MODEL QUESTION PAPER

Seventh Semester B.Tech Degree Examination, April/May 2011

(2008 scheme)

Branch: Civil Engineering
08-701: ADVANCED STRUCTUREAL ANALYSIS

Time:3 Hours   Max.Marks:100

PART A

(Answer **all** questions)

1. Differentiate between indeterminacy and kinematic indeterminacy with examples.

2. Formulate the stiffness matrix for a beam element with two degrees of freedom per node.

3. Show that flexibility matrix is the inverse of stiffness matrix.

4. Using flexibility method, evaluate the deflection at free end of a cantilever beam subjected to concentrated load at its free end.

5. Explain transformation matrix or rotation matrix in direct stiffness method.

6. What is geometric invariance? Explain its significance in finite element method.

7. What are natural co ordinates? Write down the natural co ordinates of a line element.

8. What are the different elements used in finite element analysis of 2-D problems?

(8x5=40Marks)

PART B
(Answer **one** question from each module, 20Marks each)

MODULE 1

9.   Analyse the continuous beam shown in Figure.1 by flexibility method and draw the bending moment diagram.
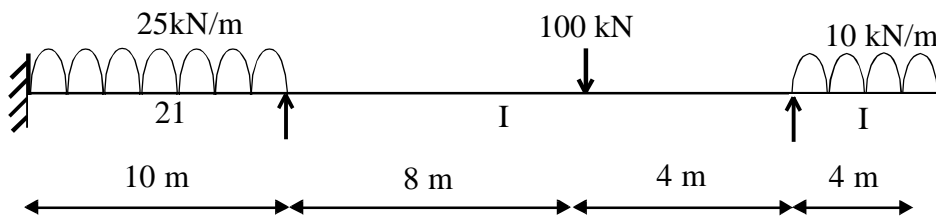

Figure. 1

OR

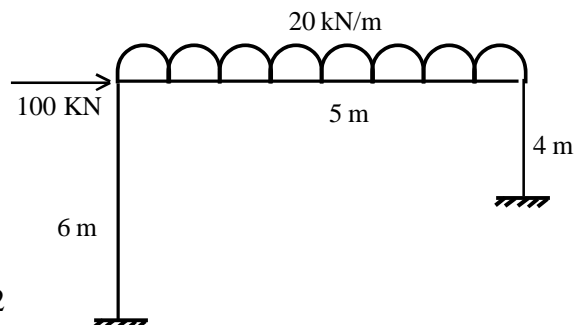10.Analyse the portal frame shown in Figure.2 by flexibility method and draw the bending moment diagram.

Figure. 2

MODULE 2

11. Analyse the fixed beam shown in Figure .3 by stiffness method and draw the bending moment diagram and shear force diagram.
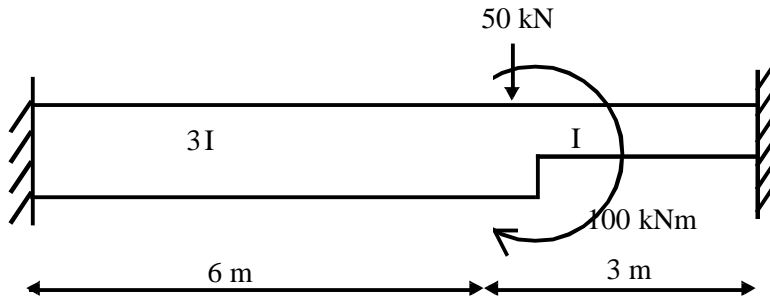

Figure. 3

OR

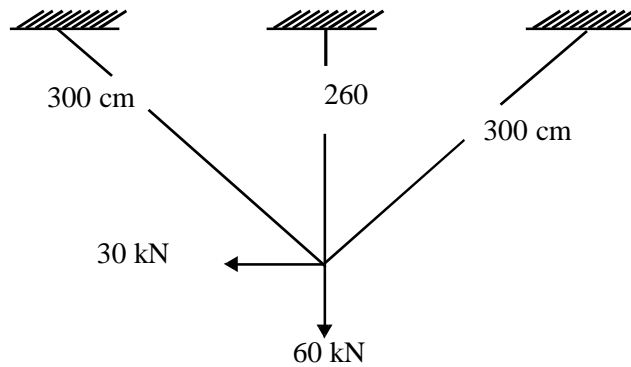12. Find the forces in members of the truss shown in Figure.4 by direct stiffness method

Figure. 4

13. The co ordinates of a CST element is A(2, 1), B (4, 6), C(6, 1). If the displacement of A, B, C are 100, 125, 175 respectively, find the natural co ordinates of point P(3,2) and its displacement.

OR

14. a) Derive the shape function for a beam element with two degree of freedom per node.

(10 Marks)

b) Derive from first principles, the expression for stiffness matrix and load vector in FEM and hence obtain the stiffness matrix for a true element.

(10 Marks)

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MODEL QUESTION PAPER

Seventh Semester B.Tech Degree Examination,

08.702 Design of Hydraulic Structures (C)

Time:4 hours   **Max. Marks: 100**

      Note: 1). Answer all questions

                2). Assume any missing data suitably

                3). Drawing sheets are to be supplied

Part A

I. (a) What are the requirements for stability of a gravity dam.

   (b) Explain the limitations of thin cylinder theory for the design of an arch dam

   (c) Explain the design of floor thickness of a hydraulic structure using Bligh's theory

   (d) Why are canal falls constructed in a channel? List the different types of canal falls.

                                             (4 x 5=20Marks)

Part B

II (a) Derive the most economical central angle of an arch dam.   **(10)**

                                    OR

   (b) What are the criteria for safe design of an earth dam   **(10)**

III (a) Briefly explain the functions of various components of diversion headworks.

                                    (10)

                                    OR

   (b) Describe with the help of sketches various types of Cross drainage works. **(10)**

Part C

IV.   Design a suitable cross drainage work for the following data at the crossing of a canal and a drainage

CANAL:

      Full supply discharge   =   30 cumecs

      Full Supply Level   =   RL.212.00m

      Canal bed level   =   RL.210.50m

      Canal Bed width   =   20m

      Canal water Depth   =   1.5m

      Trapezoidal Canal Section with 1.5H : 1V slope

DRAIN:

High flood discharge	=	300cumecs
High flood level	=	208.50m
High flood depth	=	2.50m
General ground level	=	211.00m

(30Marks)

Prepare the following drawings to a suitable scale:

    i) Half sectional plan at foundation level

    ii) Section through the centre line of the drain   **(30 Marks)**

V.   Design a Sarda type fall for the following data:

    i)   Full supply discharge   **:** $\dfrac{u/s}{d/s}$ = 40 cumecs

    ii)   Full Supply Level   **:** $\dfrac{u/s}{d/s} = \dfrac{218.30 \text{ m}}{216.80 \text{ m}}$

    iii) Full Supply depth   **:** $\dfrac{u/s}{d/s} = \dfrac{1.8 \text{ m}}{1.8 \text{ m}}$

    iv) Bed width   **:** $\dfrac{u/s}{d/s} = \dfrac{26 \text{ m}}{26 \text{ m}}$

    v)   Bed level   **:** $\dfrac{u/s}{d/s} = \dfrac{216.50 \text{ m}}{215.00 \text{ m}}$

    vi) Drop   **:**   1.5m

Design the floor on Bligh's theory taking coefficient of creep = 8   **(30 Mark)**

Prepare the following drawings to a suitable scale:

    i) Plan of the fall

    ii) Longitudinal section of the fall

(30Marks)

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MODEL QUESTION PAPER

08.703   **GEOTECHNICAL ENGINEERING-II (C)**

Time:3Hours   Max Marks:100

Answer all questions from part A & any one question from each module in Part B.

Graph sheets may be supplied on request.

Part A [8x5marks = 40Marks]

1. Differentiate between isobar and pressure bulb.
2. Critically comment on the assumption in Boussinesq's equation for determination of vertical stress.
3. Define passive state of plastic equilibrium. Give any two practical examples.
4. Define the terms [i] allowable bearing pressure ;[ii] general shear failure.
5. Two footings, one circular and the other continuous, are founded at the same depth in pure clay.
   Diameter of the circular footing is twice the width of continuous footing. What is the ratio of the net safe bearing capacities?
6. Differentiate between soil profile and borelog.
7. How is the safe load on a single pile estimated from pile load test results?
8. Suggest any three methods vibration isolation.

Part B [60 Marks]
Module I

9. [a] A rectangle footing of 10m x 18m is subjected to a uniform load intensity of 125kPa. Determine the increase in vertical stress at 5m depth beneath any one corner of the footing by equivalent point load method.   **(10Marks)**

   [b] Explain the construction of Newmark's chart for influence value 0.0025.

   (10Marks)

10. A retaining wall, 8m heigh, with a smooth vertical back, retains a layered soil with the following properties:

    upper layer : $c = 10kPa$; $\varphi = 0^0$; $\gamma = 17kN/m^3$

    lower layer : $c = 0.0$; $\varphi = 40^0$; γ above water table = $18kN/m^3$; $\gamma_{sat} = 21kN/m^3$; thickness = 5m.

    Water table is at a depth of 5.5m beneath the backfill surface. Compute [i] the depth of tension crack; & [ii] the magnitude and point of application of total active pressure.

    [20Marks]

Module II

11. [a] Suggest any two methods for controlling differential settlement.

    [5Marks]

    [b] A strip footing 1.5m wide is resting on satured clayey sand stratum [$c_u = 10$ kpa; $\Phi u = 35^0$; Nc = 95.7; $N_q = 81.3$; $N\gamma = 100.4$; $\gamma_{sat} = 20kN/m^3$] at a depth of 1.2 m below GL. The water table is at a depth of 1.5m below GL. If the water table rises by 0.9m, what will be the percentage reduction in ultimate bearing capacity?   **[15 Marks]**

12. [a] Explain dilatency correction for N value. **[5 Marks]**

   [b] Samplers having the following dimensions were used to collect undisturbed samples of a very soft cohesive soil: outside diameter of cutting edge =38.1mm; inside diameter of cutting edge = 35mm; outside diameter of sampling tube = 37mm; inside diameter of sampling tube = 36mm. Comment on the quality of samples. Justify your answer.

   [15Marks]

Module III

13. [a] Explain with a neat sketch, negative skin friction on piles. **[5 Marks]**

   [b] A 2x2 pile group of friction piles, each pile having 500mm diameter and 18m length, is installed in a loose sandy soil with the water table at the ground surface. Properties of soil are : saturated unit weight = 19.81kN/m^3; coefficient of earth pressure=1.0; coefficient of friction between the soil and the pile = 0.5; N_q =100; c/c; N_γ =60; c/c distance between the piles = 1.0m; factor of safety = 2.5. Determine the safe load on the pile group.

   [15 Marks]

14. [a] Explain with neat sketches, any four methods for rectification of tilts and shifts.

   [10 Marks]

   [b] A building is to be supported on a R.C raft foundation of dimensions 14m x 21m. The subsoil is clay, which has an average unconfined compressive strength of 15 kPa. The pressure on the soil due to the weight of the building and the load that it will carry will be 140 kPa at the base of the raft. If the unit weight of the excavated soil is 19 kN/m^3, determine the depth at which the bottom of the raft be placed to provide a factor of safety of 3.0 against shear failure.

   [10 Marks]

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MODEL QUESTION PAPER
SEVENTH SEMESTER B.TECH DEGREE EXAMINATION
(2008 scheme)
08-704: Environmental Engineering-I (C)

Time:3 Hours   Max.Marks:100

PART A
(Answer all questions)

1. What are the merits and demerits of various water supply sources in view of the quantity and quality?

2. What do mean by the term percapita demand? How is it estimated?

3. Explain the mechanism of floc formation?

4. Expalin the theory of filtration?

5. Differentiate fluoridation and de fluoridation?

6. What are the functions of air valve and sluice valve?

7. State why chlorine is most widely used for disinfection of water?

8. What is mean by economical diameter of a rising main? On what factors does it depend.

8x5 = 40

Part - B
Answer any one question from each module

9. (a) What are the different methods of forecasting population   **(5)**

   (b) The population statistics of a town is given below. Estimate the population expected in 2011 and 2021 by decreasing rate of growth method and geometric increase method.

Year	1961	1971	1981	1991
Population	71375	85489	97192	108637

(15)

OR

10. Explain physical and chemical characteristics of water   **(20)**

Module II

11. (a) Derive the stoke's equation to find the settling velocity of discrete particles(10)

    (b) Design the dimensions of a rectangular sedimentation tank for raw supplies from a town of population of 100000, with a daily percapita water supply of 120 litres. Assume detention period of 6 hrs and velocity of flow as 20 cm/minute   **(10)**

OR

12. (a) Design the dimensions and under drainage system of a rapid sand filter to treat 5 million litres per day of water. Assume necessary data.   **(12)**

    (b) Explain the working of a clariflocculator.   **(8)**

Module III

13. (a) Explain disinfection. Describe in detaid the various methods of disinfection applied in water treatment   **(10)**

    (b) Describe the various layout of distribution network and method of distribution

                                                                                (10)

OR

14. (a) Explain Hardy cross method of solving the network of pipes by balancing heads by correcting flow. Also derive an expression to find the correction of the assumed flow.

                                                                                (10)

    (b) Explain the types of chlorination.

                                                                                (10)

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MODEL QUESTION PAPER

08.705.2 ELECTIVE III   EARTH DAM ENGINEERING (C)

Time:3 Hours   Max.Marks:100

Answer all questions from **Part A** & any one question from each Module in **Part B**.

PART A

1. What are the advantages of earth dam over other types of dams?
2. What are the uses of flow net?
3. What is meant by steady seepage condition?
4. What are various field compaction methods?
5. Explain how liquefaction is caused?
6. List the various field monitoring instruments used in earth dams?
7. What are the various seepage control measures?
8. Explain the function of relief wells?

                                                                                         (8x5=40)

Part B

Module I

9. What are the factors to be considered for the selection of an earth dam.?   **(20)**

OR

10. Explain how the seepage through earth dams can be estimated.   **(20)**

Module II

11. Explain how the stability conditions of an earth dam is analyzed during sudden drawdown condition.
                                                                                         (20)
OR
12. What are the various compaction control measures to be considered for the construction of embankments?   **(20)**

Module III

13. Explain the significance of seepage measurements in an earth dam.   **(20)**

                                           OR

14. Explain hydraulic failure of earth dam?   **(20)**

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Model Question Paper 08.705.3 Elective III

Seventh Semester   B.Tech Degree Examination   (2008 Scheme)   Branch: Civil

08.705.3 Elective III : DEEP FOUNDATIONS

Time:3 Hours   Max.Marks:100

Instructions: Answer *all* questions from Part - **A** & any **one** question from each Module in Part - **B**.

