

FACULTY OF ENGINEERING**B.E 3/4 (CIVIL) II – SEM (NEW) (SUPPL) EXAMINATION, DECEMBER - 2017****Subject: STRUCTURAL ENGINEERING DESIGN AND DETAILING – I (RCC)****Time : 3 Hours****Max Marks : 75**

**Note: Answer all question from part A and any ONE Questions from each unit
Assume suitable data if required**

Part - A (25 Marks)

1. How do you design trapezoidal footing (2)
2. Give the IS specifications required for the design of cantilever and counter fort retaining wills (3)
3. What is eccentricity, how do you calculate eccentricity (2)
4. What are the IS specifications necessary for the design of domes (3)
5. How do you calculate the base width of the slab in cantilever retaining walls (2)
6. Explain what is staging (2)
7. Explain what is dispersion length (3)
8. Give any two IRC codes useful for the bridge design (2)
9. What are the different methods available to design the slab bridges (3)
10. Explain how the T-Beam bridge design is different from other bridges (3)

Part - B (50 Marks)**Unit – II**

11. Design a combined footing for two reinforced concrete columns using following size of the column is 450 x 450mm, spacing of the columns 4m, load transmitted by each column 500 ken, and soil bearing capacity is 150kN/m². A dot M30 grade concrete and fe 500 grade steel. Sketch the reinforcement details. (15)

OR

12. Design a rectangular type retaining wall to retain the earth embankment of 5.75m above the ground level density of the earth is 17.5kN/m³, angle of internal friction is 30 degrees, SBC of soil is 200 ken/m², coefficient of friction between soil and concrete is 0.4, use M 30 and fee 500 grade concrete and steel. Sketch the reinforcement details. (15)

Unit – II

13. Design a rectangular RC water tank (resting on the ground) with an open top for a capacity of 95,000 liters, the inside dimensions of the water tank may be taken as 7m x 5m. Design the side walls of tank using M25 grade concrete and fe500 grade steel. Sketch the reinforcement details. (15)

OR

14. Design a RC Intel type water tank supported on 8 columns is required to store 2,20,000 liters of water. Design the water tank for a height of staging above 13m, from ground level, SBC is 180kN/m², use M25 grade concrete and fe500 grade steel. Sketch the reinforcement details. (15)

Unit - III

15. Design a deck slab for the following particulars

Clear span	:	5.5meters	
Width of the foot path	:	1m on either side	
Wearing coat	:	100mm	
Loadig IRC	:	IRC Class AA (Tracked)	
Materials used	:	M30 fee 500	(20)

OR

16. Design the reinforced concrete slab of an RC T-beam bridge and slab deck using the following data:

Spacing of the main T-beam=	2.5m		
Span of the T-beam	=	16m	
Type of loading	=	IRC class AA tracked vehicles, no cross girders have been used	
Materials	=	M30 fee 500 Grade steel.	(20)

FACULTY OF ENGINEERING**B.E. 3/4 (Civil) II – Semester (Old) Examination, December 2017****Subject: Structural Engineering Design and Detailing – I (RCC)****Time: 3 Hours****Max.Marks: 75**

- Note:** i) Answer all questions from Part A. And three questions from Part B, one from each unit.
 ii) Use of relevant codes and tables are permitted.
 iii) Assume reasonably any missing data found essential.

PART – A (25 Marks)

- 1 In the design of combined footings, the critical section for
 - a) One way shear is
 - b) Two way shear is (2M)
- 2 Explain the difference in the behavior of Vertical wall in Cantilever and counter fort retaining walls.
- 3 State the difference in the design of base slab of water tank resting on the ground and over head water tank. (2M)
- 4 Mention the importance of the following in a bridge (2M)
 - a) Kerb
 - b) Wearing coat
- 5 What is Impact factor? How do you calculate impact factor as per IRC. (2M)
- 6 Explain the various stability checks to be performed in retaining walls design. (3M)
- 7 Sketch neatly the plan of trapezoidal footing, and explain how you fix the dimensions of the trapezoidal footing. (3M)
- 8 Discuss the design forces on the following components of Intze tank. (3M)
 - i) Cylindrical Wall
 - ii) Conical Dome
 - iii) Bottom Ring Beam
- 9 Explain effective width method w.r.t bridge design with formula and notation. (3M)
- 10 Sketch the details of Class AA tracked loading and mark the important values including ground contact dimensions. (3M)

PART – B (50 Marks)**Unit-I: 15 Marks**

- 11 a) Two RC columns 'A' and 'B' of size 450mm x 300mm each, carries 1000 kN factored loads on each of them. The projections available beyond face of both the columns are 1m. Design a suitable combined footing, if the c/c distance between them is 2.5m and ultimate bearing capacity is 220 kN/m². Use M20 and Fe-415.
 b) Sketch the reinforcement details neatly.

