

**FACULTY OF ENGINEERING****B.E. 3/4 (Civil) II - Semester (New)(Main) Examination, May / June 2017****Subject : Structural Engineering Design and Detailing - I (RCC)****Time : 3 Hours****Max. Marks: 75****Note: Answer all questions from Part - A and any one question from each unit.****Assume suitable data of required.****PART – A (25 Marks)**

- 1 Explain the need for retaining wall. (2)
- 2 Differentiate between isolated and combined footings. (3)
- 3 What are the stresses for which water tanks designed? (2)
- 4 What are the IS specifications needed for the design of water tanks? (3)
- 5 Explain the design concepts of staging. (3)
- 6 What are stresses developed in intze type tank? (3)
- 7 What do you understand from elastic design and detailing? (3)
- 8 Explain what are the heavy loads and light loads. (2)
- 9 What are the different methods that are used for the design of water tanks? (2)
- 10 What is dispersion length? Explain. (2)

**PART – B (50 Marks)****Unit-I**

- 11 Design a combined footing for the two columns of a multistoried residential building using the following data: (15)
- Size of the column = 600mm x 600mm  
 Axial load on each column = 1200kN  
 Spacing of the column = 4.5m c/c  
 SBC of the soil = 300 kN/m<sup>2</sup>  
 Materials used = M30.Fe 500 grade steel

**OR**

- 12 Design a cantilever retaining wall to retain an earth embankment with a horizontal top 6 m above ground level. Density of earth = 18.5 kN/m<sup>3</sup>, angle of internal friction  $\phi=30^\circ$ . SBC of soil = 280 kN/m<sup>2</sup>, coefficient of friction between soil and concrete = 0.60. Adopt M25 grade concrete and Fe 500 grade steel. Draw the reinforcement details. (15)

**Unit-II**

- 13 Design a circular water tank resting on the ground with a flexible base and a spherical dome using the following data: (15)
- Capacity of water tank = 7,00,000 liters  
 Depth of the storage = 6m  
 Free Board = 550m  
 Materials used M25 grade concrete and fe 500 grade steel

**OR**

- 14 Design an Intz type of water tank to store 1.8 million litres of water. The height of the tank above ground level is 12m. Depth of foundation is 1.25m below ground level, basic wind pressure 1.8 kN/m<sup>2</sup>. number of supporting columns = 10. Adopt M30 grade concrete and Fe500 grade steel. Design the top ring beam, bottom ring beam, conical dome and bottom spherical done. Use IS specifications. IS 456 and Is 456 and IS 3370 for design. (15)

**Unit-III**

15 Design a deck slabs for the following details

Clear span : 6.0 m

Width of the foot path : 1.0 m on either side

Wearing coat : 90 mm

Loading : IRC class AA (Tracked)

Materials : M30 concrete and fe 500 steel

(20)

**OR**

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

Spacing of the main T-beam = 2.5 m

Span of the T-beam = 16m

Span of the T-beam = IRC class AA tracked vehicles, no cross girders have been used

Materials = M30 fe 500 Grade steel

(20)

\*\*\*\*\*

OU - 1607 OU - 1607

**FACULTY OF ENGINEERING**  
**B.E. 3/4 (Civil) II - Semester (Old) Examination, May / June 2017**

**Subject : Structural Engineering Design and Detailing - I (RCC)**

Time : 3 Hours

Max. Marks: 75

**Note: Answer all questions of Part - A and answer any three questions from Part-B.  
 Choosing one question from each unit.**

**PART – A (25 Marks)**

**Unit-I**

- 1 Under what circumstances combined footings are designed. (2)
- 2 Differentiate between cantilever and counterfort retaining walls. (3)
- 3 What are the codal provisions required for design of water tanks? (2)
- 4 How do you design the staging? (3)
- 5 How do you calculate the hoop stress in water tank? (3)
- 6 What is the eccentricity explain? (2)
- 7 Define shear key where it can be provided. (3)
- 8 Give any two important IRC codes for design of bridges. (2)
- 9 What is effective width method? (2)
- 10 Define bridge deck. (3)