PART – A

1. a) What are the situations suitable for providing pile foundations.

    b) Write down the equations for determination of ultimate static capacity, based on CPT data, for a bored pile installed in granular soil.

    c) How is the 'critical depth concept applied in Meyerhof's method in the computation of bearing capacity.

    d) What is negative friction? What is its effects on the pile.

    e) Discuss any two dynamic formula, what are its effect on the pile.

    f) What is the difference between a drilled pier and a caisson.

    g) A concrete well foundation of outer dia 6m is sunk in loose sand by its self weight. The unit skin friction of sand is 25 kN/m³ and unit weight of concrete is 24 kN/m³ Determine the thickness of steining.

    f) What precautions can be adopted to avoid the occurrence of tilts and shifts in wells

                                                                                          (8x5=40Marks)

PART-B

Module-I

II. A concrete pile of 50cm dia is driven to a depth of 16m through a layered system of sandy soil. The following data are available.

Top layer (1); thickness - 8m, γ_d = 16.5 kN/m³, e = 0.60, φ = 30•, k = 1.5

Layer (2) : thickness - 6m, γ_d = 15.5 kN/m³, e = 0.65, φ = 35•, k = 1.8

Layer (3) : extends to great depth, γ_d = 16.0 kN/m³, e = 0.65, φ = 38•, k = 2

Assume that the value of δ in all the layers of sand equal to 0.75 φ, Calculate ultimate and allowable load using a F.S of 2.5.

                                                                                          20

OR

III. A concrete pile of 45 cm dia was driven into sand of loose to medium density to a depth of 15m. The following properties are known, average unit weight of soil along the length of pile is 17.5 kN/m³, φ_{av} = 38•, average k = 1.0, Ncor = 10, δ= 0.75 φ, Nq = 60. Calculate ultimate capacity of pile by Meyerhof's method.

                                                                                          20

Module – II

IV. a) Give the methods of determining the settlement of a pile group in i) cohesionless soil and ii) cohesive soil

8

b) A friction pile group (4x3) consists of square piles having sides of 45cm. The piles are 18m long and are embedded in a consolidated clay deposit 26 m thick, followed by shale. The clay has an average Cu = 30 kn.m2. The Cu at the base is 40 kN/m³. The piles are spaced at 1.2 m centre to centre. Determine the load carrying capacity of the group using a F.S of 2.5. Assume the water table to be at the ground surface.

12

OR

V. a) How would you estimate the load carrying capacity of drilled pier in sand and clay

8

b) A drilled pier 1m dia has a total depth of 12m. The dia of the bell is 2m and its height is 1m. If Cu = 100 kN/m², γ = 16.5 kN/m³, α = 0.3, determine the allowable load (F.S = 3)

12

Module –III

VI. a) Draw a neat sketch of a well foundation and name the differenceparts also explain the forces acting on the wall.

10

b) What consideration governs the finding the depth of well foundation

10

OR

VII. a) Derive the expression for the allowable lateral load on well foundation using Terzaghi's analysis for a free rigid bulkhead.

10

b). With the help of a neat sketch , any two methods for rectification of tilt of well foundation.

10

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EIGHTH SEMESTER B.TECH (CIVIL) MODEL QUESTION PAPER

(2008 SHEME)

08.705.6- ELECTIVE III: - AIR QUALITY MANAGEMENT

Time:3 Hours   Max.Marks:100

Answer all questions

PART- A

1. Explain briefly the components of the environment.
2. Write a short note on indoor air pollution.
3. Differentiate between primary air pollutant and secondary air pollutant.
4. Write a short note on natural ambient air quality standards.
5. List out and briefly explain the factors affecting air pollutant dispersion.
6. Write a short note on inversion
7. Define air pollution as per Bureau of Indian Standards.
8. Differentiate between adsorption and absorption.

(5x8 = 40)

PART-B

ModuleI

9. Explain in general the sources and effects of various air pollutants on health and vegetation.

OR

10. Write a short note on air pollution measurement units and explain the various industrial processes causing air pollution.

Module II

11. A thermal power plant burns at the rate of 7.5 tonnes/hr discharges the flue gases through the stack having effective height of 95m.The whole has a sulphur content of 4.6%. The wind velocity at the top of the stack is 8m/s.The atmosphere is slightly unstable. Determine the ground surface concentration of SO_2 and distance from the stack at which this occurs.

OR

12. Write a short note on lapse rate and explain the various conditions of atmospheric stability.

Module III

13. List out the various gaseous air pollutant control measures and explain briefly.

OR

14. Explian the various methods of collection and control of particulate matter.

3x20 = 60Marks

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MODEL QUESTION PAPER

Seventh Semester B.Tech Degree Examination
(2008 scheme)
Branch: Civil Engineering
08.705.10 : Elective - III: PRESTRESSED CONCRETE

Time:3 Hours   Max.Marks:100

Instructions: 1) Answer **all** questions from Part- **A** and one question each from Part - **B.**

2) **Each** question in part **A** carries **5** marks and each question in part-**B** carries **20** marks.

3) **Use** of IS 456: 2000 and IS 1343: 1980 are **permitted**.

4) Assume any missing data **suitably**.

PART - A

I.   a) Differentiate between pre tensioning and post tensioning.

b) What are the advantages of prestressed concrete over reinforced concrete?

c) Explain losses due to shrinkage and creep in prestressed concrete

d) Explain the concept of concordancy in prestressed concrete.

e) What are the advantages and disadvantages of Composite construction.

f) Explain uniform prestressing.

g) Enumerate the design criteria of prestressed concrete poles.

h) Explain partial prestressing.

PART - B

Module - I

II) A post tensioned prestressed concrete beam of rectangular section 250 mm wide and 600 mm deep is to be designed to support an imposed load of 10 Kn/m over a span of 15m. The stresses in concrete must not exceed 1.7 N/mm^2 in compression and 1.4 N/mm^2 in tension at any stage. Loss of prestress = 15%. Determine the minimum prestressing force and corresponding eccentricity.

OR

III) A one way slab of 12m span is to be designed with parallel post-tensioned cables in each of which the force at transfer is 500 kN. The slab is to support a udl of 20 kN/m^2. The permissible stresses in compression and tension are 15 N/mm^2 and zero N/mm^2 respectively at any loading stage. Calculate the maximum horizontal spacing of cables and their position at the midspan section. Assume unit weight of concrete as 24 kN/m^3 and loss ratio as 0.80.

Module - II

IV) A two span continuous beam prestressed concrete beam ABC (AB=BC=12m) has a uniform cross-section with a width of 250 mm and a depth of 600 mm. The cable carrying an effective prestressing force of 500 kN is parallel to the axis of the beam and located at an eccentricity of 200 mm. Determines the secondary moments developed at mid support section B. If the beam supports an imposed load of 2.4 kN/m, calculate the resultant stresses developed at top and bottom of the beam at B.

OR

V) A rectangular pretensioned concrete beam has a breadth of 100 mm and depth 260 mm. The beam is incorporated in a composite I beam by casting a top flange of breadth 300 mm and depth 50 mm. The prestress after all the losses at the top and the bottom of the beam (web) portion is zero and 12 N/mm^2.Calculate the maximum uniformly distributed load that can be supported on a simply supported span of 6.0m, without any tensile stress occurring if the slab is externally supported while casting.

Module - III

VI) A non-cylinder prestreed concrete pipe 1.2 m internal diameter having a thickness of 75 mm and circumferential wire winding of high tensile wires of 5 mm diameter at a pitch of 30 mm initially stressed to 1000 N/mm^2. Estimate the fluid pressure permissible if no tension is permitted in concrete and the loss ratio is 0.8.

OR

VII) Design an electric pole of 12 m height to support wires at its top which can exert a reversible horizontal force of 5kN. The tendons are initially stressed to 1000 N/mm^2 and the loss of stress due to shrinkage and creep is 10%. Maximum compressive stress in concrete should not exceed 12 N/mm^2. Assume modular ratio as 6, angle of repose 30^0 and unit weight of soil 18 kN/m^3.

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MODEL QUESTION PAPER

Seventh Semester B.Tech Degree Examination

08-705.11: Elective - III HIGHWAY AND AIRFIELD PAVEMENT MATERIALS

Time:3 Hours   **Max.Marks:100**

PART-A

Answer all questions

1. Explain the functional requirements of pavements.
2. Discuss the moisture density relationship of soils.
3. Explain the desirable properties of aggregates for road construction.
4. Describe the term modified binders with examples.
5. Discuss the viscoelastic behavior of pavement materials.
6. Explain ageing of bitumen
7. Discuss about bituminous soil stabilization and the mode of construction
8. Explain the requirements of paving concrete

8 x 5 = 40Marks

PART-B

Answer any one full question from each module

Module I

1. a) Explain the functions of different layers of flexible pavements

   b) Discuss the systems for classification of soils

2. a) Explain in detail the mechanical properties of soils for highways

   b) Describe the different methods for aggregate gradation

Module II

1. a)Differentiate penetration grading and Viscosity grading, Cutback and emulsions and their application in pavement construction.

   b) Explain the super pave mix design procedure.

2. a) Explain the Marshall mix design procedure.

   b) Discuss fatigue and creep characteristics for the analysis of viscoelastic systems.

Module III

1. a) Explain the mix design procedure for recycled bituminous pavements

   b) Describe the step wise construction procedure for cement concrete pavements.

2. a) Explain the mix design procedure for recycled concrete pavements.

   b) Explain the soil stabilization construction procedure using lime and cement

20 x 3=60

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Model Question Papers

VII Semester B.Tech Degree (2008 Scheme)

Branch : Electrical and Electronics Engineering

Model Question
B.Tech Degree Examination
Seventh Semester Electrical and Electronics Engineering
**08.701 CONTROL SYSTEMS**

Time:3 Hours   Max.Marks:100

Part A
Answer all questions

1. Write the advantages and disadvantages of open loop and closed loop control systems.

2. A system is described by a differential equation $(d^2y/dt^2) + (3dy/dt) + 2y = (5dx/dt) + 2x$ where x is the input and y is the output. Obtain the poles and zeros of its transfer function.

3. Explain the properties of Transfer Function.

4. Describe the basic principle operation of sycnchro.

5. Develop the transfer function for Rotational Mechanical System.

6. Write the standard test signals employed for time domain analysis

7. Explain static and dynamic error constants

8. Explain Nyquist stability criterion.

9. What are the different types of compensators? Explain any one.

10. Explain the significance of Gain Margin and Phase Margin.   **(10 x 4 = 40)**

Part B

(Answer One question from each Module)

Module I

11. (a) Derive the transfer function for dc motor armature speed control.   **(6)**

   (b) Obtain the transfer function of the mechanical system shown below and draw its force-voltage analogous circuit.   **(14)**
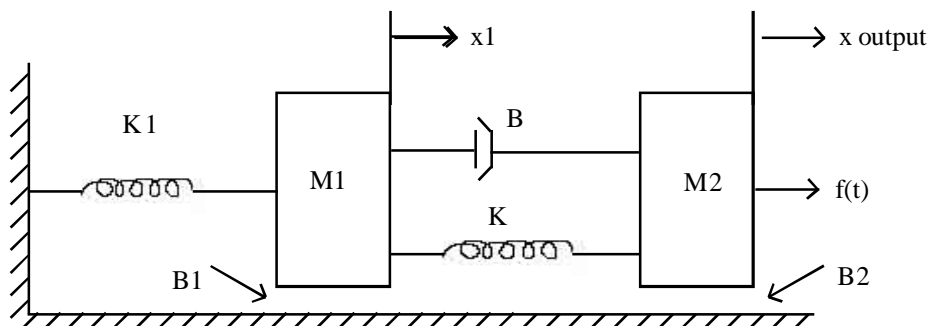
12. (a) Determine the ratio C/R, C/D and the total output for the system the block diagram for which is shown below.
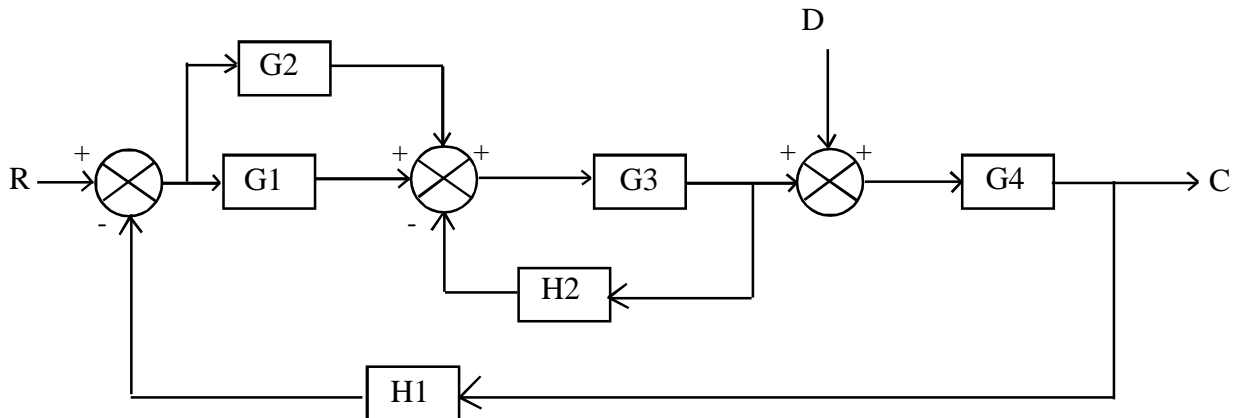
(10)

(b) Draw the signal flow graph for the system shown above **(5)**

(c) Briefly explain the working of permanent magnet type stepper motor. **(5)**

Module II

13. (a) Consider a unity feedback control system with closed loop transfer function is
    $C(s)/R(s) = ks + b/(s^2+as+b)$. Determine the steady state error in the unit ramp input.
    (10)

(b) Derive the expression for maximum peak overshoot of a second order system with unit step input. **(10)**

14. (a) explain the concept of stability of a system. **(5)**

(b) A unity-freedback control system has an open loop transfer function.