OR

- 12 a) Design the Vertical wall and Heel Slab of a Cantilever retaining wall for the following data:

i) Height of the wall	4m
ii) S.B.C of the soil	200 kN/m ²
iii) Angle of repose	30°
iv) Density of soil	18.5 kN/m ³
v) Live Load Surcharge	19.2 kN/m ²
vi) Co-efficient of friction	0.5

Also check the wall for stability, use M20 concrete and Fe 415 steel.

..2

- b) Sketch the reinforcement details

Unit-II: 15 Marks

- 13 a) Design a Circular water tank with rigid base of height 2m (including 0.2m free board) to store water for two days in an apartment having 6 flats with 5 persons in each flat. The usage of water may be considered as 300 liters per day per person. Use M20 concrete and Fe 415 steel.

- b) Sketch the reinforcement details of vertical wall and base slab.

OR

- 14 a) Design the staging for an elevated rectangular water tank of size 3m x 3m x 4m (deep). Four columns are supporting this tank and height of the tank is 8m above G.L. Bracings are provided at 2m interval. The design wind speed is 1.4 kN/m². Thickness of base slab as well as side walls are 250mm each. Use M20 concrete and Fe415 steel

- b) Sketch neatly the reinforcement details.

Unit-III : 20 Marks

- 15 Design a Simply supported Solid Slab bridge for the following data. Also draw the design details:

Clear Span	6m
Clear width of Roadway	7.5m
Live Load	IRC Class AA(Tracked),
Kerbs	600mm wide on either side
Thickness of Wearing Coat	75mm
Materials	M25 & Fe-500

OR

- 16 Design the longitudinal girder of T- Beam bridge for the following data:

Effective span	16m
Carriage way width	7.5 m
Thickness of wearing coat	80 mm
Live Load	IRC Class A
Spacing of 3 longitudinal girders	2.5 m c/c
Spacing of cross girders:	4 m c/c
Materials	M25 & Fe-500

- Also sketch the reinforcement details.

FACULTY OF ENGINEERING**B.E. 3/4 (EE/INST.) II-Semester (New) (Suppl) Examination, December 2017****Subject: Microprocessors and Micro Controllers****Time: 3 Hours****Max.Marks: 75****Note: Answer all questions from Part-A & any FIVE questions from Part-B****PART – A**

1. What are the functions of CS & SS registers? [3]
2. What is the need of memory segmentation in 8086? [2]
3. Explain the following 8086 directives with an example. [3]
i) PAGE ii) DUP iii) DATA.
4. Write 8086 assembly language program to multiply two 16 bit numbers. [3]
5. Write important features of 8255 PPI. [3]
6. List the various applications micro controllers. [2]
7. List various addressing modes of 8051 microcontroller. [3]
8. Write the following pin functions of 8051 [2]
i) PSEN ii) XTAL.
9. List the special functions registers responsible for serial I/O in 8051. [2]
10. Write the various interrupts of 8051 micro controller. [2]

PART – B

- 11.a) Draw the architecture of 8086 microprocessor and explain in detail its memory segmentation. [7]
b) List the various operations of flag register 8086 processor. [3]
12. Draw and explain minimum and maximum mode pin operations of 8086. [10]
13. Explain with diagram how D/A convertor is interfaced to 8086 microprocessor through 8255 and develop a program to generate a square wave. [10]
14. Explain in detail with examples all the addressing modes of 8051 microcontroller. [10]
15. Explain the following 8051 instructions with examples. [10]
i) Rotate & Logical instructions ii) Data movement instructions.
- 16.a) With examples explain exchange push and pop instructions of 8051. [5]
b) Explain briefly the Timer operations of 8051. [5]
- 17.a) With a diagram explain keyboard interfacing with 8051 microcontroller. [5]
b) Write a program to find the maximum number from a given 8- bit ten numbers using 8051. [5]

FACULTY OF ENGINEERINGB.E. ^{3/4} (EE/INST.) II-Semester (Old) Examination, December 2017**Subject: Microprocessors and Micro controllers****Time: 3 Hours****Max.Marks: 75****Note: Answer all questions from Part-A & any FIVE questions from Part-B****PART – A**

1. Indicate the addressing modes of following instructions in 8086. [2]
i) MOV CL, FFh ii) MOV AL, [BX]
2. Explain operation of following pins in 8086. [3]
i) LOCK ii) BHE
3. Write 8086 assembly language program to add two 16 bit numbers using indirect addressing mode. [2]
4. Define segment override prefix in 8086. [2]
5. Compare procedure and macros in 8086. [2]
6. List the hardware and software interrupts of 8086. [3]
7. Draw the control word format of 8253. [3]
8. Write a 8051 program to logical OR for a given 8 bit number. [2]
9. What is ISR? Write its significance. [2]
10. How many timers are available in 8056 microcontroller? Write their usage. [3]