**PART – B (50 Marks)**

- 11 Design a combined footing for the two columns of a multistory building using the following data: (15)

Size of the column = 480mm x 480mm

Axial load on each column = 850kN

Spacing of the column = 6m c/c

SBC of sil = 220 kN/m<sup>2</sup>

Use M<sub>30</sub> grade concrete and Fe 415 grade steel

**OR**

- 12 (a) A counterfort type retaining wall into be designed to support a soil embankment with a stepped

Height of fill retained by wall = 9m

Surcharge angel = 10°

Density of soil = 16kN/m<sup>3</sup>, Angle of internal friction 0.55

SBC = 225 kN/m<sup>2</sup>

Use M25 grade concrete and fe 415 grade steel (15)

**Unit-II**

- 13 Design a rectangular water tank resting on the ground for a capacity of 15,00,000 litres. Design also side walls of the tank using the following data:

Dimension of tank = 8.5m x 5.5m

Use M<sub>30</sub> grade concrete fe 500 grade steel (15)

**OR**

- 14 An RC Intze. type water tank supported on six columns is required to store 2,50,000 litres of water. Design the intze type water tank using the following data:

Height of staging above ground level = 12m

SBC of soil at site = 180 kN/m<sup>2</sup>

Basic wind pressure = 3 kN/M<sup>2</sup>

Use M25 grade concrete and fe 415 steel (15)

**Unit-III**

15 Design an RC slab culvert for a national high way to suit the following data:

A two lane carriage way (7.5 m wide)

Footpaths on either side (1 m wide)

Clear span = 6m

Weaving coat = 80 mm

Width of beaming = 0.4m

Use M<sub>30</sub> grade concrete and fe 500 grade steel. Use IRC class AA loading tracked vehicle. Design a deck slab and sketch the details of reinforcements in the longitudinal and cross section of slab. (20)

**OR**

16 Design a reinforced concrete slab of an RC –T-beam slab bridge using the following data:

Spacing of the main T – beam bridge = 6m

Span of the main T – beam = 20 m

Type of loading IRC class 'AA' traced vehicles no cross girders have been used.

Use M<sub>25</sub> grade concrete and fe 500 grade steel. (20)

\*\*\*\*\*

**FACULTY OF ENGINEERING**  
**B.E. 3/4 (EE/Inst.) II - Semester (New)(Main) Examination, May / June 2017**

**Subject : Microprocessors and Micro Controllers**

**Time : 3 Hours**

**Max. Marks: 75**

**Note: Answer all questions from Part - A and answer any five questions from Part-B.**

**PART – A (25 Marks)**

1. Indicate the addressing modes of the following instructions in 8086. (2)  
 i) MOV AX, FFFF h ii) MOV AL, [BL]
2. Explain operation of following pins in 8086. (3)  
 i) MN/MX ii) NMI
3. What is difference between debugger & loader tool in Assembly Language Programming? (3)
4. Explain the operation of PUSH and POP instruction in 8086. (2)
5. List the various string instructions in 8086 with an example. (3)
6. List the hardware and soft ware interrupts of 8086. (2)
7. Write the important features of 8253. (3)
8. Write a 8051 program to logical AND two given 8 bit numbers. (2)
9. List various special function registers of 8051. (2)
10. How many timers are available in 8051 microcontrollers? Write their usage. (3)

**PART- B (50 Marks)**

11. a) Explain with examples the Default & Alternate register usage of 8086. (6)  
 b) Explain segment override prefix in 8086. (4)
12. Explain the following 8086 Instructions with examples. (10)  
 i) Arithmetic & Logical instructions ii) Processor control Instructions.
13. Draw the control word format of 8253 and explain BSR word format of 8255. (10)
14. With a Architectural diagram explain in detail about the I/O ports operation of 8051 Microcontroller. (10)
15. With an interfacing diagram explain 4 LEDs connected to 8051 microcontroller, and a write a program to make all four seven segment LEDs On and OFF periodically. (10)
16. a) What is a procedure? Explain the Re-entrant & Recursive procedures with examples. (5)  
 b) Explain with examples the jump and call instructions of 8051 microcontrollers. (5)
17. a) Write an 8051 ALP for finding the maximum number from a given 8-bit ten numbers. (6)  
 b) Explain the functions of Timers in 8051 microcontroller. (4)

