M. Tech. - (ME) - 2nd SEM. ANNUAL EXAMINATIONS; JUNE 2018
Modeling and Simulation of Manufacturing System – 13140201

Time: 3 hours   **Maximum Marks: 100**

Instructions:
1. Write your Roll No. on the question paper.
2. Candidate should ensure that they have been provided with correct question paper. Complaint(s) in this regard, if any, should be made within 15 minutes of the commencement of the exams. No complaint(s) will be entertained thereafter.
3. Attempt any FIVE questions. Q.1 is compulsory. Students are required to attempt FOUR questions selecting ONE from each unit. Marks are indicated against each.
4. Draw diagram whenever required.

Q.1 Answer the following questions: (5x4=20)
   a) Mention some advantages and limitations of simulation technique.
   b) What are the different steps involved in construction of a simulation model?
   c) Define Queue, Entity, State, Event and Random variable in reference to simulation models.
   d) What is the function of Create, Process, Assign, Dispose and Decide module in ARENA software?
   e) What is the use of TRANSFER statement in GPSS? Explain the function of following GPSS block
      GENERATE   10,5,2,2,1

UNIT - I

Q. 2 (a) What are the different types of simulation models and explain them in brief?
        (b) Discuss in detail about the different classes of simulation languages.   (20)

Q. 3 Explain in detail different modeling elements in manufacturing system.   (20)

UNIT - II

Q. 4 Write short notes on: (20)
   a) Simulation software's used in modeling FMS problems
   b) Features of GPSS
   c) Random number generation
   d) Application of simulation in supply chain management

Q. 5 Discuss various modeling elements in Supply Chain Management and different modeling processes.   (20)

UNIT - III

Q. 6. Briefly explain: (20)

   a) 2k factorial design
   b) Monte Carlo simulation.

Q. 7 Discuss about the salient features of ARENA taking an example of n jobs and single server system. **(20)**

UNIT - IV

Q. 8 A television shop employs a single repairman to overhaul its rented television sets, service customers' sets and do on-the-spot repairs. Overhaul of company owned television sets commences every 40±8 hours and takes 10±1 hours to complete. On-the-spot repairs, such as fuse replacement, tuning and adjustments are done immediately. These arrive every 90±10 minutes and take 15±5 minutes. Customers' television sets requiring normal service arrive every 5±1 hours and take 120±30 minutes to complete. Normal service of television sets has a higher priority than the overhaul of company owned, rented sets. Give GPSS program for simulating this problem. **(20)**

Q. 9 Discuss and differentiate between Continuous and Discrete simulation languages with examples. **20)**

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M. Tech. (ME) - 2nd Semester
Vibration and Condition Monitoring – 13140203
END TERM THEORY EXAMINATION

Time: 3 hours   **Maximum Marks: 100**

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3. Attempt any **FIVE** questions. **Q.1** is compulsory. Students are required to attempt **FOUR** questions selecting **ONE** from each unit. Marks are indicated against each.
4. Draw diagram whenever required.

Q.1 **Define the following:**   **(5 X 4= 20)**

    a) Free and Forced vibration.
    b) Degree of freedom.
    c) Continuous and Discrete systems.
    d) Deterministic and Random vibration.
    e) Resonance.

UNIT - I

Q.2 What do you understand by the concept of virtual work?
Use Lagrange's equation to find out the equation of motion for a single degree spring mass coupled system.   **(20)**

Q.3 Determine the effect of the mass of the spring on the natural frequency of the single degree freedom system.   **(20)**

UNIT - II

Q.4 Explain Under damping, Critical damping and Over damping with suitable example.   **(20)**

Q.5 What is Vibration Isolation? Derive an expression for force transmissibility.
A vibrometer having the amplitude of vibration of the machine part as 4 mm and ξ = 0.2, performs the harmonic motion. If the difference between the maximum and minimum recorded value is 10 mm, determine the natural frequency of vibrometer if the frequency of the vibration part is 12 rad/sec.   **(20)**

UNIT - III

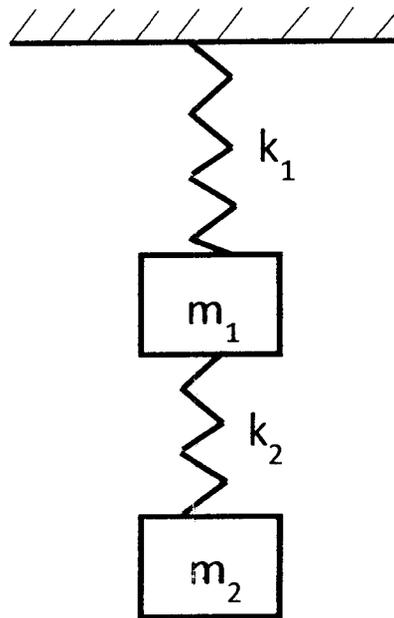**Q.6** Explain the Vibration Absorber with mathematical expression.   **(20)**