PART – B

11. With architectural diagram explain the Default & Alternate register assignments of 8086. [10]
12. Explain the following 8086 instructions with examples [10]
i) Iteration instructions ii) Processor control instructions.
13. Draw the control word format of 8253 and explain BSR word format of 8255. [10]
14. Explain in detail with examples of all the addressing modes of 8051 microcontroller. [10]
15. Explain how LEDs are interfaces to 8051 microcontroller, draw the interfacing diagram and develop a program to make all four seven segment LEDs ON and OFF continuously until system is reset. [10]
16. a) Explain interrupt priority in 8051 and draw the logic bit diagram of IP register. [5]
b) Explain with examples any five directives of 8086. [5]
17. a) Write an ALP for finding the 2's compliment of a given 8 bit number using indirect addressing mode. [5]
b) Explain in detail Timers of 8051 microcontroller. [5]

FACULTY OF ENGINEERING**B.E. ³/₄ (ECE) II-Semester (New) Examination, December 2017****Subject: Microprocessors and Micro controllers****Time: 3 Hours****Max.Marks: 75**

- Note:** i) Answer all questions from Part – A & any Five questions from Part – B
 ii) Answers to the questions Part – A must be at one place and in the same order as they occur in the question paper.
 iii) Missing data, if any may be suitably assumed.

Paper – A [MARKS: 25]

1. How does a microcontroller differ from a microprocessor. [2]
2. Name all of the general purpose registers in INTEL 80x86 families and some of their special function. [3]
3. What are assembler directives? How are they different from instructions. [2]
4. Draw the write cycle timing diagram for 8086 minimum mode operation. [3]
5. Explain the BSR control word format of 8255 and write the control word to set PC3. [2]
6. Draw the functional block diagram of 8254 programmable interval timer. [2]
7. Write the program using 8051 to
 - a) Clear accumulator, then
 - b) Add 03 to the accumulator ten times. [3]
8. What is the minimum number of times that the loop in the above example can be repeated? [2]
9. Write an ALP for the 8051 to transfer letter 'M' serially at 4800 baud continuously. [3]
10. Interface a DAC to 8051 and write a program to generate triangular wave. [3]

PART-B [50 MARKS]

11. a) Explain the functions of the following pins of 8086.
 - i) \overline{TEST} ii) DT/\overline{R} iii) ALE iv) \overline{BHE} v) \overline{LOCK} . [5]
 - b) Write an ALP for 8086 to find square root of a 2 digit number (Assume that the number is a perfect square) using assembler directives. [5]
12. a) Describe interrupt vector table of 8086. [4]
 - b) i) If CS contain 03E0H and IP contain 1F20H, from what is the address is the next instruction fetched? [2]
 - ii) If a SS contain 04100H and Sp contain 3FFEh, where is the top of the stack located? [2]
 - iii) If a data segment begins at address 24000H, what is the address of the last location in segment? [2]
13. Design a memory interface with 8086 for the following specification. [10]
 - i) Two 8KB EPROMs ending at FFFFFH.
 - ii) Two 8KB SRAMs starting from C0000H.
14. a) Draw the interfacing diagram of 8251 USART with 8086 and explain. [5]
 - b) Explain operational modes of 8255. [5]

- 15.a) Draw the port 0 structure of 8051 and explain. [5]
- b) Write an ALP for 8051 to read 10 bytes of data from external RAM starting at 8400H and save the data in internal RAM starting at 70H. [5]
- 16.a) Write a program to generate a square wave of 10 KHz frequency at port pin P1.1 using Timer 1 of 8051. [5]
- b) Discuss addressing modes of 8051 with examples. [5]
17. Write short notes on any two of the following
- a) Stepper motor interface. [5]
- b) Bit addressable features of 8051. [5]
- c) Analog to digital interface. [5]

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FACULTY OF ENGINEERING**B.E. 3/4 (ECE) II Semester (Old) Examination, Dec, 2017****Subject: Computer Organization and Architecture****Time: 3 hours****Max. Marks: 75****Note: Answer all questions from Part-A and any Five Questions from part-B****PART – A (25 Marks)**

1. Convert the hexadecimal number F3A7C2 to binary. (2M)
2. Draw IEEE 754 formats of floating point representation. (3M)
3. What is direct and indirect address instructions. (3M)
4. What is the instruction set completeness? (2M)
5. Explain the sequence of micro operations for PUSH and POP instructions. (3M)
6. Distinguish between ASHR and SHR instructions. (2M)
7. What is the difference between memory mapped I/O and I/O mapped I/O. (3M)
8. Explain cycle stealing operation of DMA. (2M)
9. Explain 1-bit associative memory cell with a neat sketch. (2M)
10. What are the differences among sequential access, direct access, and random access memories? (3M)