$G(s) = k/s\,(s+4)\,(s^2+8s+32)$; $k>0$, Sketch the root locus of the system. Hence find the value of k so that the system has a damping factor of 0.707. **(15)**

Module III

15. (a) Explain the steps for ploting polar plot. **(5)**

(b) The open loop transfer function of an unity feedback system is given by

$G(s) = 10(s+3)/s\,(s+2)\,(s^2+4s+100)$. Draw the Bode plot and hence find the gain margin and phase margin. **(15)**

16. Consider the system whose open loop transfer function is $G(s) = 2.66/s\,(s+1)\,(s+4)$.

Compensate the system so that it meets the following specifications (a) Damping ratio $\zeta = 0.5$

(b) Settling time $t_s = 10$ sec. and (c) Velocity error constant $k_v>5$ sec^{-1}

(20)

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Seventh Semester B.Tech Degree Examination
(2008 Scheme)
Subject: 08.702 Power System Engineering III (E)
Model Question

Time: 3 hours   Max Marks: 100

Part A

Answer all questions

1. Explain the significance of Load Flow Analysis in Power system.

2. Starting from first principles develop the equations for real and reactive powers.

3. How reactive power is controlled in synchronous machines?

4. Define economic load dispatch problem.

5. Explain the role of TCSC in FACTS Technology

6. Draw a diagram to illustrate the application of equal arecriterion for a fault on one of the parallel feeders. Opening subsequently clears the fault and then it is reclosed. Mark the acceleration and decelerating area.

7. What type of motor is ideally suited for traction purpose? Given reason.

8. What is ground return? What are the problems associated with the use of ground as return path?

9. Explain need of back to back dc systems.

10. What is meant by insulation coordination?   **(10x4=40)**

Part B

Module I

11. Line impedances and load details of a 3 bus system are shown below. All values in p.u. The maximum and minimum reactive power limits for bus 2 are 0.3 and 0 p.u. respectively.

Bus code	Impedance	Line charging adm.y'ij/2	Bus code	V	Generation		Load	
					P	Q	P	Q
1-2	0.06+j 0.18	j0.05	1	1.06∟0⁰	------	-----	0.0	0.0
1-3	0.02+j0.06	j0.06	2	1.04	0.2	-----	0.0	0.0
2-3	0.04+j0.12	j0.05	3	-----	0.0	0.0	0.6	0.25

From Y_{BUS} and compute voltages at the end of first iteration using Gauss Seidel method with an acceleration factor of 1.6   **(20)**

12 a) The fuel costs in Rs. per hour of plants 1 and 2 are given as

$F_1 = 0.20P_1^2 + 40P_1 + 120$

$F_2 = 0.25 P_2^2 + 30P_2 + 150$

The maximum and minimum loading on each unit is 100MW and 25MW respectively. Determine the economic operating schedule and the corresponding cost of generation for a demand of 180 MW. Transmission losses are neglected. If the load is equally shared by both the units, determine the saving obtained by economic distribution.   (12)

b) Mention the assumptions and equation for power in DC load flow.   (8)

Module II

13) a) Two system areas are connected by a tie line with the following characteristics:

Area 1	Area 2
R=0.01pu	R=0.02pu
D=0.8pu	D=1.0pu
Base MVA=500	Base MVA=500

A load change of 100MW occurs in area 2. What is the new steady state frequency and what is the change in the tie flow? Assume both areas were at nominal frequency 50Hz to begin
(12)

b) Explain the working principle of a STATCOM (8)

OR

14 a) Explain the point by point method for solving swing equation. (8)

b) A 50Hz generator is delivering 50% of the power that it is capable of delivering through a transmission line to an infinite bus. A fault occurs that increases the reactance between the generator and the infinite bus to 500% of the value before the fault . When the fault is isolated, the maximum power that can be delivered is 75% of the original maximum value. Determine the critical clearing angle for the condition described. (12)

Module III

15 a) An electric train has an average speed of 42 kmph on level track between stops 1400 km apart. It is accelerated at 1.7 kmphps. And is braked at 3.3kmphps. Draw the speed time curve for the run. Estimate the energy consumption at the axles of the train per ton per km. Take tractive resistance constants as 50N/ton and allow 10% for the rotational inertia.
(10)

b) Draw the actual control characteristics of HVDC system with CC and CEA control.
(10)

OR

16. a) A 500KV surge travels on an overhead line of surge impedance 400Ω towards its junction with a cable which has a surge impedance of 40Ω. Find a) transmitted voltage b) transmitted current c) reflected voltage d) reflected current. Comment on the results.
(10)

b) Explain Bewly lattice diagram. (10)

****

Seventh Semester B.Tech Degree Examination- Model Question
08.703: DIGITAL SIGNAL PROCESSING (E)

Time: 3 hours   Max Marks: 100

Part A

(Answer **all** questions)

1. Check whether the following signals are periodic or not. If periodic determine the fundamental period.

    a. $x(t) = 50 \sin 10\pi t$

    b. $x[n] = 30\cos\left(\dfrac{4\pi n}{30} + \dfrac{\pi}{5}\right)$

2. State the necessary and sufficient conditions for Fourier series representation of a signal.

3. Find the linear convolution of the sequences $x[n]=\{1,-2,3,0,2\}$ and $h[n]=\{1,2,1\}$

4. Explain quantization and coding.

5. Define Z transform and list the properties of ROC.

6. State and explain schur-cohn stability criterion.

7. Why DIT and DIF algorithms are called 'in-place' algorithm? Draw the basic butterfly diagram for DIT and DIF algorithms

8. Realize the system described by the following system function.

    $H(z) = 1+2.75Z^{-1} + 3.508Z^{-2} + 1075Z^{-3} + 0.25Z^{-4}$

9. What is Gibbs Phenomenon? State the method to control this effect in FIR filter design.

10. Compare impulse invariant and bilinear transformation techniques.

(10x4=40 Marks)

Part B

(Answer **one full Question** from **each** module)

MODULE-I

11. a.Obtain the frequency spectrum of the signal shown
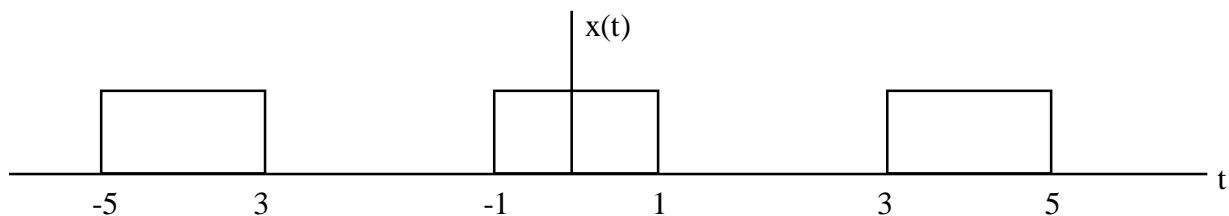
(10 Marks)

b. Test the time invariance, linearly, causality and stability for following systems.
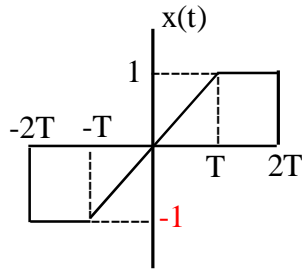
    (i). $y[n] = x[n^2]$

    (ii) $y[n] = \sum_{k=-N}^{N} x[k]x[n+k]$ **(10 Marks)**

OR

12. a. State and prove any five properties of DTFT (**10 Marks)**

b. Determine the Fourier transform of the following signals

(i)

(ii) $x[n] = \left(\dfrac{1}{5}\right)^n U[n]$

(iii) $x[n] = n(0.4)^{3n} U[n]$

(iv) $x(n) = \sin w_0 n$ (**10 Marks)**

MODULE-II

13. a. Obtain the inverse Z transform of the following signals

(i) $X(z) = \log(1-Az^{-1})$, ROC: $|Z| > |a|$

(ii) $X(z) = \dfrac{Z(Z^2 - 4Z + 5)}{(Z-3)(Z-2)(Z-1)}$ for all possible ROCs **(10 Marks)**

b. A digital filter implemented on a DSP chip is described by a linear constant coefficient difference equation $y(n) = \dfrac{3}{4} y(n-1) - 1/8\, y(n-2) + x(n)$, $y(-1) = -1$, $y(-2) = 1$. Determine the response of the filter for all $n \geq = 0$ and compare it with zero state response.

(10 Marks)

OR

14. a. Develop a 16 point Radix 2 DITFFT algorithm giving all necessary steps.
Draw the flow graph **(10 Marks)**

b. Draw an 8 point Radix 2 DIFFFT flow graph and obtain DFT of the sequence
$x(n) = \{1,1,1,1,0,0,0,0\}$ **(10 Marks)**

MODULE-II

15. a. Realize the filter in direct form I, direct form II, cascade and parallel forms

$H(z) = \dfrac{(Z^3-1)}{(Z^2 + 0.5Z + 1)(Z - 0.5)(Z + 0.5)}$ **(10 Marks)**

b. Explain the Fourier series method of designing FIR filter with an example.

(10 Marks)

OR

16. a. Convert the analog filter with system function $H(s) = \dfrac{1}{(s + 0.1)^2 + 9}$ into a digital IIR

filter using (i) Impulse invariant transformation and (ii) bilinear transformation.

(10 Marks)

b. Explain the different frequency transformations in analog and digital domains.

(10 Marks)

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Seventh Semester B.Tech Degree Examination
(2008 Scheme)
Branch: Electrical & Electronics Engineering
08.704 Elective III
ELECTRONIC COMMUNICATION (E)

Time: 3 hours   Max Marks: 100

Part:A

(Answer **all** questions. Each question carries **4 marks.**)

1. Define modulation index for AM and FM waves
2. The rms value of the antenna current before modulation is 10A and after modulation is12A. Determine the modulation index assuming no distortion?
3. Draw a simple AGC circuit and explain its function.
4. Explain the principle of super heterodyne receiver and mention its advantage.
5. What are the advantages of VSB over SSB-SC?
6. What is interlaced scanning and aspect ratio?
7. Draw the schematic of image orthicon video camera tube
8. Explain the concept of frequency reuse. What is its advantage?
9. Explain the term hand-off in mobile communication?
10. What are the advantages of mobile communication?

Part : B

(Answer **any two questions** from each module. Each question carries carries **10Marks**)

Module - I

11. Explain the working of a Foster Seely discriminator.
12. An Amplitude Modulated signal is represented by V (t) = 0.1 [1 = 0.1 Cos 2512 t + 0.5Cos 6280 t] Sin (10^7 t) Volts. Gather all possible information about base band, carrier and modulated signal from this.
13. Explain the method of power line carrier communication.
14. Derive an expression for a single tone FM signal and draw its frequency spectrum.

Module-II

15. Draw the block diagram of a monochrome television transmitter and explain the functions of each block.
16. What are the features of HDTV?
17. Bring out the difference between different TV standards
18. With a neat sketch explain the features of composite video signal

Module-III

19. Explain personal communication satellite system with relevant figure.

20. Explain call processing procedure in a cellular system.

21. What is the significance of cell splitting and sectoring in cellular communication and explain cell system layout?

22. What is the concept of CDMA in cellular communication?

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Model Question paper

The question paper will consist of two parts. Part-A is to be compulsory for 40 marks (10questions of 4 marks each). Part B is to cover 3 modules foe 60 marks. (50% choice, One out of two or two out of four from each module).

S7 B.Tech Electrical

08.704 EMBEDED SYSTEMS

Time: 3 hrs   Max Marks : 100

PART A

Answer all questions in Part A, Each question carries 4 marks

1. Define an Embedded System?
2. How could you distinguish Hard and Soft Real Time systems?
3. Write notes on Assemblers, compilers, loaders & profilers?
4. What is SFR in 8051?
5. Write notes on Interfacing and address decoding in 8051?
6. Compare sequential tasking and multi tasking?
7. Explain how stepper motor is interfaced to 8051?
8. How Real time interfacing is done in an 8051 based embedded system?
9. What are the different data types used for 8051 C? Explain them with examples?
10. Write an ALP find the number of zeros in register R2?

PART B

Module 1

11. a. Discuss the current trends and challenges in the field of Embedded Systems. Also discuss the design issues in an embedded system? **(10 marks)**

    b. Write notes on compilers, linkers, Loaders, Debuggers profilers & Test Coverage Tools
    (10 marks)

OR

12. a. Briefly explain the design of an embedded system with reference to a case study?
    (20 marks)

Module 2

13. a. Write an ALP to monitor the P2.0 bit when it is high, send 99H to P1. If it it low, send 66H to P1? **(10 marks)**

    b. Write an ALP (Assembly language program) for generating a square wave of 25% duty cycle on pin P1.3? **(10 marks)**

OR

14. a. With a neat diagram explain the architecture of 8051?　　　　　　**(10 marks)**

   b. Write an ALP(Assembly language program)to multiply two numbers which are stored in program RAM locations 35H and 36H and store the result in next two locations?

　　　　　　(10 marks)

Module 3

15. a. What are the components of an Embedded control? Write an 8051 C program to toggle all the bits of P0, P1, P2 continuously with a 250ms delay?

　　　　　　(10 marks)

   b. Write notes on structured programming, data structures and data types in embedded C programming?　　　　　　**(10 marks)**

16. a. Discuss how Real time interfacing can be done with 8051? Write an ALP or C program which deals with Real time interfacing of LCD, ADC and sensors. Discuss it with an example.

　　　　　　(20 marks)

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Model Question
B.Tech Degree Examination
Seventh Semester
Electrical & Electronics Engineering
08.705 ELECTRICAL DRAWING

Time: 3 hours   Max Marks: 100

Part:A

(Answer ANY TWO questions)

1. (a) Draw the layout of a 220 kV double circuit transmission tower.   (10)

    (b) Sketch neatly the half sectional view of a disc insulator and bushings.   (15)

2. (a) Draw a single line lay out of a Generating station switch yard and marking with all the equipments used in the generating station.   (15)

    (b) Draw the sectional end elevation of the pole for the given below dimensions:

Width of the pole	= 14cm
Pole arc	= 20cm
Of the pole with shoe	= 19cm
Radious of pole	= 28cm
Thickness of yoke	= 9.5cm

    Show clearly the method of fixing the pole core lamination and the pole core with the yoke.