Q.7 Figure shows a vibrating system having two degrees of freedom. Determine the two natural frequencies of vibrations and the ratio of amplitudes of the motion of m_1 and m_2 for the two modes of vibration.   **(20)**
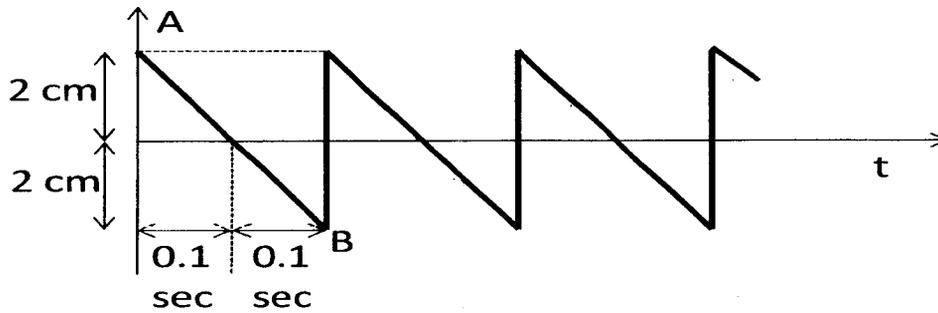
Given: $m_1 = 1.5$ kg, $m_2 = 0.80$ kg

$k_1 = k_2 = 40$ N/m

UNIT - IV

Q.8 Represent the periodic motions given in fig. by harmonic series. **(20)**

Q.9 **(a)** Explain the construction and working principle of piezoelectric accelerometer. **(10)**

(b) What are the different types of frequency measuring device? Explain Fullarton Tachometer. **(10)**

*****ETE MAY/JUNE 2018*****

M. Tech. (ME) - 2nd SEMESTER
ADVANCED HEAT TRANSFER - 13140204
END TERM THEORY EXAMINATION

Time: 03:00 Hours   Maximum Marks – 100

Instructions:

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3. Attempt any **FIVE** questions. Q.1 is compulsory. Students are required to attempt **FOUR** questions selecting **ONE** from each unit. Marks are indicated against each.
4. Draw diagram whenever required.

Q.1 **(a)** Define heat pipe.   **(5)**

   (b) Explain thermometric well.   **(5)**

   (c) Explain absorptivity, reflectivity, emissivity.   **(5)**

   (d) Explain the difference between heat transfer and thermodynamics.   **(5)**

UNIT - I

Q.2 **(a)** What do you mean by steady and unsteady heat transfer. Define thermal resistance and derive heat conduction equation in cylindrical co-ordinates for plane wall.   **(10)**

   (b) Derive the case for heat dissipation from a fin insulated at the tp. An array of 10 fins of anodized aluminum (k= 180W/m-deg) is used to fin measures cool a transient operating at a location where the ambient conditions correspond to temperature 35^0C and convective coefficient 12 W/m^{2}deg. Each 3mm wide x 0.4 mm thick x 5 cm length and has its base at 60^0C. Determine the power dissipated by the fin array.   **(10)**

Q.3 **(a)** Define fin effectiveness and explain the case for all the 3 cases of fins and derive its formula with diagram.   **(10)**

   (b) A 2 cm dia bar is used as a support in a stack through which pass the fluid gases at 200^0C. The bar is 1 meter long and thermal conductivity of its material is 150 W/m-deg. Determine the maximum temp along the bar if the chimney walls where the bar is attached are maintained at 80^0C. Assume the heat transfer coefficient as 8W/m^2-deg .   **(10)**

UNIT - II

Q.4 **(a)** Explain the difference between forced and free convection. A spherical heater of 20 cm. diameter and at 60^0C is immersed in a tank of water at 20^0 C. Determine the value of convective heat transfer coefficient.   **(10)**

   (b) Define Thermal boundary layer in detail explain all its phases.   **(10)**

Q.5 (a) Explain Hydrodynamic boundary layer on a flat plate explaining every region in detail with diagram. **(10)**

(b) Define Reynolds Analogy and distinguish it with Reynolds - Colburn analogy. Calculate the rate of heat loss from a human body which may be considered as a vertical cylinder 30cm dia and 175cm high in still air at 15^0C. The skin temperature is 35^0C and emissivity at the skin coefficient at the skin surface is 0.4. Neglect sweating and effect of clothing. **(10)**

UNIT - III

Q.6 Explain boiling and boiling regimes. Define the concept of bubble growth, nucleate and film boiling with neat sketch. **(20)**

Q.7 Air moving at 0.3 m/s blows over the top of a chest type freezer. The top of the freezer measures 0.9m by 1.5m and is poorly insulated so that the surface remains at 10^0C. If the temperature of air is 30^0C, make calculations for the maximum heat transfer by forced convection from the top of the freezer. **(20)**