PART – B (50 Marks)

11. a) Explain Booths multiplication algorithm with the help of numerical example. (7M)
b) Compare and contrast between restoring and non-restoring division algorithm. (3M)
12. a) Explain common bus system of the general purpose computer. (7M)
b) Distinguish between hardwired and micro programmed control unit. (3M)
13. a) Explain possible pipeline hazards with its resolving techniques. (7M)
b) Explain merits and de-merits of RISC and CISC processors. (3M)
14. a) Explain programmed I/O and interrupt driven I/O data transfer. (7M)
b) What are the merits and demerits of programmed I/O data transfer. (3M)
15. a) What is virtual memory? Explain its address translation. (7M)
b) What are the various page replacement algorithms? (3M)
16. a) Show the hardware for a 2-bit by 2-bit array multiplier with an example. (5M)
b) Explain Flynn's computer classification. (5M)
17. Write short notes on
a) Micro program sequencer b) Register based CPU c) I/O channel (10M)

FACULTY OF ENGINEERING

BE. 3/4 (Mech / A.E) II – Semester (New) (supply) Examination, December 2017

Subject: Heat Transfer

Time: 3 Hours

Max. Marks: 75

Note: Answer all Questions from Part-A, & any Five Questions from Part-B.**PART – A (25 Marks)**

- 1 Distinguish between thermal conductance and thermal resistance (2)
- 2 Explain the significance of internal heat generation (3)
- 3 What are the assumptions for lumped capacity analysis? (3)
- 4 How does transient heat conduction differ from steady state conduction? (2)
- 5 State the Buckingham's Theorem (2)
- 6 Sketch the temperature and velocity profiles in a free convection on vertical wall (3)
- 7 Define Wien's displacement law. (2)
- 8 State and explain the reciprocity theorem (3)
- 9 Define the $\nu - NTU$ of a heat exchanger (2)
- 10 What is nucleate boiling? Why is it important? (3)

PART – B (50 Marks)

- 11 A steel pipe line ($k = 45 \text{ W.mK}$) of I.D. 110 mm and O.D 120 mm is to be covered with two layers of insulation each having a thickness of 50mm. The thermal conductivity of the first insulation material is 0.06 W/mK and that of the second is 0.14 W/mK . Calculate the loss of heat per meter length of the pipe and the interface temperature between the two layers of the insulation when the temperature of the inside tube surface is 300°C and that of the outside surface of the insulation is 50°C (10)
- 12 A cylinder 1 m long and 5cm in diameter is placed in an atmosphere at 50°C . It is provided with 10 longitudinal straight fins of material having $k = 120 \text{ W/mK}$. The height of 0.78 mm thick fins is 1.27 cm from the cylinder surface. The heat transfer coefficient between cylinder and atmospheric air is 18 W/mK . Calculate the rate of heat transfer and the temperature at the end of fins if the surface temperature of cylinder is 150°C . (10)
- 13 A plate 20 cm in height and 1 m wide is placed in air at 20°C . If the surface of the plate is maintained at 100°C , Calculate the boundary layer thickness and local heat transfer coefficient at 10cm from the leading edge. Also calculate the average heat transfer coefficient over the entire length of the plate. Take the suitable convective heat transfer correlations and properties. (10)
- 14 Two parallel square plates, each 4m^2 area, are large compared at gap of 5 mm separating them. One plate has a temperature of 800K and surface emissivity of 0.6, while the other has a temperature of 300k and surface emissivity of 0.9 Find net energy exchange by radiation between the plates. If a thin polished metal sheet of surface emissivity 0.1 on both sides is now located centrally between the two plates, what will be its steady state temperature? How the heat transfer would be altered? Neglect the convection and edge effects if any. (10)

- 15 A single – shell pass, four – tube counter flow heat exchanger is used as an economizer on steam generator. Fuel gases ($c_p = 1.06 \text{ kJ/kg} - \text{K}$) enters the exchanger at 250°C and leaves at 150°C with a flow rate of 0.5 kg/s the feed water enters at 125°C at the rate of 0.35 kg/s Determine the number of transfer units and effectiveness of the heat exchanger. (10)
- 16 Emissivities of two large parallel plates maintained at 800°C and 500°C are 0.45 and $.05$ respectively. Find the net radiant heat exchange per square meter for this plate. Also find the percentage reduction in heat transfer when a polished aluminum radiation shield ($\epsilon = 0.05$) is placed between them and temperature of the shield. (10)
- 17 a) What do you understand by hydrodynamic and thermal boundary layer? Illustrate with reference to flow over a flat heated plate (5)
b) Explain with neat sketch the various regimes of pool boiling (5)