**FACULTY OF ENGINEERING**  
**B.E. 3/4 (EE/Inst.) II - Semester (Old) Examination, May / June 2017**

**Subject : Microprocessors and Micro Controllers**

**Time : 3 Hours**

**Max. Marks: 75**

**Note: Answer all questions from Part - A and answer any five questions from Part-B.**

**PART – A (25 Marks)**

1. What is the function of SI and DI registers in 8086? (3)
2. What is the need of memory segmentation in 8086? (2)
3. Explain the following 8086 Directives with an example. (3)
  - i) ASSUME    ii) EQU    iii).DATA
4. Calculate the Effective and Physical Addresses of 8086 for direct, register indirect and based index addressing modes, if (BX) = 0158h , (DI) = 10A5 h displacement = 1B57h and (DS) = 2100h, where DS is used as segment register. (3)
5. Write important features of 8253 interval timer. (3)
6. List the various special function registers of 8051 microcontroller. (2)
7. Mention alternative functions of Port 3 pins in 8051. (3)
8. Write the following pin functions of 8051. (2)
  - a) ALE    b) EA
9. List the various interrupts in 8051. (2)
10. Write the function of Data Pointer (DPTR) register in 8051 microcontroller. (2)

**PART-B (50 Marks)**

11. a) Explain with a examples program and stack memory addressing modes of 8086 processor. (7)
  - b) Explain various Flag register bits of 8086. (3)
12. a) What is a procedure? Explain the Re-entrant & Recursive procedures with examples. (7)
  - b) Define macro with an example (3)
13. Explain with a diagram how D/A converter is interfaced to 8086 microprocessor through 8255 and develop a program to generate 50% duty cycle waveform. (10)
14. Draw the architecture of 8051 microcontroller and explain in detail its memory organization. (10)
15. Explain how 7-Segment display unit is interfaced to 8051 microcontroller showing the interfacing connections develop a program to display 8 on the display unit. (10)
16. a) With examples explain rotate and jump instructions of 8051. (5)
  - b) Explain briefly the minimum mode and maximum mode pin operations of 8086. (5)
17. a) With examples explain 8086 data movement and string instructions. (5)
  - b) Write a program to find the largest number from a given 8 - bit ten numbers using 8051. (5)

**FACULTY OF ENGINEERING**  
**B.E. 3/4 (ECE) II - Semester (New)(Main) Examination, May / June 2017**

**Subject : Microprocessors and Microcontrollers**

**Time : 3 Hours**

**Max. Marks: 75**

**Note: Answer all questions from Part - A and answer any five questions from Part-B.  
 Missing data, if any may be suitably assumed.**

**PART – A (25 Marks)**

1. What is the purpose of instruction Queue in 8086? [2]
2. Differentiate between maximum and minimum mode of operation in 8086. [2]
3. What is the function of READY pin in 8086? [3]
4. Mention the advantages of DMA. [2]
5. List out the techniques used for passing parameters to procedures. [3]
6. Describe the following 8051 instructions with an example. [3]
  - i) XCHD
  - ii) MOVX
  - iii) JNB
7. What is meant by 'framing' in asynchronous serial data communication? Justify with an example. [3]
8. Write an ALP for 8051 to compliment the upper nibble of the given byte 57H. [2]
9. Describe the interrupt vector table of 8051 along with their priorities. [2]
10. Interface a stepper motor to 8051 and write a program to rotate it 4 times in the clockwise and 4 times in anti-clockwise direction. [3]