UNIT - IV

Q.8 (a) What are heat exchangers? Classify types of heat exchangers. **(10)**

(b) A tubular heat exchanger is to be designed for cooling oil from a temperature of 80^0 C to 30^0 C by a large of stagnant water which may be assumed to remain constant at a temperature of 20^0 C. The heat transfer surface consists of 30 m long straight tube of 20 mm inside diameter. The oil (specific heat = 2.5 kJ/kg K and specific gravity = 0.8) flows through the cylindrical tube with an average velocity of 50 cm/s. Calculate the overall heat transfer coefficient for the oil cooler. **(10)**

Q.9 (a) Define all the basic 4 laws of radiation & define gray body also. **(10)**

(b) Two opposed, parallel, infinite planes are maintained at 420 K and 480 K resp. Calculate the net heat flux between these planes if one has an emissivity of 0.8 and other an emissivity of 0.7. How this heat flux will be affected if
(i) the temp difference is doubled by raising the temp. 480 K to 540 K.
(ii) the planes are assumed to be black? **(10)**

M. Tech. (ME) - 2nd SEMESTER
ANALYSIS OF MANUFACTURING PROCESSES - 13140209
END TERM THEORY EXAMINATION

Time: 3 hours   **Maximum Marks: 100**

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3. Attempt any **FIVE** questions. **Q.1** is compulsory. Students are required to attempt **FOUR** questions selecting **ONE** from each unit. Marks are indicated against each.
4. Draw diagram whenever required.

Q.1 Define the following: **(5 X 4= 20)**
    a) Different allowances applied in pattern making.
    b) Gating system in sand casting.
    c) Hot working and cold working.
    d) List the advantage of forging.
    e) Directional solidification.

UNIT - I
Q.2 Give the nomenclature of single point cutting tool with labeled diagram.   **(20)**

Q.3 A 75 mm diameter MS bar was turned at 220 rpm to get a tool life of 14 minutes. The rpm was changed to 260 and tool life obtained was 10 minutes. Find out the values of n and c.   **(20)**

UNIT - II
Q.4 (a) Explain open and close die forging.   **(10)**
    (b) Discuss working of a forging press with labeled diagram.   **(10)**

Q.5 Deduce stress strain relations in elastic and plastic deformation.   **(20)**

UNIT - III
Q.6 Explain Gravity Die Casting method with its advantages and limitations.   **(20)**

Q.7 (a) Explain different Compacting methods used in Powder Metallurgy.   **(10)**
    (b) With neat sketches, explain Semi-Centrifugal and Centrifuged Casting process with its applications.   **(10)**

UNIT - IV
Q.8 (a) Explain different Resistance Welding processes with neat sketches.   **(10)**
    (b) What are the common Welding defects? Explain their causes and remedial measures.   **(10)**

Q.9 (a) Explain Submerged Arc welding process with its advantages, disadvantages and applications.   **(10)**
    (b) Compare TIG and MIG welding processes.   **(10)**

M. Tech(MECHANICAL ENGINEERING) - 2ND SEMESTER
RELIABILITY BASED DESIGN - 13140212
END TERM THEORY EXAMINATION

Time: 03:00 Hours

Maximum Marks – 100

Instructions:

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3. Attempt any **FIVE** questions. **Q.1** is compulsory. Students are required to attempt **FOUR** questions selecting **ONE** from each unit. Marks are indicated against each.
4. Draw diagram whenever required.

Q.1 Define the following-   **(5X4=20)**
   a) MTBF & MTTF
   b) Reliability
   c) Factor of safety
   d) Different modes of failure
   e) Maintainability

UNIT - I

Q.2 a) What are fundamental causes of failure .   **(10)**

   b) Explain Reliability function, Hazard rate & Failure rate.   **(10)**

OR

Q.3 a) Explain Failure data analysis in detail.   **(10)**

   b) Explain 4 –bar mechanism in detail with neat sketch.   **(10)**

UNIT - II

Q.4 Explain Stress-Strain model for Plastic, Elastic & Brittle material in detail with neat sketch. **(20)**

OR

Q.5 Define Fatigue strength and also explain SN diagram for strength under fluctuating stress. **(20)**

UNIT - III

Q.6 a) What is Normal distribution and explain with the help of exponential curve. **(10)**

   b) What are different types of Optimization problems in detail?   **(10)**

OR

Q.7 a) Discuss Lagrange multiplier method with the help of an example.   **(10)**

   b) In order to determine the tensile strength of the material of a supply of connecting rods, sample of tensile specimens were prepared & tests conducted .The result showed a normal distribution with a mean tensile strength of 310 MPa & a standard deviation of 34.5 MPa. If the consignment involved 300 connecting rods , estimate.

   (i) How many connecting rods can be expected to have a strength less than 275 MPa.

   (ii) How many connecting rods can be expected to have a strength between 275 MPa & 410 MPa.   **(10)**

UNIT - IV

Q.8 **a)** Define Maintenance and also explain Preventive maintenance, Imperfect maintenance in detail. **(10)**

b) Define Distribution and also explain its types in detail with neat sketch. **(10)**

OR

Q.9 **a)** Differentiate between Event –Tree & Fault- Tree analysis . **(05)**

b) What are the different types of Failure theories ? Explain. **(15)**

******ETE MAY/JUNE 2018*******