FACULTY OF ENGINEERING

BE. 3/4 (Mech / A.E) II – Semester (Old) Examination, December 2017

Subject: Heat Transfer

Time: 3 Hours

Max. Marks: 75

Note: Answer all Questions from Part-A, & any Five Questions from Part-B.**PART – A (25 Marks)**

1. Define Fourier law of heat conduction (2)
2. Explain about critical radius of insulation (3)
3. What is lumped heat analysis? Explain any two applications (3)
4. What is meant by transient analysis (2)
5. Define skin friction coefficient (2)
6. List physical significance of Reynolds number (3)
7. Define Stefan Bolts man law (2)
8. Explain about radiation shields? (3)
9. List the classification of heat exchangers (2)
10. Distinguish between film wise and drop wise condensation (3)

PART – B (50 Marks)

11. A pipe with OD 20 mm is covered with two insulating materials. The thickness of the each insulating layer is 10mm. The conductivity of first insulating layer is 6 times that of the second insulating layer. Initially, insulating layers are placed in the order of first and second layer. Then they are placed in the order of second and first layer. Calculate the percentage change in heat transfer and increase or decrease in heat transfer. Assume a length of 1m. In both arrangements there is no change in temperatures. (10)
12. A metal plate of 5 cm thickness is initially at 300°C Suddenly it is exposed to an ambient at 30°C with a convective heat transfer coefficient of 500 W/m²-K. Calculate:
 - a) The centre temperature at t=2 minutes after the start of the cooling
 - b) The temperature at the depth of 1.0 cm from the surface at t=2 minutes after the start of the cooling.
 - c) The energy removed from the plate during this time of 2 minutes. Assume surface area of 2 m²
 Take $\rho = 7850 \text{ kg/m}^3$, $c_p = 0.46 \text{ kJ/kg-K}$, $k = 60 \text{ W/m-K}$ and $\alpha = 1.6 \times 10^{-5} \text{ m}^2/\text{s}$. (10)
13. Using the method of dimensional analysis, obtain the dimensionless groups in forced convection, to obtain convection coefficient. The physical quantities present to forced convection are listed below together with the dimensions. (i) Flow length (L), (ii) Free stream velocity (L/t), (iii) Fluid density (m/L³), (iv) Fluid viscosity (m/Lt), (v) Thermal conductivity (mol/t³ T) (vi) Specific heat (L²/t² T) and (vii) Convection coefficient (m/t³ T). (10)

14. Emissivities of two large parallel plates maintained at 850°C and 500°C are 0.35 and 0.054 respectively. Find the net radiant heat exchange per square meter for this plate. Also find the percentage reduction in heat transfer when a polished aluminum radiation shield ($\epsilon = 0.05$) is placed between them and temperature of the shield. (10)
15. In cross flow heat exchangers hot exhaust gases ($C_p = 1000 \text{ J/kg K}$) entering at 300°C and leaving at 100°C are used to heat water, flowing at 1 kg/s from 35°C to 125°C . The overall heat transfer coefficient based on the gas side surface area has been found to be $100 \text{ W.m}^2 \cdot \text{K}$. Using NTU method estimate the exit temperature of the air. (10)
16. An electronic circuit generates heat at the rate of $30 \times 10^{-3} \text{ W}$. In order to keep the surface temperature at 75°C , the generated heat must be transferred to the ambient air 30°C . For this, rectangular fin of 0.5mm square and 10mm long are attached to the surface. Calculate the number of fins required. $K = 175 \text{ W/m-K}$, $h = 15 \text{ W/m}^2\text{-K}$. Assume no heat loss from the tip. (10)
17. a) Water enters a cross flow heat exchanger (both fluids unmixed) 5°C and flow at the rate of 4200 kg/h to cool 3800 kg/h of air that is initially at 50°C . Assuming the U value to be $180 \text{ W.m}^2\text{K}$. For an exchanger surface area of 22m^2 , calculate the exit temperature of the air and water. (5)
- b) Derive the expression for the local heat transfer coefficient in film wise condensation on a vertical plate. (5)

FACULTY OF ENGINEERING

B.E. ¾ (PROD.) II-Semester (New) (Suppl.) Examination, December 2017

Subject: CAD/FEM

Time: 3 Hours

Max.Marks: 75

*Note: Answer all questions from part-A and any FIVE questions from part-B***PART – A**

1. What do you mean by design criteria?
2. What are synthetic curves explain?
3. What do you mean by synthetic curves?
4. Derive translation and scaling from simple example
5. Differentiate surface of revolution and tabulated cylinder.
6. Compare wireframe and surface modeling.
7. Write the 'D' matrix for axisymmetric element.
8. What are quadratic shape functions?
9. Write a short note on any one FEA software, its features.
10. Sketch 3D elements tetrahedron and brick elements with different nodes.