    (10)

3. Draw the full sectional elevation , sectional plan , sectional side elevation of a 3-phase transformer core for the given below dimensions. Show clearly the method of fixing the core and yoke.

    Core, 3-step construction

Core dia.	= 22 cm
Height of core	= 48 cm
Height of yoke	= 25 cm

    Centre to centre distance between the cores = 35 cm   (25)

Part B

(Answer ANY One questions)

4. Draw a suitable scale a half sectional end view and a half sectional longitudinal view of 60 HP, 4 pole dc shunt motor for the dimensions given below:

    Armature   : Out side diameter = 18.5 cm, Length=13.5cm, No.of slots=24

                              Size of slot = 0.7cm x 2cm.

    Main Pole   : Total height = 11 cm, Width = 7 cm, Pole arc = 10 cm,

                              Length of pole = 14 cm, Air gap = 0.5 cm.

    Inter pole   : Size = 2 x 10.8 cm, Length = 11 cm.

Commutator   :   Diameter = 13 cm, Length = 10 cm.

Brush   :   Total no. Of spindles = 4

Winding   :   Main pole = 2 cm.. Thick, Inter pole winding = 1 cm.Thick.

The armature is directly mounted on the shaft and is held between two end plates.

The shaft is supported by means of end shield bearings in the end cover.

OR

5. Draw a suitable scale a half sectional end view and a half sectional longitudinal view of the squirrel cage induction motor with the following dimensions:

External diameter of stator stamping   = 69 cm

Inside diameter of stator stamping   = 45 cm

Stator core length   = 20 cm

The stator has 54 slots, each of 6 cm x 1.5 cm. Section, and the winding overhang 5 cm, on each side.

External diameter of rotor stamping   = 44.75 cm

Inside diameter of rotor stamping   = 25 cm

Rotor has 43 slots, each carrying a bar of 1.5 cm x 3.51.2 cm. Section.

The end rings have a section of 0.75 x 3.5 cm.

The rotor is mounted on a spider fixed to the shaft by akey.

Shaft diameter   = 5 cm.

Total height of the motor   = 81 cm.

The motor has ball-bearings carried by the end shield. Assume dimensions of the motor frame and missing data.

(50)

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COLLEGE OF ENGINEERING THIRUVANANTHAPURAM

Model question paper for Seventh semester Electronics&Communication Engg

Sub: Industrial Engg and Management

Max marks:100

Time: 3 hrs

Part A

Answer all the questions

1) Explain about productivity with a suitable example.

2) Explain about skills required for a successful manager

3) Explain about scientific management.

4) How the selling price of a product is fixed? Explain.

5) Explain about Breakeven chart with suitable examples

6) Derive an expression for EOQ model of inventory control

7) Distinguish between chance cause of variation and assignable cause of variation in Quality control

8) Distinguish between PERT and CPM in project management

(5x8=40 marks)

Part B

Answer any three questions

9) What is meant by fatigue? What are different methods available for eliminating fatigue?

OR

Explain about control charts for variables and attributes with suitable examples.

10) Breakeven production of a firm is 5000 units. Its fixed cost is Rs 50,000/-. The variable cost per unit is Rs 25/- Find out the price of the product. How much the firm should produce to earn profit of Rs 25,000/-?

OR

Sales of XYZ company were Rs 30,000 producing a profit of Rs 800 in a week. In the next week sales amounted to Rs 38000 producing profit of Rs 2400. Find the Breakeven point.

11) Explain about different factors influencing plant location and layout

OR

Explain about different job evaluation techniques. What is meant by merit rating?

(3x20=60 marks)

7ᵗʰ Semester B.Tech Degree Examination (2008 scheme)
Model Question Paper
Branch ECE
08-702.Optical Communication(T)
Answer all Questions Each question Carries 4 marks

1. Explain Refractive index, Reflection & refraction?

2. What is parallel polarization and perpendicular Polarization of light wave?

3. Explain different types of fibers?

    What is meant by single mode and multimode fibers?

4. Compare the relative advantages and disadvantages of LEDs and Laser Diodes?

5. A semiconductor optical amplifier is used to amplify two channels separated by 1 GHz. Each Channel can be amplified by 30 dB in isolation. What are the channel gains When both channels are amplified simultaneously Assume Pin/Ps =10⁻³, τc = 0.5ns & βc = 5

6. Explain modulation formats used in Coherent detection system?

7. What are the desired features of photo diode?

8. What are the basic performance criteria of WDM technique?

9. What is Soliton?

10. What is OTDR?

Part-B

Answer any two question from each modules Each question carries 10 marks

Module I

11. Discuss type of losses that an optical signal suffer while Propagating through fiber Which is the most important one? What is the effect of these losses on light power& Pulse shape?

12. Discuss about modulation of the Laser diodes. With neat diagram explain the construction of high radiance surface emitting diode?

13. Astep index multimode fiber with a numerical aperture of 0.20 supports approximately 1000 mode at an 850 nm wave length
    a) What is the diameter of its core
    b) How many modes does fiber support at 1550 nm and at 1320 nm

Module 2

14. Explain the fundamental Receiver operation in optical Communication?

15. What is meant by Receiver sensitivity? What are the system considerations in coherent system?

16. Explain the Principle of operating EDFA and noise in EPFA?

Module 3

17. Explain operational principles of WDM?

18. Write short note on optical couplers?

19. Discuss in details about soliton based Communication system

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MODEL QUESTION PAPER

Seventh Semester B.Tech Degree Examination

(2008 scheme)

08-703: MICROWAVE ENGINEERING (T)

Time:3 Hours   Max.Marks:100

PART A

(Answer all questions. Each question carries 4 marks)

1. What do you mean by a Cavity Resonator?

2. Explain the difference between velocity modulation and current modulation.

3. Explain the importance of using slow wave structures in TWT.

4. What is π mode of oscillation in magnetron.

5. Explain the physical structure of heterojunction bipolar transistor.

6. Explain the importance of rising sun structure in magnetron

7. Write brief notes on Gunn Oscillation modes.

8. What do mean scattering parameters? List the important properties of scattering matrix.

9. Explain the working of a four port circulator.

10. Explain how impedance measurement is done at microwave frequencies.

(4 x 10 = 40)

PART-B

Answer any two question from each module Each question carries 10 marks

MODULE - I

11. With the help of neat diagrams explain the principle of operation of a 2 cavity klystron. Derive expressions for its bunching parameter.

12. Explain the principle of operation of a Reflex Klystron. Derive expressions for its power output and efficiency.

13. With the help of neat diagrams explain the working of TWT. What are its advantageous features?

MODULE – II

14. Explain the construction of a cavity magnetron. Derive expression for Hull cutoff voltage.

15. Explain the voltage- frequenc, current-frequency and power frequency limitations of microwave transistors.

16. With the help of neat diagrams explain the principle of operation of tunnel diode.

MODULE –III

17. What do you mean by a directional coupler? Explain the operation of a two hole directional coupler and derive its Scattering Matrix.

18. Explain how power and frequency measurement is done at microwave frequencies.

19. With the help of neat diagram explain about FM microwave radio system.

(6 x 10 = 60)

****

SEVENTH SEMESTER B.TECH - MODEL QUESTION PAPER
08-704: INFORMATION THEORY AND CODING(T)
(2008 scheme)

Time:3 Hours   Max.Marks:100

PART A

(Answer **All** questions)

1. Consider a discrete random variable X having L possible outcomes and let H (X) represents its entropy. Prove that $0 \leq H(X) \leq \log L$.

2. For random variables X and Y, define mutual information. Show that mutual information is symmetric.

3. Prove that, for a binary prefix-free code having code-word lengths {w1, w2, . . . wn}, $\sum_{i=1}^{N} 2^{-wi} \leq 1$.

4. Derive the channel capacity of Binary Symmetric Channel (BSC).

5. State and explain channel coding theorem.

6. Define Hamming distance and show that minimum Hamming distance of a linear block code is equal to the minimum weight of the code words.

7. Show that ,in a standard array of a linear block code, no two n-tuples in the same row can be identical and every n-tuples appears in one and only one row.

8. Show that if g(X) is a polynomial of degree n - k and is a factor of $X^n + 1$, then g(X) generates (n, k) cyclic code.

9. Define free distance and free length of convolutional codes.

10. Differentiate public key cryptography and secret key cryptography   .**(10 x 4 = 40)**

PART B

(Answer **any 2** questions from each module)

Module I

11. (a) A source , X, has infinitely large set of outputs with probability of Occurance given by $P(x_i) = 2^{-i}$,
    $i = 1, 2, 3, ...$ What is the entropy H(X) of this source?   **5**

    (b) Show that I (X; Y) $\leq$ 0. Under what condition does the equality holds?   **5**

12. Consrtuct a Huffman code to encode the discrete random variable X having possible outcomes $m_1, m_2, m_3, m_4, m_5,$ and m_6 with probabilities $p_1 = 0.30, p_2 = 0.20, p_3 = 0.20, p_4 = 0.15, p_5 = 0.10, p_6 = 0.05$. Determine the efficiency and redundancy of the constructed code.

                                                                                            10

13. Estimate the channel capacity of a AWGN channel. Show that the channel capacity saturates to a finite limit even though the band-width is increased to infinity.

                                                                                            10

Module II

14. (a) Show that C = {0000, 1100, 0011, 1111} is a linear code.
    What is its minimum distance? **5**

    (b) Show that , the columns of parity check matrix of a Hamming code is pairwise linearly independent. Also show that sum of three columns of this matrix can be equal to zero.

    5

15. Consider the following generator matrix over GF(2)

$$\mathbf{G} = \begin{bmatrix} 1 & 0 & 1 & 0 & 0 \\ 1 & 0 & 0 & 1 & 1 \\ 0 & 1 & 0 & 1 & 0 \end{bmatrix}$$

    (a) Generate all possible code words using this matrix.

    (b) Find parity check matrix, **H**.

    (c) Construct standard array for this code. **10**

16. Let the polynomial $g(x) + x^{10} + x^8 + x^5 + x^4 + x^2 + x + 1$ be the generator polynomial of a cyclic code over **GF(2)** with block length 15. Find the generator matrix G and the parity check matrix H for this code. How many errors can this code detect and how many errors can this code correct?

    10

Module III

17. Design a rate ½ Convolutional encoder with a constraint length $\nu = 4$ and $d^* = 6$. Construct State Diagram and Trrellis Diagram for this encoder. What is d_{free} for this code? **10**

18. Generaror polynomial of an (3,2,3) convolutional code is given by

$$\mathbf{G} = \begin{bmatrix} 1 + D & 1 + D + D^3 & 1 + D^2 \\ 1 + D + D^2 & 1 + D^3 & 1 + D^2 + D^3 \end{bmatrix}$$

    Construct the state diagram of the encoder. Also, obtain the encoder output corresponding to the input data stream{1 1 0 0 1 1 0 0 1} **10**

19. (a) Define free distance and free length of convolutional codes. **5**
    (b) Write RSAencryption algorithm. **5**

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MODEL QUESTION PAPER

Seventh Semester B.Tech Degree Examination
(2008 scheme)
Branch:ELECTRONICS AND COMMUNICATION
08-715: (Elective III) Cryptography (TA)

Time:3 Hours   **Max.Marks:100**

PART- A
Answer all questions. Each question carries 4 marks

1.   Write short notes on hash functions.

2.   Prove the formula for all $n \geq 1$ by mathematical induction.

$$\sum_{i=1}^{n} (2i-1) = n^2$$

3.   Prove that if p is prime, then $p^p - 1$ has a prime factor that is congruent to 1 modulo p.

4.   Find the values of the following Legendre Symbols

       (a) (19/23)   (b) (-23/59)

5.   Cryptanalyse the ciphertext

       IRCCH EKKEV CLLFK EIOKL XKKLF ILIGM EKOIV EKKE

       Generated by an affine cipher $C = aP+k \pmod{26}$

6.   Using the enciphering key $\begin{bmatrix} 1 & 25 & 25 \\ 25 & 1 & 24 \\ 2 & 9 & 5 \end{bmatrix}$ encipher each plaintext.

7.   Solve the knapsack problem $3x_1 + 5x_2 + 9x_3 + 19x_4 + 37x_5 = 45$

8.   State and explain Wilson's theorem.

9.   List out different methods for cryptanalysis

10.   Write the steps to find out the keys using DES algorithm.

PART-B

Answer two questions from each module. Each question carries 10 marks.

Module-1

11.   (a) Show that $7/2222^{5555} + 5555^{2222}$

       (b) If p and $p^2 + 2$ are primes, then $p^3 + 2$ is also a prime.

12.   (a) Show that if $a^k + 1$ is prime, k>0, and a >1 then k is a power of 2. Show that if $p | (a^{2n}+1)$ then p = 2 or p = 1 $\pmod{2^{n+1}}$

       (b) Sole the linear diaphantine equation $12x + 30y - 42z = 66$.

13.   Explain different types of ciphers used in symmetric key encryption.

Module-II

14.   (a). Using the RSA enciphering key(e, n)=(11,2867)encrypt the message SEA FOOD.

(b). Decrypt the ciphertext 0010 0325 2015 2693 2113 2398 2031 1857 created using the RSA enciphering key (e, n) = (21, 2773).

15. (a) Write down the knapsack deciphering algorithm

(b) Explain how digital signatures ensure authentication and protection against Forgeries.

16. (a) Bring out the various steps involved in Diffie-Hellman key exchange

(b) Write short notes on zero knowledge protocol.

Module-III

17. (a) Find all the factors for which 21 is a pseudoprime.

(b) If n is an odd pseudoprime, then show that $N=2^n-1$ is also an odd pseudoprime.

18. (a) Using the rho method factor 4087, $f(x) = x^2+x+1$ & $x_0 = 2$.

(b Find the order of P where P = (0, 16) has finite order on the elliptic curve over $y^2 = x^3+256$

19. (a) Write down the DES algorithm for encryption.
(b) Write the steps involved in Dixon's algorithm and explain how it can be used for cryptanalysis.

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MODEL QUESTION PAPER
Seventh Semester B. Tech Degree Examination
(2008 scheme)
Branch: Electronics and Communication
08-725: Elective III :PATTERN RECOGNITION(TA)

Time:3 Hours   **Max.Marks:100**

PART- A

Answer **all** questions. **Each** question carries **4** marks

1. Explain the role of decision functions in pattern classification.
2. What do you mean by statistical decision making.
3. Define unsupervised learning.
4. State Baye's theorem.
5. What are the differences between parametric and nonparametric decision making.
6. Write the perceptron training algorithm.
7. What do you mean by a decision tree. Explain its importance in pattern classification.
8. Define linear separability.
9. How can you measure the information gain from a decision tree.
10. Explain eigen vectors and eigen values.

