C and 25°C. The working fluid ammonia has a dryness fraction of 0.62 at entry to compressor. If the machine has a relative efficiency of 55%, calculate the amount of ice formed during a period of 24 hours. The ice is to be formed at 0°C from water at 15°C and 6.4 kg of ammonia is circulated per minute. Specific heat of water is 4.187 kJ/kg and latent heat of ice is 335 kJ/kg.

<table>
<thead>
<tr>
<th>Temperature (°C)</th>
<th>Liquid heat (kJ/kg)</th>
<th>Latent heat (kJ/kg)</th>
<th>Entropy of liquid (kJ/kg K)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>298.9</td>
<td>1167.1</td>
<td>1.124</td>
</tr>
<tr>
<td>-5</td>
<td>158.2</td>
<td>1280.8</td>
<td>0.630</td>
</tr>
</tbody>
</table>

Q.2 (a) An air refrigeration working on bell-coleman cycle takes in air at 1 bar at a temperature of 10°C. The air is compressed to 5 bar. The same is cooled to 25°C in the cooler before expanding in the expansion cylinder to cold chamber pressure of 1 bar. The compression and expansion laws followed are pv^{1.35}=C and pv^{1.3}=C respectively. Determine COP of plant and net refrigeration effect per kg of air. Take C_p=1.009 kJ/kg K and R=0.287 kJ/kg K for air. [06]

(b) Draw the schematic and T-S diagram for Bootstrap Air Refrigeration system. Enlist the processes. [03]

(c) Define the following: [02]
1. Relative Humidity
2. Specific Humidity
Q.2  (a) What is the effect of sub-cooling on the performance of vapour compression refrigeration system? [04]
(b) Define the following: [07]
   1. Dew Point Temperature
   2. Wet Bulb Temperature
   3. Psychrometry
   4. By-Pass Factor
   5. Degree of Saturation
   6. Dry bulb temperature
   7. Sensible Heat Factor

Q.3  (a) The Sling Psychrometer reads 40°C DBT and 28°C WBT. Find (i) specific humidity (ii) relative humidity (iii) vapour density in air (iv) dew point temperature (v) enthalpy of mixture per kg of dry air
Assume atmospheric pressure to be 1.03 bar [06]
(b) Explain Working of Simple Vapour Compression Refrigeration System with proper diagram. State its advantages and disadvantages. [05]

OR

Q.3  (a) 28 tonnes of ice from and at 0°C is produced per day in an ammonia refrigerator. The temperature range in the compressor is from 25°C to -15°C. The vapour is dry and saturated at the end of compression and expansion valve is used. Assuming a co-efficient of performance of 62% of the theoretical, calculate the power required drive the compressor.
The following properties are given:

<table>
<thead>
<tr>
<th>Temperature (°C)</th>
<th>Enthalpy (kJ/kg)</th>
<th>Entropy of liquid (kJ/kg K)</th>
<th>Entropy of vapour (kJ/kg K)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Liquid</td>
<td>Vapour</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>100.04</td>
<td>1319.22</td>
<td>0.3473</td>
</tr>
<tr>
<td>-15</td>
<td>-54.56</td>
<td>1304.99</td>
<td>-2.1338</td>
</tr>
</tbody>
</table>
Take latent heat of ice = 335 kJ/kg.
(b) Explain Adiabatic saturation process with schematic diagram and show it on psychrometric chart. [04]
Q.1 (a) Explain types of chips. [5]  
(b) Differentiate orthogonal and oblique cutting. [3]  

Q.2 (a) Write classification of presses. [3]  
(b) Draw Single point cutting tool geometry and state the relevant terms. [3]  
(c) Explain mechanism of chip formation. [5]  

OR  
Q.2 (a) Explain relative terms  i) embossing ii) nibbling [2]  
(b) What is the importance of rake angle in single point cutting tool? [2]  
(c) Draw merchant circle diagram with force notation and find relationship of cutting force and shear force. [7]  

Q.3 (a) Draw neat sketch of power press and explain any four components of it. [4]  
(b) During an orthogonal machining (turning) operation of C-40 steel, the following data were obtained: (i) chip thickness =0.45mm (ii) width of cut= 2.5mm (iii) feed= 0.25 mm/rev (iv) feed thrust force =295N (v) tangential cut force =1130N (vi) cutting speed =2.5m/s (vii) rake angle= +10°  
Calculate:  
(a) Force of shear at the shear time.  
(b) Kinematics coefficient of friction at the chip tool interface.  

OR  
Q.3 (a) What are the various methods of reducing force requirements in press working? [4]  
(b) A steel tube 42 mm outside diameter is turned on a lathe. The following data was obtained:  
(i)Rake angle: 32° (ii) Cutting speed: 18 m/min (iii)Feed:0.12 mm/rev  
Length of continuous chip in one revolution : 52 mm  
Cutting force :180 kg  Feed force:60 kg  
Determine (a) Chip thickness ratio (b) Chip thickness (c) Shear plane angle (d) Velocity of chip along tool face (e) Coefficient of friction.