PART-B (25 MARKS)

11. a) Explain C-rep and B-rep approaches neat figure.
b) Derive an expression for Bezier curve.
12. a) What is scaling transformation? Write the scaling transformation matrix for different types.
b) A line defined by two end points A (1,0) , B (2,5) is rotated by 30° . Determine the coordinates of transformed line.
13. a) Write any four properties of B-spline curve.
b) Given four corners P0(1,1), P1(3,1), P2(3,3) and P3(4,2). Find the equation of the bi-cubic surface.
14. For the truss shown in fig 1 find
 - i) The deflection at node 2
 - ii) The strains and stress in each member if $E=200\text{GPa}$. $A=10^{-6}\text{m}^2$

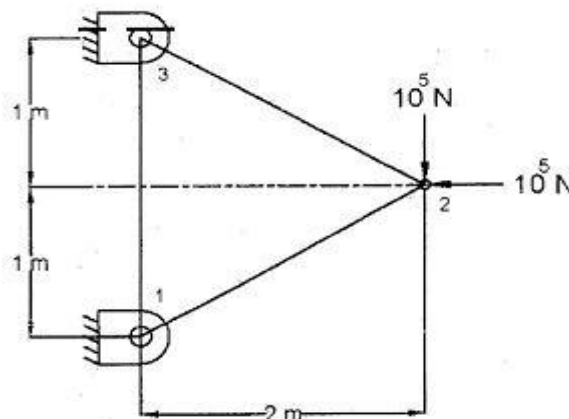
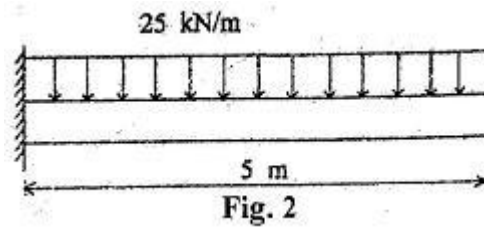
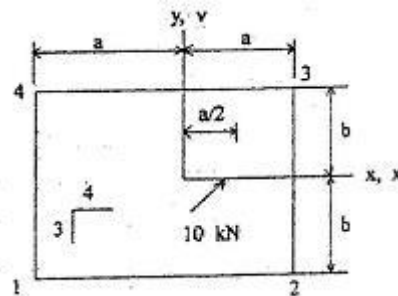


Fig. 1

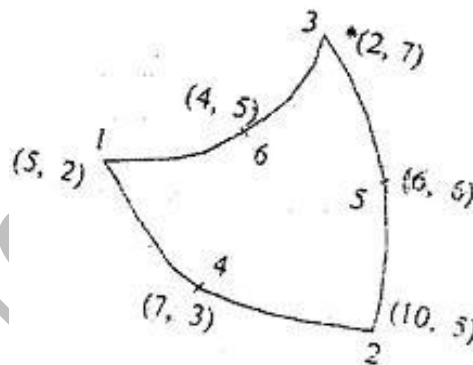
15. Determine the deflection at the tip of the cantilever for the beam shown in fig.2. take I of the beam $120 \times 10^{-6} \text{m}^4$, $E=200 \text{GPa}$.



16. Determine the nodal load vector for the point load acting on a Q4 element as shown in fig 3.



17. For the quadratic isoparametric triangle shown in fig 4, obtain the jacobian



FACULTY OF ENGINEERING

B.E. 3/4 (Prod) II-Semester (Old) Examination, December 2017

Subject: CAD/FEM

Time: 3 Hours

Max.Marks: 75

*Note: Answer all questions from part – A and any five questions from part - B***PART – A**

- 1 What are the various types of geometric models available in CAD system?
- 2 What are the limitations of a non- parametric representation? Explain.
- 3 Explain the importance of curves in wire frame modeling.
- 4 Mention the characteristics of B – spline curve.
- 5 What is concatenation of transformation? Explain.
- 6 Describe the general steps of finite element method.
- 7 Mention the significance of shape function.
- 8 Explain the applications of four noded iso-parametric element.
- 9 Differentiate between LST and CST.
- 10 Give a list of FEM software.