PART-B

Answer **any two** questions from each module. **Each** question carries **10** Marks.

Module-I

11. Explain the application of Baye's theorem to syntactic pattern.
12. Describe the different types and implementations of decision functions.
13. Consider a set of the following 2- dimentional patterns $(20\ 20)^T$, $(20\ 100)^T$ and $(100\ 20)^T$. Using Euclidean distance norm find out a discriminating function for classifying the pattern into two classes.

Module-II

14. Explain Fisher discriminant analysis.
15. Explain Hidden Markov models with example.
16. Explain Principal component analysis

Module-III

17. Explain Hierarchical clustering procedure.
18. Describe Support vector machines and its applications.
19. Write the Decision tree building algorithm.

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Elective-III
08.735 OPTOELECTRONIC DEVICES(TA)
Model Question paper
Part I
(Answer all questions)

1. Briefly explain radiative and non radiative recombination in semiconductors.

2. Discuss briefly quasi Fermi-level and Debye tailing in a PIN junction.

3. Briefly discuss the operation of an APD.

4. Differentiate electrical bandwidth, optical bandwidth and modulation bandwidth of an LED.

5. A 5cm 2 Ge solar cell with a dark reverse saturation current of 2nA has AMI radiation incident up on it producing 4×10^{17} electron-hole pairs per second. The electron and hole diffusion lenghs may be assumed to be 5 micro m. Calculate the short circuit current and open circuit voltage of the cell.

6. Compare the performance characteristics of a p-i-n photodiode and a p-n photo diode.

7. Briefly explain the Electro-optic measurement technique.

8. A gallium Arsenide injection laser with a cavity of length 500micro meters has a loss coefficient of 20cm^{-1}. The measured differential external quantum efficiency of the device is 45% .Calculate the internal quantum efficiency of the laser. The refractive index of GaAs is 3.6.

9. Briefly discuss the line broadening mechanism in Lasers.

10. The differential quantum efficiency of an InP laser with negligible cavity losses is 30%. The voltage applied to the device is 2.5V. Calculate the external power efficiency of the device.

(10x4=40)

Part II
(Answer any 2 from each module)
Module I

11. Describe the Absorption in Quantum wells and the Quantum wells and the Quantum Confined Stark effect.

12. What is Auger Recombination? Derive the equation for absorption coefficient of a semiconductor.

13. Consider a PN junction Semiconductor sample. At equilibrium the acceptor concentration at P type region is $N_A=10^{16}$ cm^{-3} and that of in N region the donor concentration $N_D=5 \times 10^{15}$ cm^{-3}. At a particular temperature the hole concentration in P region is determined to be 1.1×10^{16} cm^{-3}. Find the intrinsic concentration *ni* for the semiconductor at this temperature. Find the equilibrium electron concentration n in the N region at this temperature.

(2x10=20)

Module II

14. What is quantum efficiency? Discuss the techniques and parameters need to be optimized to maximize quantum efficiency of an LED.

15. Derive the relation to find the numerical aperture of a step index fiber. A GaAs LED is coupled through air ($n_r=1$) to a step index glass fiber ($n_{r1}=1.5$). Find the acceptance angle.

16. Discuss the principle of operation of different electro-optic modulators.

(2x10=20)

Module III

17. With the aid of suitable diagrams, discuss the principles of operation of the injection laser. Compare its ideal light output against current characteristics.

18. Explain FP laser. Calculate the mirror reflectiveness needed in GaAs-AlGaAs double hetro structure laser in which the FP cavity length is 20mico meter and the cavity loss is 10 cm^{-1}. The optical confinement factor is unity and the threshold gain in the medium is 10^3 cm^{-1}.

19. Write short notes
    a. Relaxation oscillations
    b. Frequency chip
    c. Partition noise.
    d. Mode hopping.

(2x10=20)

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Model Question paper

Seventh Semester B. Tech Degree Examination

08.716   **Embedded Systems (TA)**   **Elective - IV**

Time 3 hours   **Max. Marks 100**

Part A

(Answer all questions)

1. List the three main components of an embedded system and their features

2. Write short notes on ISA bus

3. Write   short notes on Cross compiler, Macros

4. Describe the important functions of real time operating systems

5. Discuss about code optimization by compilers

6. Discuss the distinction between tasks and interrupt service subroutines with respect to

    a) context saving

    b) posting and sending parameters

7. Distinguish between a preemptive kernel and a non-preemptive kernel ?

8. Illustrate the use of semaphore

9. Discuss about priority inversion problem

10. List the time delay function prototypes used by uC/OS II   **(4 x 10=40marks)**

Part B

(Answer two questions from each module)

Module I

11. Describe the device I/O types with examples

12. Discuss 12C protocol

13. Describe about HDLC protocol

Module II

14. Write short notes on a) Null pointers b) Function queues

15. Describe the various operating system services

16. Briefly outline the concepts of object oriented embedded programming

Module III

17. Describe the cooperative round robin scheduling

18. Describe the preemptive scheduling model

19. Describe the use of mailboxes and remote procedure calls

                                              (6x10=60 marks)

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MODEL QUESTION PAPER
SEVENTH SEMESTER B.TECH DEGREE EXAMINATION
Elective IV

08.736   MEMS (TA)

Time 3 hours   **Max. Marks 100**

PART A

(Answer *All* questions)

(10 x 4 = 40marks)

1.   List a few applications of Microsystems in the automotive industry.
2.   Explain the working principle of chemical microsensors.
3.   With neat sketches, explain micro grippers.
4.   Explain Trimmer Force Scaling Vector.
5.   What is ion implantation?
6.   What is the working principle of the chemical vapour deposition?
7.   What are the major advantages of surface micro matching?
8.   Why silicon is widely used as the substrate material for MEMS and Microsystems?
9.   What are the principle requirements that should be considered on the detailed design analysis?
10. Mention a few optical MEMS components.

PART B

(Answer **any two questions** from each module)

MODULE I

(10x3=30 marks)

11. Explain micro pressure sensors.
12. Brifly explain micro accelerometers.
13. Write notes on scaling in heart transfer.

MODULE II

(10x3=30marks)

14. With neat sketches explain the steps involved in photolithography
15. Explain the fabrication steps in the LIGA process.
16. Explain bulk micro manufacturing.

MODULE III

(10x3=30 marks)

17. Explain the three levels of micro system packaging.
18. Explain the various interfaces in micro system packaging.
19. Explain the selection of signal transduction in micro system.

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MODEL QUESTION PAPER

Seventh Semester B.Tech Degree Examination (2008 Scheme)

08.706: Elective IV: Mixed Signal Circuit Design (TA)

Time:3 Hours   **Max.Marks:100**

PART A

(Answer all questions. Each question carries 4 marks)

1. Explain the CMOS inverter switching characteristics using digital model.

2. Compare the effective transconductance of two MOSFETs when connected in series and in parallel.

3. Explain pass transistor logic.

4. Drwa the transmission gate implementation of XNOR logic.

5. What is meant by ICMR of a CMOS differential amplifier?

6. Draw the circuit diagram of two stage OP_AMP and explain.

7. Explain resistor emulation using switched capacitor filter.

8. Explain capacitive feed through in MOS switches.

9. Explain the following terms with respect to DACs

    a. Integral non linearity error

    b. Differential non linearity error

10. Explain any one type of high speed ADC.

Part B

(Answer any two questions from each module. Each question carries 10 marks)

Module I

11. Derive the expression for minimum delay of serially connected inverters while driving large capacitive loads.

12. Derive the expression for the switching threshold of N-input NOR gate.

13. Derive the expression for the propagation delay of N-input NAND gate .

Module 2

14. Draw the cascade differential amplifier circuit and explain.

15. Explain Miller compensation technique in OP_ AMPS.

16. Explain two stage open loop CMOS comparator circuit.

Module 3

17. Explain charge scaling DACs.

18. Explain the working of sense amplifier.

19. With the help a block diagram explain the working of successive approximation ADC

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MODEL QUESTION PAPER
Seventh Semester B.Tech Degree Examination
(2008 Scheme)
08.702: ROBOTICS AND INDUSTRIAL AUTOMATION (A)

Time:3 Hours   Max.Marks:100

PART A

(Answer all questions. Each question carries 4 marks)

1.   What do you mean by degrees of freedom of a manipulator?

2.   What is an end effecter in a robotic manipulator arm?

3.   Describe the general categories of sensors used in robotic systems.

4.   What is a Jacobian matrix and what is its significance in the analysis of robotic motion?

5.   Explain how dynamic stabilization is achieved in robotic control?

6.   Brief the different problems peculiar to robot programming?

7.   What are the technical features required for a robotic manipulator in machine loading application?

8.   What do you mean by a robotic work cell? What are the different lay outs of a work cell?

9.   What is a multiple robot? What interference issues are there in connection with this?

10. Narrate the basic approaches in recognition of two dimensional images.

(4x10=40)

PART B

(Answer any two questions from each module. Each question carries 10 marks)

Module I

11. Explain the elements of a robotic vision system

12. What are the common kinematic arrangements in a robotic manipulator.

13. Describe about the different mechanical drives used in robotic manipulator.

MODULE-II

14. Explain the translational and rotational matrix transformation with examples.

15. Discuss the fundamental problems in robotic control.

16. Explain the different robot programming languages.

Module-III

17. Discuss the applications of robots in processing operations.

18. Explain about the automatic feeding lines, ASRS and transfer lines.

19. Briefly discuss the computer integrated manufacturing.

(6x10=60 marks)

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Seventh Semester B.Tech Degree Examination
Branch : Applied Electronics and Instrumentation
08.703 DISCRETE TIME CONTROL SYSTEMS
(Model Questions)

Time:3 Hours   Max.Marks:100

Part A

(Answer all questions)

(10x4=40 marks)

1. Obtain the transfer function of a Zero Order Hold circuit.

2. Find x(k) when $X(z) = 1/z+1$

3. Obtain an expression for steady state error due to Unit step input in a discrete time control system.

4. What are different types of State space representation of discrete time systems?

5. How Pulse transfer function of a system is obtain from its State model.

6. Explain the need for observability test and controllability test

7. Explain the following terms

    i). Locally Stable   ii)   Asymptotically stable.

8. Briefly explain state Observer used in discrete control systems

9. Define Optimal control problems. How do you formulate an optimal control problem?

10. Write short notes on "Diophantine equation".

Part-B

(Answer any *Two* questions from each module)

Module I

11. Draw and explain the block diagram of a Discrete time control system.

12. Solve the difference equation $c(k+2) + 3 c(k+1) + 2 c(k) = u(k)$, given c(0)=1, c(1)= -3; c(k)=0, for k<0

13. Determine the stability of sampled data control systems described by the following characteristic equation.

    i. $Z^3 + 3Z^2 - 2.75Z + 0.75 = 0$

    ii $Z^3 + 4Z^2 + 4Z + 1 = 0$

    iii $Z^4 - 1.4Z^3 + 0.4Z^2 + 0.08Z + 0.002 = 0$

Module II

14. Obtain the state model of the following system, whose transfer function is given by
    $T(s) = 2(s+5) / [(s+2) (s+3) (s+4)]$

15. Consider a system described bythe transfer function

    $Y(s)/ U(s) = 10 / [s(s+1) (s+2)]$, determine whether the system is completely controllable and observable.

16. Explain Liapunov stability analysis in detail with suitable examples.

Module II

17. Derive Matrix - Riccati equation in detail.

18. Consider the discrete time control system defined by

$$X(k+1) = 0.3679 \ x(k) + 0.6321 \ u(k), \ x(0)=1$$

Determine the optimal control law to minimize the following performance index:

$$J = \tfrac{1}{2} [x(10)]^2 + \tfrac{1}{2} \Sigma^9_{k=0} [x^2(k) + u^2(k)].$$

19. Write short notes on

i   Quadratic optimal control

ii Time optimal trajectories.

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Model Question Paper
2008 Scheme
B.Tech Degree Examination
S7 Applied Electronics & Instrumentation Engg.

08.704   **Process Dynamics & Control**

Timm:3 Hrs.   **Marks:100**

Part A (10*4 = 40 MARKS)

(Answer all questions)

1.   Distinguish between servo and regulator operations

2.   What is meant by degree of freedom? Illustrate with example

3.   Give an example for a self regulating system. Derive its transfer function

4.   What is the difference between flow sheet and P& ID? Illustrate with example.

5.   What is meant by bumples transfer? Which is the PID algorithm suitable for bumples transfer? Justify your answer.

6.   Which are the error criteria for comparing responses? Explain the significance of each.

7.   What is split rage control? Where is it used?

8.   What is flow coefficient? How is it related with sizing of the control valve?

9.   What is meant by installed characteristics? Why is it different from inherent characteristics?

10.   Which are the challenges in distillation column control? Explain briefly?

Part B

(Answer any two questions from each module.6*10=60marks)

Module I

11.   Derive the mathematical model of interacting system and prove that it is sluggish than non interacting systems.

12.   Explain piping and instrumentation diagram with neat sketches of symbols used. Take the example of a distributed control loop and draw its P& ID.

13.   Explain P, PI and PID controllers with the help of equations and transfer functions.

Compare there behavior in terms of stability, time response and frequency response.

Module 2

14.   Explain various controller tuning techniques . Which is the preferred technique?Justify.

15.   Explain the response of PID controller for any three step inputs.

16.   Briefly explain the following   i) Cascade control

ii) Over ride control

iii) Multivariable process control

iv) Feed forward control

Module 3

17. With necessary diagrams explain different types of control valves and their characteristics.

18. Derive the mathematical model of a distillation column.

19. Explain the control of   a) Chemical reactor

b) Heat exchanger.

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Model Question Paper June 2011
Seventh Semester B.Tech Mechanical Engineering
08.701 Principles of Management and Decision Making

Time: Three hours   Maximum: 100 marks

PART A - (4x10 = 40 marks)

Answer any FIVE questions.

1. Differentiate between line and staff functions.

2. Explain the Hawthorne experiment and its outcome.

3. Illustrate the usefulness of U shaped layout using a diagram and description.

4. How is selection different from recruitment?

5. Explain the components of marketing mix.

6. Explain the major classification of forecasting techniques.

7. What is PLC? Describe the same in words using a suitable diagram.

8. Differentiate between PERT and CPM.

9. How is crashing practically carried out projects?

10. How is risk different from uncertainty in decision making?

PART B - (3x20 = 60 marks)

Answer one from each module.

MODULE I

11. Explain the various functions of management.

Or

12. Describe matrix organization using a suitable diagram and explain its usefulness.

MODULE II

13. Differentiate between lean, mass and craft production.

Or

14. Which factors will you consider for deciding the location of site for a facility? Elaborate.

MODULE III

15. Sole the following using Simplex method.

Maximize z = 10x + 12y

Subject to $2x + y \leq 60$

                $3x + 4y \leq 120$

                $x, y \geq 0$

Or

16. Find the initial basic feasible solution for the following transportation problems by
    (a) North-west corner method
    (b) Least-cost method

		Warehouse				
		W1	W2	W3	W4	Capacity
	F1	21	16	25	13	11
Factory	F2	17	18	14	23	13
	F3	32	27	18	41	19
Requirement		6	10	12	15	43

(3x20=60 marks)

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Model Question Paper
Seventh Semester B.Tech Degree Exam
08.702 MECHATRONICS(MPU)

Time:3 Hours   Max.Marks:100

(Answer All questions)

PART A

(10x4=40 marks)

1. Distinguish between measurement system and control system.
2. List five mechatronics systems that you see every day, what are the various sensing and controlling elements in those systems?
3. A system has a transfer function, $G(s)=20/(s + 20)$. Determine : (a)the time constant, Tc; (b) the rise time, Tr; and (c) the settling time, Ts?
4. Differentiate zero order, first order and second order system
5. Explain the working of Capacitive proximity sensors
6. Explain the working of thermo mechanical MEMS.
7. Explain the working of ultrasonic range finder.
8. State the application of servomotor in mechatronics system.
9. How does PLC differ from relay logic.
10. Automatic camera is a mechatronic system justify.

(10x4=40 marks)

PART B

11. (i) Explain hall effect sensors and its types

    (ii) Discuss the static and dynamic characteristics of a sensor.

OR

12. (i) Compare memory mapped I/O technique with peripheral I/O technique.

    (ii) Discuss why an interrupt controller is required. Describe the interrupt controller 8259.

13. (i) Discuss the close loop control system suitable for shaft speed control with a neat block diagram

    (ii) Explain various mechatronics elements in a CNC machine.

OR

14. (i) How will you select a PLC for a specific application

    (ii) Explain the direct and indirect measuring system using in CNC machine.

15. (i) Explain various types of stepper motors

    (ii) Discuss various steps in image based motion tracking.

OR

16. (i) With the help of an example explain any one edge detection algorithm

    (ii) Design an mechatronics system for automatic car parking.

(20x3=60marks)

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Model Question Paper
B.Tech DEGREE EXAMINATION
Seventh Semester B.Tech MECHANICAL ENGINEERING(M)
08.703-GAS DYNAMICS (2008 scheme)

Time:3 Hours   Max.Marks:100

PART A (10X4=40 marks)
(Answer All Questions)

1. Derive the relationship between static temperature and stagnation temperature.
2. Define Zone of action and Zone of silence.
3. What is choked flow?
4. Heat addition to a gas may cool the gas. Explain with proper h-s diagram.
5. Explain the difference between normal and oblique shocks.
6. Define strength of shock wave?
7. Give four practical examples of Rayleigh flow?
8. Discuss supersonic flow over a compression and expansion corner?
9. What are the requirements of a good hotwire anemometry system?
10. What is temperature recovery factor?

PART - B (3x20 = 60 Marks)
Answer Any three Full Questions. All Questions carry equal marks

Module I

1. a) Sketch the variation of area, velocity and pressure for isentropic flow through subsonic and supersonic nozzle.

   b) Air enters an isentropic diffuser with a Mach number of 3.6 and is decelerated to a Mach number of 2. The diffuser passes a flow of 15 kg/s.The initial static pressure and temperature of the air are 1.05 bar and 40^0C. Assuming $\gamma = 1.4$, calculate area, total pressure and total temperature at inlet and exit and static temperature and pressure at exit.

OR

2 a) Derive velocity of sound in fluid from first principles?

   b) An aircraft flying at an altitude of 8 km where the ambient temperature is 250K. Find the Mach number and classify as subsonic or supersonic when the speed of the aircraft is (i) 30m/s and (ii) 1000 m/s.?

Module II

3. a) Compare the flows through a constant area duct for isentropic and adiabatic conditions.

   b) A constant area combustion chamber receives air at 77^0C, 0.55 bar and 75 m/s, If the air leaves the combustion chamber at a Mach number of 0.85, determine conditions of air and the amount of heat transferred. Also find the change in entropy.

OR

4   a) Explain choking due to friction in Fanno flow?

   b) A supersonic nozzle is provided with a constant diameter circular duct at its exit.

   The diameter of the dust is same as the nozzle exit diameter. Nozzle exit cross section is three times that of its throat. The entry conditions of the gas are $P_0 = 10$ bar, $T_0 = 600$ K. Calculate the static pressure, Mach number and velocity of the gas in the duct,

      i)   When the nozzle operates at its design conditions.

      ii) When a normal shock occurs at its exit and

      iii) When a normal shock occurs at a section in a diverging part where the area ratio $A/A^* = 2$.

   Assume $\gamma = 1.4$, R = 0.287 kJ/kgk.

Module III

5   a) Explain shock strength? Derive Rankine-Hugoniot Relation?

   b) A gas stream ahead of a normal shock has pressure, tempetature and velocity of 0.2 bar, 20^0C and 1000 m/s respectively. Determine the Mach number, pressure , tepetature down stream of the shock and the entropy changes across the shock wave. Take $\gamma = 1.3$ and Cp=0.95 kJ/kgk.

OR

6.   a) Explain Pressure measurement techniques for subsonic and supersonic flow fields?

   b) Write short notes on

      (i)   shadowgraph

      (ii) Schlieren technique

      (iii) interferometer

      (iv) temperature recovery factor.

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Model Question Paper
08.704- Refrigeration and Air conditioning
Seventh Semester B.Tech Degree Examination(Mechanical)
Answer all questions from Part A and any one question from each module of part B
Use of Refrigeration properties table allowed.

Time:3 Hours   Max.Marks:100

Part A

1. Differentiate between a heat pump and a refrigerator

2. Define i) COP and ii) Unit of refrigeration

3. Explain the terms i) Subcooling ii) Superheating iii) Discharge temperature

4. What is the use of flash chamber?

5. What is the advantage of using Liquid Suction Heat Exchanger?

6. Define i) ODP and ii) GWP

7. What are the advantages of VCR systems over VARS systems?

8. Define i) Relative humidity ii) Wet bulb temperature iii)Sensible heat factor scale

9. Write a note on comfort conditions

10. Explain the processes i) Sensible heating ii) Dehumidification

(4x10=40marks)

Part B

11. a) Differentiate between isentropic expansion process and isenthalpic expansion process with regard to production of low temperature.

    b) A Carnot refrigerator works between the temperature limits -20 oC and 30 oC has a capacity of 5TR. Calculate its i) COP, ii) Power consumption and iii) COP when it acts as a heat pump.

OR

12. A refrigerator uses R 134a as the refrigerant maintains the evaporator at -25 oC and condenser at 30 oC . The refrigerant coming out of the evaporator is superheated by 10oC by using a LSHE. Calculate i) COP, ii) The Power requirement, if the capacity is 10TR.

13. a) Explain the working of an refrigeration system with two compressors and a flash chamber. Show the process in a p-h diagram.

    b) With the help of a neat sketch, explain the working of a LiBr-H2O vapour absorption system.

OR

14. a) Explain the working of an Electrolux refrigeration system

    b) With the help of a neat sketch, explain the working of a thermostatic expansion valve.

15. (a) What are the steps involved in the load estimation of a hall to be air conditioned?

    (b) Explain the working of a winter air conditioning system.

OR

16. A hall to be air conditioned is having a sensible heat load of 1000 kW and a latent heat load of 150 kW. The atmospheric condition is 70% RH and 35 ^{0}C db. The room design condition is 22 ^{0}C db and 45% RH. If t_{ADP} is 10 ^{0}C, find i) the bypass factor of cooling coil, ii) supply air condition and iii) amount of fresh air to be supplied to the room.

(3x20=60 marks)

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Model question
SEVENTH SEMESTER B.TECH DEGREE EXAMINATION
Mechanical Engineering
08.705- DESIGN OF MACHINE ELEMENT II

Time:3 Hours   Max.Marks:100

Use of design data book allowed

Answer *all* questions in **Part A** and answer any *one full* question from each module of **part B**.

PART A

1. With a neat sketch explain the interference in gear.

2. Explain Law of gearing

3. Explain the common type of gear tooth failures.

4. Explain hydrodynamic action in bearing

5. Explain the significance of bearing characteristic number

6. Derive stribeck's equation

7. Derive an equation for the single plate clutch transmitting torque under uniform pressure theory

8. With a sketch explain working of a centrifugal clutch

9. With the help of a sketch explain the force analysis of bevel gear

10. Which are the common type of material used for journal bearing material. State its merits and demerits.

(10x4=40 marks)

PART - B

Module I

Answer one questions each from each module

11. A Compressor running at 300 rev/min. is driven by a 15 kw, 1200 rev/min. motor through $14\frac{1}{2}^0$ full depth gears. Centre distance is 0.375m. Assuming suitable steel material design gears fully for medium shock condition.

Or

12. Design the teeth of a pair of bevel gears to transmit 20 kw and 600 rev/min. of the pinion.The velocity ratio is 3 and the pinion has 20 teeth which are full depth 20^0 involute Specify material selected and do the full design of gars.

Module 2

13. A rolling element bearing undergoes the following work cycle

   a. Radial load of 6000N at 600 rpm for 25% of time

   b. Radial load of 7000N at 500 rpm for 20% of time

   c. Radial load of 2000N at 500 rpm for 55% of time

   Inner ring rotates and loads are steady. Select a suitable bearing for on expected life of 3000hrs

Or

14. A Journal bearing is to be designed for the following data

Load on journal =15 kN , Diameter of journal = 80mm. Speed = 1440rpm.

Atmospheric temperature of oil = 22^0C

Operating temperature of oil = 80^0C

Systematically design the bearing

Module 3

15. Design a connecting rod for petrol engine from following data

Diameter of piston = 120mm

Mass of reciprocating pants = 3kg

Length of contently rod = 325mm

Stroke = 150mm

Speed 1500 rpm in the possible over speed up to 2500 rpm. Compression ratio 4:1 Maximum explosion pressure = 2.5 MPa.

Or

16. Design a flywheel for a single cylinder, four stroke vertical diesel engine developing 4kw at 1500 rpm. Assume coefficient of fluctuation speed of Cs = 0.01

(10x4=40 marks)

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Model question
SEVENTH SEMESTER B.TECH DEGREE EXAMINATION
(2008 SCHEME)

Time:3 Hours   Max.Marks:100

PART A

**(Answer all questions .Each question carries 4 marks)**

1. Write down the stress strain relationship for 3D elasticity problem in matrix form.
2. Define and briefly explain the principle of minimum potential energy
3. Differentiate between Lagrangian and Serendipity elements.
4. Explain the method of assembly of element equations for a sky line solutions
5. Discretize a square region using four noded quadrilateral elements. Also wire down the finite element data for the discretization.
6. Write down the transformation matrix for the analysis of a plain truss element having arbitary orientation. Also write down the stiffness matrix.
7. Write down the shape functions of C_1 continuous beam element.
8. What is a multi point constraints. How can it be modeled in FEM
9. Write down the shape function of a constant strain triangle.
10. Define mass matrix and write the general expression for it.

PART - B

Answer one question from each module.

Module I

11. a. Explain general steps in FEM and discuss the merits and demerits of FEM

                                                                          (10 mark)

    b. Derive the equation $K = \int B^TDBdV$

                                                                          (10 mark)

12. a. Describe how the thermal stress in modeled in FEM. Derive the necessary equation for modeling thermal stresses.

                                                                          (10 mark)

12. b. Evaluate $\int_0^1 \int_0^2 xydxdy$ using 2 Gauss Points

                                                                          (10 mark)

Module II

13. Determine the nodal displacement, element strain, element stress and support reactions of the following axial has (Given that $E = 200 \times 10^9$ N/m^2)
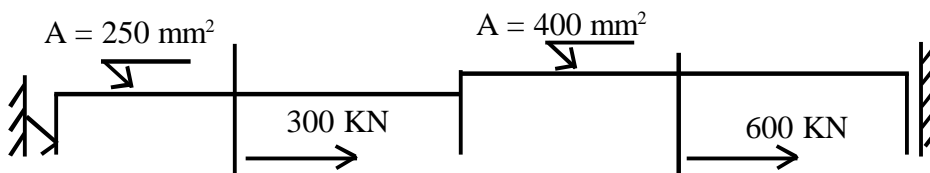
14. Consider the four bar truss shown in figure. Given that E = 203.39 GPa and A_e = 6.45 cm² for all elements. Consider following.

    (a) Determine the element stiffness matrix for each element.

    (b) Assemble the structural stiffness matrix K for the entire truss.

    (C) Using the elimination approach solve for the nodal displacement.