PART-B (25MARKS)

- 11 a) Discuss the benefits of computer aided design.
b) Compare and contrast wire frame model with surface model.
- 12 a) What is parametric representation of a curve? Write the parametric equation of a circle.
b) Explain the concept of B-rep technique of solid modeling.
- 13 a) Explain how mass properties are calculated in CAD system.
b) A line is defined by its end points (0,0) and (3,4) in 2-D graphic system. Express the line in matrix notation and perform the following transformations on this line:
i) Scale the line by a factor 2.0.
ii) Rotate the original line by 45° about the origin.
- 14 a) How CAD systems can be applied to FEM? Explain.
b) Discuss the function served by a pre-processor in FEM.
- 15 Formulate the finite element equations for CST element shown in fig.1 below. Considering the plane stress , take $E=210$ GPa, $\nu=0.25$; thickness=6mm nodal coordinates in mm $x_i=1$; $x_j=5$; $x_k=3$; and $y_i=2$; $y_j=4$; $y_k=6$ pressure $p=7\text{N/mm}^2$ on side ij .

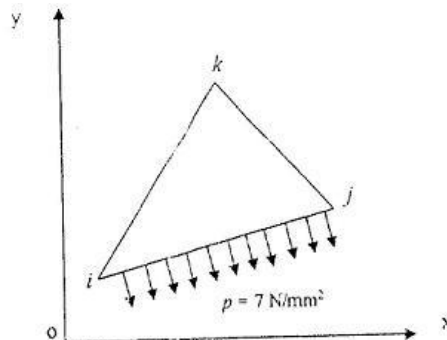
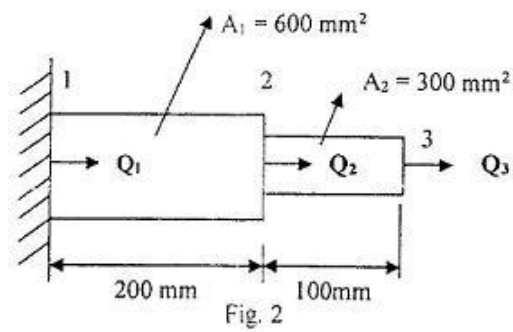


Fig. 1

16 Determine the eigen values and eigen vectors for the stepped bar shown below.



- 17 a) Derive the quadratic shape functions.
b) Write the feature and applications FEM software.

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FACULTY OF ENGINEERING

B.E. 3/4 (CSE) II – Semester (New) (Suppl.) Examination, December 2017

Subject: Object Oriented System Development

Time: 3 Hours

Max.Marks: 75

*Note: Answer all questions from Part A and any five questions from Part B.***PART – A (25 Marks)**

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|----|---|---|
| 1 | Define a structural model. What is its use? | 2 |
| 2 | “UML is a language for construction”, Justify. | 2 |
| 3 | What are the characteristics of a Unified model? | 3 |
| 4 | Define the following relationships with notations: | 3 |
| | a) Generalization | |
| | b) Aggregation | |
| | c) Realization | |
| 5 | Differentiate between component and deployment diagram. | 3 |
| 6 | Define and Artifact with notation. | 2 |
| 7 | What are included and extend? | 2 |
| 8 | What is a Unified process? | 3 |
| 9 | Define Testing. | 2 |
| 10 | What are core workflows? | 3 |

PART – B (5x10 = 50 Marks)

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|----|---|----|
| 11 | List and explain the elements of UML. | 10 |
| 12 | a) Define Usecase. Explain different stereotypes that apply to usecases. | 5 |
| | b) Differentiate between a class and an advanced class. | 5 |
| 13 | What is an Interaction diagram? Explain in detail with an example. | 10 |
| 14 | Explain the concept of swimlanes in Activity diagrams with an example. | 10 |
| 15 | a) What is a unified process? Explain the Architecture-centric model. | 5 |
| | b) Write the differences between Iterative and Incremental process. | 5 |
| 16 | Explain in detail how requirements are captured. | 10 |
| 17 | Discuss the workers and artifacts in Design and Implementation workflows. | 10 |

FACULTY OF ENGINEERING**B.E. 3/4 (CSE) II – Semester (Old) Examination, December 2017****Subject: Object Oriented System Development****Time: 3 Hours****Max.Marks: 75****Note: Answer all questions from Part A and any five questions from Part B.****PART – A (25 Marks)**

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|----|--|---|
| 1 | Why do we model a system? | 2 |
| 2 | What is a class? Define advanced class. | 3 |
| 3 | Differentiate between a component and a node. | 2 |
| 4 | What is an Artifact? | 2 |
| 5 | Differentiate between structural and behavioural diagrams. | 3 |
| 6 | What is a use case diagram? Why do we use it? | 3 |
| 7 | What is a deployment diagram? | 2 |
| 8 | What is the difference between forward and backward engineering? | 3 |
| 9 | What is a unified process? | 2 |
| 10 | What is an implementation phase? | 3 |

PART – B (5x10 = 50 Marks)