    (d) Calculate the reaction forces.
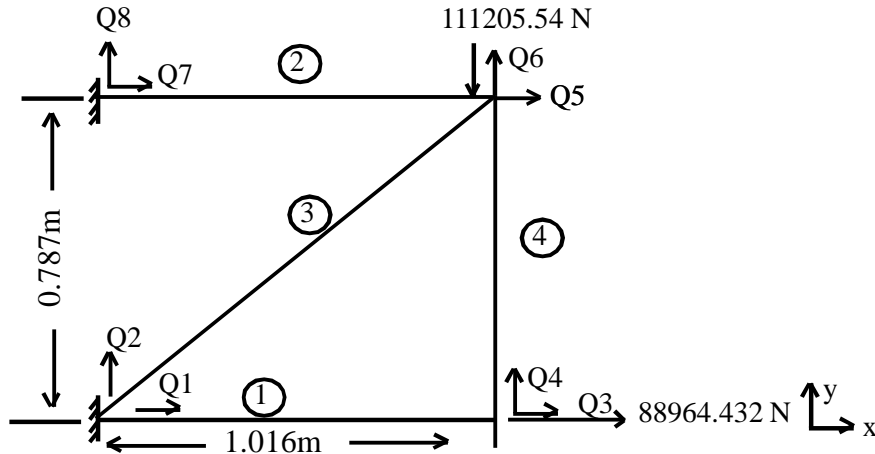
15. Model the plate shown in figure using one CST element and determine the nodal displacement and reaction forces.
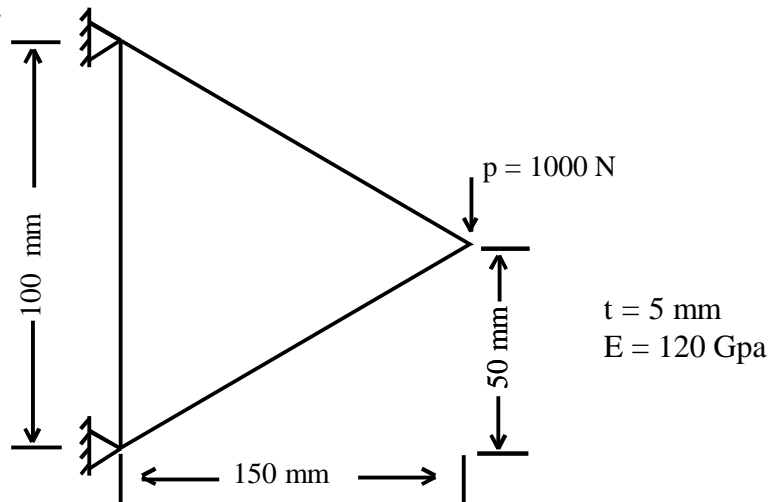
16. Mention three applications of scalar field problems and write down its governing equations and obtain its finite element formulation using Galerkin method.

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Model question
SEVENTH SEMESTER B.Tech DEGREE EXAMINATION
(2008 Scheme)
Plant Engg & Maintenance (MP)
(08.706.4) Elective III

Duration: 3 Hrs.   Max Marks: 100

Instructions: i) Answer all questions from Part A.
                       ii) Answer one question from each module in Part B

1.   What are the useful applications of wear phenomenon?

2.   Distinguish between scuffing and pitting?

3.   Explain briefly on synthetic Lubricants?

4.   What is meant by Ferrography?

5.   Distinguish between Reliability and Quality?

6.   Prepare a short note on MTTR?

7.   What do you mean by stand by Redundancy?

8.   Explain the Concept of Tero technology?

9.   Enumerate the specific objectives of maintenance in an organization?

10. Give a brief description of an 'Accident Report'?   **(10x4=40 marks)**

PART - B

Module I

11. a) Explain an major factors affecting wear in machine elements?   **(10 mark)**

    b) Give an account on various vapour Disposition methods adapted for wear prevention?
                                                                                          (10 marks)

12. a) What are the qualities of a good Lubricant? Explain?   **(10 marks)**

    b) Discussion various types of additives used in Lubricants?   **(10 marks)**

13. a) Define the terms (i) Failure density (ii) Failure Rate and (iii) Reliability? How these Parameters
       will vary with time in typical FDA.   **(12 marks)**

    b) Distinguish between Maintainability and Availability?   **(8 marks)**

14.   A manufacturer is offered two machines A and B has cost price of Rs. 2500/- its running cost is
      Rs. 400/- for each of the first 5 yrars and increases by Rs. 100/- every subsequent year.
      Machine B being the same capacity as machine A costs Rs. 1250/- has running cost of Rs. 800/
      - for 6 years, increasing by Rs. 100/- everyyrar thereafter. If money worth 10% per year which
      machine should be purchased? Scrap values of both machines is negligibly small.

                                                                                          (20 mark)
Module III

15.   a) Give the organization setup of maintenance department in a large plant? How does it differ
         from that in a small plant manufacturing same product?   **(10 mark)**

b) Discuss in brief the use of computers in maintenance management?

(10 mark)

16. a) Explain a various first aid equipments needed for the treatment of on injured person?

(10 mark)

b) Give a classification of fires and corresponding extinguishing agents?

(10 mark)

(3x20 = 60 marks)

****

Seventh Semester B.Tech Degree Examinations October 2011
Branch - Mechanical Engineering
Subject: 08.706.1 Computer Graphics (Elective III)

Time 3 Hrs.   Marks: 100

Part A
Answer all questions

1   Describe different types of Graphic standards?   4

2   Describe the working of a color CRT   4

3   Describe the use of homogeneous coordinate system in Computer Graphics 4

4   Compare the unique features of different types of display devices   4

5   Draw layout representing classification of projections in computer graphics 4

6   How orthographic projections of inclined surfaces can be done.   4

7   What-are fractals and "NURBS   4

8   Describe the characteristics of B- Splines   4

9   Explain Z- Buffer algorithm   4

10 Describe how non parametric curves can be formulated in Computer Graphics 4

                                                                (10 x 4 = 40)

Part B
Answer one full question from each module

Module I

11-a   Describe the working principles of different types of input devices used in computer graphics

                                                                          10

11-b   Explain Bresenham circle generating algorithm with neat sketches   **10**

OR

12-a   Describe the working principles of different types of output devices used in computer graphics

                                                                          10

12-b   Explain Midpoint circle generating algorithm with neat sketches   **10**

Module II

13-a   Describe the mathematical formulation of rotation, reflection and translation of a 3D object in space   **10**

13-b   Describe the mathematical formulation of different types of perspective projection in computer graphics   **10**

OR

14-a   Describe the mathematical formulation of orthographic projections and isometric projections in computer graphics   **10**

14-b   Describe any algorithm with neat sketches for windowing and clipping in computer graphics

                                                                          10

Module III

15-a   Derive the matrix formulation of a single cubic spline segment from its general equation

10

15-b   Describe the mathematical formulation of different types of surfaces in computer graphics

10

OR

16-a   Derive the general equation for a Bezier curve segment   **10**

16-b   Describe different types of solid modeling techniques   **10**

(3x 20 = 60)

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Seventh Semester B.Tech Degree Examination, Nov 2011
08-701 Computer Graphics
(2008 Scheme)

PART B

1. Distinguish between Raster scan display and Random scan display.
2. What is the reason behind the stair-step appearance of lines when drawn with DDA algorithm.?
3. What is a pixel and what do you mean by its gray level value.?
4. How scanline algorithms are used for Area filling?
5. Define Window to Viewport transformation.
6. What is meant by homogeneous co-ordinate system?
7. Draw the schematic of general 3-D transformation pipeline from modeling co- ordinates to final device coordinates.
8. Distinguish between Parallel and Perspective projections.
9. Give some applications of Image processing.
10. What is meant by Perimeter measurement?

PART B

11. Explain the Bresenham's algorithm for generating circle. Discuss the merits of this method compared to other methods. **(20)**

OR

12 (a) Explain the architecture of Raster Scan system. **(10)**

   (b) Discuss a method to test whether a point is inside a given polygon. **(10)**

13. A triangle formed by the co-ordinates (1,1), (6,1) and (3,8) is rotated by 60 degrees about the origin and then scaled by half of its magnitude about the origin. Draw the resultant triangle.
(20)

OR

14. Explain line clipping algorithm. How Cohen-Sutherland algorithm can detect whether a line can be totally rejected, in the first step itself? **(20)**

15. Explain depth buffer algorithm for hidden surface elimination. Indicate how depth calculation is done at each point on a surface? What arc the limitations of this method? **(20)**

OR

16. Explain Scene Segmentation and labeling with an example. **(20)**

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Seventh Semester B.tech Degree Examination November 2011
Computer science & Engineering

Model question paper

08.704 MULTIMEDIA SYSTEMS AND DATA COMPRESSION(R)

Time : 3 Hours

Max. Marks : 100

PART – A
Answer **all** questions(10 X 4)

1. Define multimedia.
2. What are the differnt types of multimedia systems?
3. Explain data modelling in MMDBMS.
4. Mention the advantages of lossless compression over lossy compression.
5. What are the various applications of Huffman coding?
6. Explain LZW coding
7. Write notes on motion compensation.
8. Explain adaptive DPCM
9. What is mean by interframe compression.
10. Briefly discuss the types of frames used in video compression.

(4X10=40)

PART – B
Answer one question from each module(3 X 20).

Module -I
11. a)Explain the applications of multimedia systems   (10)
    b)Explain the different types of media and thier representations.   (10)
OR
12. Discuss the architecture of multimedia systems.   (20)

Module -II
13. Explain the compression technique used in JPEG.   (20)
OR
14. Explain Entropy coding and source encoding   (20)

Module -III
15.With a neat diagram,discuss 4-layer synhronization reference model.

(20)

OR
16. Differentiate between intra object and inter object synchronization.Also explain MPEG standards.   (20)

Code: 08.706(C) F

UNIVERSITY OF KERALA
Seventh Semester B.Tech Degree Examination, November 2011
(2008 Scheme)

08.706(C) ELECTIVE II: DATA MINING TECHNIQUES (F)

Time : 3 Hours

Max. Marks :100

Instructions: Answer all questions from Part A. Answer any one question from each module in Part B

PART-A
(Answer all questions. Each question carries 4(four) marks)

1. Define Data warehouses with example.
2. Describe the process of knowledge discovery with a neat diagram.
3. Discuss about various data mining tasks.
4. Discuss about mining multilevel association rules with example.
5. Discuss about Fuzzy set Approach with example.
6. Outline the preparation of data for classification and prediction.
7. List out the requirements of clustering in data mining.
8. Differentiate between interval-scaled variables and Binary variables.
9. Discuss about categorical variables and ordinal variables.
10. Illustrate the various integration schemes of a data mining system.

PART – B
(Answer one full question from each module. Each question carries 20(twenty) marks.)

Module – I

11. With a neat sketch describe the architecture of a data ware house system.
12. Examine apriori algorithm with suitable example..

Module - II

13. Evaluate the accuracy of a classifier with example.
14. Analyze with suitable example mining of various kinds of association rule.

Module III

15. Describe spatial data mining and its applications.
16. Summarize multimedia data mining and its applications.

Seventh Semester B.Tech Degree Examinations

(2008 Scheme)

Design and Analysis of Algorithms (R)

Max Marks : 100   Time : 3 Hours

Model Question paper

PART –A

Answer **all** Questions.

1. Define the following asymptotic notations:

    i) Big Oh (O)   ii) Big Omega (Ω)

    iii) Big Theta (θ)   iv) Little Oh (o)

2. Why worst case analysis of algorithms is more important than average case analysis?

3. Consider the recurrence $T(n) = T(n/2) + n$ and $T(1) = \theta(1)$. Obtain the asymptotic bound for this recurrence.

4. Define master theorem for solving recurrence.

5. What is an AVL tree? Write an algorithm for LL rotation on an AVL tree.

6. Prove that a red-black tree with n internal nodes has height at most 2 log (n+1)

7. What are strongly connected components o a graph? Draw a directed graph and indicate the strongly connected components.

8. Compare the divide-and-conquer and dynamic programming techniques.

9. What is principle of optimality? Give an example.

10. Illustrate how the following list of 10 integers will be divided at various levels of recursion tree of merge sort algorithm. L=(15, 10, -2, 36, 3, 14, 25, 18, 55,12)

PART-B

Answer one question from each module.

Module I

11.   a) What is the smallest value of n such that an algorithm whose running time is $100n^2$ runs faster than an algorithm whose running time is 2^n on the same machine?

                                                                                      5

       b) Write and explain insertion sort algorithm. Obtain its worst case running time.

                                                                                      15

OR

12.   a) Show that quicksort's best case running time is $\Omega(n \log n)$ 5

       b) What is a heap? Write an algorithm to build a heap. Obtain the time complexity of the algorithm for building a heap of n items.   15

Module II

13. a) Discuss various cases involved in inserting a node a red-black tree. 15

    b) Discuss a data structure used for representing disjoint sets. 5

OR

14. a) Write an algorithm to determine whether a given directed graph is acyclic or not. What is the running time of the algorithm? 10

    b) Explain Dijkstra's algorithm for computing shortest path. 10

Module III

15. a) Write a greedy algorithm for Knapsack problem. 10

    b) Using divide-and-conquer paradigm write an algorithm for finding the smallest and largest values in a set of n integers. Obtain the number of comparisons needed as an expression in n. 10

OR

16. a) Using dynamic programming technique, write an efficient algorithm for ordering a chain of n matrices such that the number of scalar multiplications is the minimum

    10

    b) Explain how a problem is established as an NP-complete problems. 10

****

Seventh Semester B.Tech Degree Examination, Nov 2011
(2008 Scheme)
Branch: Computer Science
08.703 : Computer Networks (R)

Time: 3 hours   Max Marks: 100

Part:A

(Answer all questions. Each question carries 4 marks.)

1. Compare LAN, WAN, and MAN

2. List the design issues associated with Data link layer. Explain each.

3. Explain the HDLC protocol

4. Distinguish between services, interface and protocol with the help of a neat diagram sketch.

5. Explain the following terms

   a. non persistent CSMA   b. 1-persistent CSMA

6. What is the difference between connectionless and connection-oriented services?

7. Which are the different data link, network and transport layer policies that affect the congestion.

8. Explain the concept of tunneling

9. What is DNS?

10. What is meant by transport service primitives? Give Examples

(10x4=40 Marks)

Part B

(Answer **one** from each module)

MODULE-I

11. Explain the OSI reference model with a neat sketch and explain the functionalities of each layers   (20)

OR

12. Explain the following:-

   a. Stop and wait ARQ

   b. Go-Back N ARQ

   c. Selective Repeat ARQ   (20)

MODULE-II

13. (a) What are the functions of MAC sub layer   (10)

   (b) Explain leaky bucket algorithm   (10)

OR

14. (a) Explain IEEE 802.3 frame format, the functions of all fields and collision recovery scheme.

                                                                              (15)

(b) Explain the working of DQDB (5)

MODULE-III

15. (a) Explain the IPv6 Addressing (10)

(b) Explain the interior gateway routing protocol. (10)

OR

16. How e-mail systems are organized? What are the services provided by such system?
(20)

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Seventh Semester B.Tech Degree Examination (2008 Scheme)
Branch : Information technology
08.701 : Software Project Management

Time : 3 Hours   Max. Marks : 100

PART A
(Answer all questions)

1.   What are the differences in the characteristics of Software products compared to products of other engineering discipline?