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|-------|---|----|
| 11 a) | What is Behavioural Modeling? Explain how interaction diagrams help in modeling the basic behavior of the system. | 8 |
| b) | What is collaboration? | 2 |
| 12 | Explain the concept of swimlanes in Activity diagrams with an example. | 10 |
| 13 a) | What is a state machine? Explain how a State Chart diagram helps in the modeling of a system? | 7 |
| b) | What is a framework? | 3 |
| 14 a) | What is a component diagram? Explain how it helps in designing the modules of a system. | 6 |
| b) | Differentiate between an object diagram and an artifact diagram. | 4 |
| 15 a) | What are the four P's of a unified process? Explain. | 5 |
| b) | How can you say that unified process is Iterative and Incremental? | 5 |
| 16 a) | What are the core work flows of a unified process? | 5 |
| b) | Explain how requirements are captured as use cases? | 5 |
| 17 | Explain in detail the phases of a unified process. | 10 |

FACULTY OF INFORMATICS

B.E. 3/4 (IT) II-Semester (New) (Supplementary) Examination, December 2017

Subject: Object Oriented System Development

Time: 3 hours

Max. Marks: 75

*Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.***PART – A (25 Marks)**

- 1 Explain briefly the following terms 3
a) Association b) Dependency c) Realization
- 2 What is structural modeling of a system? How it is different from behavioural modeling? 3
- 3 Mention any two advantages of component diagram. 2
- 4 Explain about common modeling techniques of use case diagram. 3
- 5 Explain about processes and threads. 3
- 6 What is Domain model? 2
- 7 Explain the phase of unified software development process. 3
- 8 Define event and signal. 2
- 9 What is requirement capture? 2
- 10 Define interface and package with notation. 3

PART – B (5 x 10 = 50 Marks)

- 11 a) Explain different things in UML. 5
b) Explain different diagrams in UML. 5
- 12 a) Explain about class diagram with example. 5
b) Explain different stereotypes apply to dependency relationship among classes and objects in class diagram. 5
- 13 a) Explain about interaction diagrams with example. 8
b) What are responsibilities of software architect? 2
- 14 a) Draw the state machine for the lifetime of the object. 5
b) Explain the following parts of transition 5
i) Guard ii) Action iii) Target state
- 15 a) Explain common modeling techniques that apply through out the language. 5
b) Explain about following relationships in use case 5
i) extends ii) includes iii) uses
- 16 a) Explain the role of testing in software lifecycle. 5
b) Explain briefly about use case driven process. 5
- 17 Write short notes on: 10
a) Systems and models
b) Collaborations

FACULTY OF INFORMATICS**B.E. 3/4 (IT) II-Semester (Old) Examination, December 2017****Subject: Object Oriented System Development****Time: 3 hours****Max. Marks: 75****Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.****PART – A (25 Marks)**

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|----|---|---|
| 1 | What is the difference between a mode and a diagram? | 3 |
| 2 | What is trace relationship? | 2 |
| 3 | What is the difference between communication and synchronization? | 3 |
| 4 | Define role and activity. | 2 |
| 5 | What do you mean by basic behavioural modeling? | 3 |
| 6 | What are the different parts of a transition in a state machine? | 3 |
| 7 | What is extensibility mechanism? | 2 |
| 8 | What are the benefits of unified process? | 3 |
| 9 | What is guard condition? | 2 |
| 10 | What is core workflow? | 2 |

PART – B (50 Marks)

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|----|--|---|
| 11 | a) Illustrate how the requirements can be converted to use cases. | 5 |
| | b) Explain how unified software development is iterative and incremental process. | 5 |
| 12 | a) Discuss the following concepts of activity diagram.
i) transition ii) branching iii) fork and join iv) swimlanes | 5 |
| | b) Give different types of stereotypes of link in behavioural modeling. | 5 |
| 13 | a) What are the various kinds of diagrams that can be used to view the static and dynamic parts of a system? Explain. | 6 |
| | b) List common modeling techniques for a class diagram. | 4 |
| 14 | a) What is sequence diagram? How it is different from collaboration diagram? Draw interaction diagrams for answering a telephone call. | 7 |
| | b) What is deployment diagram and when it is used? | 3 |
| 15 | a) What is collaboration? What are the structural and behavioural aspects of a collaboration, explain with an example. | 6 |
| | b) What is realization? How is it related to collaboration? | 4 |
| 16 | a) Discuss about components, process, methods and technologies used in unified software development process. | 5 |
| | b) Differentiate between patterns and frame works. Explain how do we model architectural patterns. | 5 |
| 17 | Write short notes on: | |
| | a) tagged value | 2 |
| | b) systems and models | 4 |
| | c) active object | 2 |
| | d) adornment | 2 |