2.   Define Software Engineering. Comment on the layered technology concept of Software engineering.

3.   Which process model will be the best suited for the development of "Library management System" software? Justify.

4.   Discuss the merits and demerikts of size-oriented metrics and function-oriented metrics.

5.   What are the various resources that should be identified while a software project is planned?

6.   Discuss about the RMMM plan.

7.   What is Risk Exposure ? How it is measured in a Software Project Development?

8.   What is a Gantt Chart? Explain its importance in Scheduling with an example.

9.   How Software Configuratikon Management is important in software development process? Discuss.

10.   What are the core steps of the Six Sigma methodology in software engineering ?

(10 x 4 = 40 marks)

PART B
(Answer **any** one question from **each** module)

Module – I

11. a) What are the elements of a software process ? (10)

    b) Explain Spiral model with its features. (10)

OR

12. a) Explain Waterfall model. Why it is the most commonly used process model

    in the current software industry ? (10)

    b) Explain the advantages and disadvantages of Waterfall model. Suggest some

    process models which will solve the limitations of Waterfall model. How? (10)

Module – II

13. a) Explain COCOMO model (10)

    b) Estimate the Effort and Duration required for the development of the Office
    Automation System mentioned below, using COCOMO model. The LOC of
    each module and the existing multiplying factors are as given below: (10)

a.	Data Entry	0.6 KDLOC
b.	Data Update	0.8 KDLOC
c.	Query	0.7 KDLOC
d.	Reports	1.1 KDLOC

Complexity	High 1.15	Experience	Low 1.13
Storage	High 1.12	Programmer- capability	Low 1.12

OR

14. What is Risk management ? Why it is important ? What are the steps to do it? (20)

Module – III

15. What is SCM ? What is SCM Process? Explain in detail about the layers of SCM
    process. (20)

OR

16. a) Brief about the various tasks to be undertaken for software project scheduling. (10)

    b) Explain Earned Value Analysis method and its significance in project scheduling(10)

Seventh Semester B.Tech Degree Examination (2008 Scheme)
Branch : Information technology

08.702 : INTERNETWORKING (F)

Time : 3 Hours   Max. Marks : 100

PART A
(Answer all questions. Each question carries 4 marks)

(4 x 10 = 40 Marks)

1.   Distinguish between error reporting and error correction with an example for each.
2.   Why are some of the ICMP Message types no longer needed ?
3.   Is it reasonable for a single router to use proxy ARP and subnet addressing ? Justify your answer.
4.   Why is UDP checksum separate from the IP checksum?
5.   Explain BGP UPDATE message format.
6.   Compare RIP, Hello and BGP.
7.   Should MPLS accommodate layer 2 forwarding as wellas optimized IP forwarding ? Why or why not?
8.   List the characteristics of HTTP.
9.   Explain TFPT.
10. Explain the fixed header used in RTP

PART B

(Answer one question from each module. Each question carries 20 marks)

Module – I

11.   a) Explain ARP and RARP Protocol.
      b) What is silly window syndrome ? How it can be avoided?

12.   Explain error and control messages in internet protocol.

Module – II

13.   Explain BGP
14.   a) Explain OSPF protocol
      b) Explain how RIP is implemented ? What network families does RIP support ?

Module – III

15.   Explain the two file transfer protocols
16.   a) Explain RTP.

      b) Explain SNMP.

Seventh Semester B.Tech Degree Examination (2008 Scheme)
Branch : Information technology

08.703 : Cryptography

Time : 3 Hours   Max. Marks : 100

PART A
(Answer all questions.)

1.   Explain active and passive attack with example?

2.   Explain the aspects of security?

3.   Discuss the working of Hagelin Machine ?

4.   Compare stream cipher with block cipher?

5.   Explain avalanche effect in DES ?

6.   Write the characteristics of finite state machine?

7.   What is knapsack System.

8.   What is Elliptic curve.

9.   Differentiate MAC and Hash function.

10.   What is meant by digital signature?

                                                                (10 x 4 = 40 marks)

PART B
(Answer any one question from each module)

Module – I

11.   a) What are various cryptanalysis attacks ? Explain with examples.   (10)
       b) Write notes on information measure and absolute security.   (10)

OR

12.   a) Discuss different categories of classical encryption techniques.   (10)
       b) Write notes on error probability security.   (10)

Module – II

13. a) Explain the modes of DES (10)

    b) Perform encryption and decryption using RSA algorithm for the following:
       p=7; q=11; e=17; M=8 (10)

OR

14. Discuss public key systems based on elliptic curves. (20)

Module – III

15. Explain key distribution for asymmetrical systems (20)

OR

16. Explain zero-knowledge techniques. (20)

Seventh Semester B.Tech Degree Examination
(2008 Scheme)
Branch : Information technology

08.704 : Web Applications Development

Time : 3 Hours   Max. Marks : 100

PART A
(Answer all questions.)

1.   Explain the J2EE application life cycle.
2.   What is JDBC ?
3.   Explain the development phases of J2EE application?
4.   What are the advantages of servlets?
5.   What is MVC architecture ? Explain its advantages
6.   Explain the life cycle of a servlet
7.   What are the benefits of EJB framework?
8.   What is JMS ?
9.   What is stateful session bean?
10. What is CORBA?

(10 x 4 = 40)

PART B
Answer any one question from each module.

Module I

11.   Explain in detail about J2EE layers

Or

12.   What are the different types of JDBC database drivers ? Explain

Module II

13.   Explain the different techniques used for session managmenet

Or

14.   Design and develop an online bookshop using MVC architecture with the following facilities.
a) Search options based on book name and author
b) New user registration
c) Add new items to shopping cart
d) Purchase items with bills

Module III

15.   Explain the life cycle of enterprise Java Beans.

Or

16.   Explain the steps in developing entity bean

(3 x 20 = 60)

Seventh Semester B.Tech Degree Examination (2008 Scheme)
Branch : Information technology

08.705A   : Design & Analysis of Algorithms

Time : 3 Hours   Max. Marks : 100

PART A
Each question carries 4 marks.

1.   Give a randomized version of the quick sort algorithms.
2.   What is meant by an NP-Complete problem ?
3.   Define O and Ω notations for asymptotic running time of algorithms.
4.   Compare greedy   strategy with dynamic programming method.
5.   Show thatg log (n!) = θ (n log n)
6.   What is the 'birthday paradox?
7.   What is the largest and smallest possible number of internal nodes in a red-black tree with
         black-height k?
8.   List the Bellman-Ford single-source shortest-path algorithm.
9.   What is meant by topological sorting?
10.   Explain an algorithm for finding the minimum spanning tree for a graph.

PART B
Each question carries 20 marks

11.   Write the merge sort algorithm. Perform time complexity analysis and derive the worst-case
         running time for merge sort.
OR
12.   a) Use the master method to give asymptotic bounds for the following recurrence.
             $T(n) = 4T(n/2) + n^3$ (12 marks)
         b) Describe the recursion tree method for solving recurrences.   (8 marks)

13.   Define B-tree. Write an algorithm for inserting a key into a B-tree in a single pass.
14.   Perform time analysis for breadth-first and depth-first searches on a graph.

15.   a) Give A dynamic programming solution to the 0-1 knapsack problem.   (10 marks)
         b) Give an algorithm to solve the 8-Queens problem   (10 marks)

OR

16.   Explain Strassen's algorithm for matrix multiplication.

Seventh Semester B.Tech Degree Examination (2008 Scheme)
Branch : Information technology
08.706A : Computer Peripherals and Interfacing

Time : 3 Hours   Max. Marks : 100

PART A
(Answer all questions)

1.   Explain the various processor sockets.
2.   Explain PCI slots and AGP slots.
3.   Write a note on USB
4.   Explain the working of a drum scanner.
5.   Distinguish between impact and non-impact printers.
6.   Briefly explain the working if Ink jet printers.
7.   Write a note on VGA.
8.   Explain the operation of Hard disk.
9.   Explain the working of DVDs.
10.   Explain the features of Blu-ray discs.

(10 x 4 = 40 marks)

PART B
(Answer any olne question from each module)

Module – I

11.   Explain the features of following:

a) DRAM
b) DDR
c) SIMM
d) RIMM

(20)

OR

12.   Explain the mother board components of a system.

(20)

Module – II

13.   a) Write a note oln Scanners and explain the working of a Flat bed scanner.   (10)

b) Explain the working of Laser printer.   (10)

OR

14.   a) Explain the features of ATA/IDE and SCSI   (10)

b) Explain the working of Optical mouse.   (10)

Module – III

15.   Write a note on Display adapters and explain any five display standards.   (20)

OR

16.   Write short note on   (20)

a) Serial access mass storage devices.

b) Random access mass storage devices.

MODEL QUESTION

SEVENTH SEMESTER PRODUCTION ENGINEERING

Time:-3hrs   *08- 704* Sub: THEORY OF METAL CUTTING   Max marks- 100

PART-A

(Answer all questions)

1. How different cutting tools are classified?
2. What is a multipoint cutting tool? Give the geometry of a drilling tool.
3. Explain primary and secondary deformation in metal cutting.
4. Derive the relation between chip thickness ratio r, $\emptyset$ and α
5. How BUE is formed? What is its effect.
6. what are different types of chip breakers ?Explain with figures
7. How cutting temperatures can be measured
8. Explain machinability index
9. What is the significance of optimum cutting speed.
10. What are the requirements of a cutting fluid.   (4X10=40Marks)

PART –B

(Answer any one question from each module)

MODULE-1

11. a. With a figure, explain the tool terminology of a single point cutting tool
    b. What are different types of chips produced during metal cutting? Explain.

12 a. Explain friction in cutting . How it can be reduced during cutting?

    b. Explain the mechanism of chip formation.

MODULE-2

`13 a. Explain orthogonal and oblique cutting .Show different forces acting during cutting.

    b. Explain different sources of heat generation during cutting.

14 a. Explain how the stress variation occurs along rake face

    b. What are the assumptions of Merchants theory? How Lee and shaffers theory differs from

    Merchants theory

MODULE-3

15 a. What are, different tool wear mechanisms? Explain.

    b. What is tool life equation ?Explain the factors affecting tool life.   (PTO)

16 a. Derive expression for optimum cutting speed in machining

b. Explain different tool materials used in metal cutting.

(3x20=60Marks)

(MODEL QUESTION)

SEVENTH SEMESTER B.TECH. DEGREE EXAMINATION

OCTOBER/NOVEMBER 2011

(2008 Scheme)

Machine Tool Design (P)

Time: Three Hours

Max. Marks: 100

Instructions: i) Answer all questions from Part A

ii)Answer one question each from each Module in Part B. Assume any missing data. Use of approved handbook permitted.

PART- A (10X4=40 marks)

1. Sketch the tooth profile of a spur gear and explain the various terms connected with it.
2. Describe the significance of Sommerfeld number in design of journal bearing.
3. What are the characteristics of a good bearing material?
4. Compare the characteristics of hydrodynamic, hydrostsatic and rolling contact bearing.
5. State and prove law of gearing.
6. What is equivalent number of teeth in helical gear.
7. Sketch and explain the various forces acting on a bevel gear.
8. Explain the purpose of a ray diagram.
9. Mention the requirements of a guide way of a machine tool.
10. Describe the functions of a spindle unit.

PART- B (3X20=60 marks)

MODULE I

11. A 5500N rortor is supported midway between two journal bearings on a 0.05m shaft which rotate at 800rpm.If the bearing is to operate in an atmosphere of 32° without artificial cooling design the bearing and suggest the oil to be used. The maximum oil film temperature is limited to 100°.
12. A rolling element bearing is subjected to a radial load of 5kN and an axial load of 3.5kN.The outer ring is stationary and the inner ring is to rotate for 5 years at 6hrs per day with a speed of 600rpm.Select a suitable bearing and compute the probability of the selected bearing surviving 15000hrs.If the bearing outer ring is rotating and is subjected to light shock how does the life of the bearing change.

MODULE II

13. A pair of helical gears connecting parallel shafts is to transmit a torque of 400Nm at 2800rpm of pinion. The teeth are 20° degree stub teeth of heat treated alloy steel. The width of face is limited to 40mm.The driven gear rotates at 1800rpm and helix angle of 30 °.Design and sketch the drive.

14. Design a gear box for a drilling machine to give a speed variation between 120rpm and 700rpm in six steps. The input shaft speed is 700rpm.The intermediate shaft is to have three speeds. Show the kinematic arrangement and ray diagram used in the design. Take Ø=1.4.

MODULE III

15. Explain the design procedure of column in machine tools. Draw the commonly used column selections and explain their applications.

16. (a) Explain hydrodynamic action of the lubricant.

(b) What are the methods to lower the thermal stresses in machine tools .Explain with examples?

Model question

Seventh Semester B.Tech Degree Examination, November 2011

(2008 Scheme)

08.703 COMPUTER INTEGRATED MANUFACTURING (P)

Time : 3 Hrs.   Max.Marks : 100

*Answer all questions from **Part A** and any one full question from each module of **Part B***

PART – A (Each question carry 4 marks)

1. Explain product development cycle.

2. Enumerate the importance of CIM in a manufacturing industry.

3. Compare and contrast CAM and CIM

4. Write short notes on the application of computer in CAD.

5. Enumerate the advantages and disadvantages of cellular layouts.

6. What is automation? Explain different types of automation with example.

7. Describe accuracy and repeatability.

8. Explain the structure of the process planning software.

9. List out the major elements of FMS.

10. Define Resolution and repeatability of Industrial Robots.

PART- B (Each question carry 20 marks)

Module- I

11.   (a) Explain the major elements of a CIM.

(b) Explain Sequential engineering in the product development process.

12.   (a) Explain concurrent engineering and its benefits over sequential engineering.

(b) Explain the application of computer in CAM.

Module – II

13.   (a) Explain Opitz coding system with block diagram.

(b) Compare Process layout and Product layout with examples.

14.   (a) Explain a method of computer aided process planning.

(b) Explain Direct Numerial Control (DNC) and its functions.

Module – III

15.   (a) Explain Automated Guided Vehicles with neat sketches.

(b) Explain any three physical configuration of Industrial robots with sketches.

16.   (a) Explain Computer Aided Inspection and Testing.

(b) Explain the methods of Rapid Prototyping.