**PART-B (50 Marks)**

- 11.a) Draw and discuss interrupt structure of 8086 in detail. [5]
  - b) Explain the following addressing modes of 8086 with an example. [5]
    - i) Register relative.
    - ii) Register indirect
    - iii) Relative based indexed.
- 12.a) Explain physical memory organization of 8086. [5]
  - b) Write an ALP in 8086 to find whether the given string is palindrome or not. [5]
- 13.a) Explain the operational modes of 8254 programmable timer. [5]
  - b) Interface the following memory ICs with 8086. [5]
    - i) Two 4 KB EPROMs ending at FFFFFH.
    - ii) Two 4 KB SRAMs starting from 00000H.
14. Explain the architecture of 8051 with a neat diagram. [10]
- 15.a) Write a program for 8051 that continuously gets 8 bit data from P0 and sends it to P1 while simultaneously creating a square wave of 200 $\mu$ s period on pin P2.1 [5]
  - b) What is stack? Discuss its role in call subroutine with examples. [5]
16. a) Interface ADC with 8051 and explain. [5]
  - b) Write a program to interface an LCD to 8051 and display "INDIA". [5]
17. Write short notes on the following
  - a) 8051 timer and counter. [5]
  - b) Instruction formats of 8086 [5]

**FACULTY OF ENGINEERING**  
**B.E. 3/4 (ECE) II - Semester (Old) Examination, May / June 2017**

**Subject: Computer Organization and Architecture**

**Time : 3 Hours**

**Max. Marks: 75**

**Note: Answer all questions from Part - A and answer any five questions from Part-B.**

**PART-A (25 Marks)**

1. Show the hardware for Booths multiplier. 2
2. Derive an algorithm for floating point multiplication. 3
3. Explain various phases of an instruction cycle. 3
4. What are the two instructions needed in the basic computer in order to set the E flip-flop. 2
5. What is the basic difference between a CALL subroutine and program interrupt instructions. 3
6. Distinguish between RISC and CISC processors. 2
7. What is the basic advantage of using interrupt initiated data transfer under program control without an interrupt? 3
8. Compare and contrast between synchronous and asynchronous communication. 2
9. How many 128X8 RAM chips needed to provide memory capacity of 2048 bytes? 2
10. Distinguish between SRAM and associative memory. 3

**PART-B (50 Marks)**

11. a) Draw the flow chart for signed addition/subtraction and also draw the hardware required for that. 7  
 b) What are the difficulties of floating point representation? 3
12. a) Explain timing and control unit of the general purpose computer. 5  
 b) What is the program interrupt? Explain interrupt cycle in the computer. 5
13. a) Draw the space time diagram for a four –segment pipeline showing the time it takes to process five tasks. 6  
 b) Explain various addressing modes in the general purpose computer. 4
14. a) What are the different modes in DMA transfer? Explain operation of each mode. 5  
 b) Explain CPU-IOP communication. 5
15. Explain various address mapping techniques of the cache memory. 10
16. a) Draw the flow chart for fixed point division algorithm. 5  
 b) Explain Daisy –chain interrupt priority scheme. 5
17. Write short notes on 10  
 a) Stack organization  
 b) Array processor  
 c) Memory hierarchy



**FACULTY OF ENGINEERING**  
**B.E. 3/4 (Mech./A.E.) II - Semester (Old) Examination, May / June 2017**

**Subject : Heat Transfer**

**Time : 3 Hours**

**Max. Marks: 75**

**Note: Answer all questions from Part - A and answer any five questions from Part-B.**

**PART – A (25 Marks)**

- 1 What are the boundary and initial conditions? (2)
- 2 Derive the expression for critical radius of insulation for cylinder. (3)
- 3 Explain the physical significance of Biot number. (3)
- 4 Define transient heat transfer. (2)
- 5 Draw the hydrodynamic boundary layer on horizontal flat plate. (2)
- 6 What you mean by critical value of Reynolds number. (3)
- 7 Define Wiens displacement law. (2)
- 8 Define total emissive power and monochromatic emissive power. (3)
- 9 How the heat exchanger are classified? (2)
- 10 Differentiate between film wise and dropwise condensation. (3)

**PART – B (50 Marks)**

- 11 A furnace wall has the inside surface temperature of  $1100^{\circ}\text{C}$ , while the ambient air temperature is  $25^{\circ}\text{C}$ . The wall consist of 125mm thick refractory brick ( $k=1.6 \text{ W/mK}$ ), 125mm thick firebricks ( $k=0.3\text{W/mK}$ ) and 12 mm thick plaster ( $k=0.14\text{W/mK}$ ). There is an air gap which offers a thermal resistance of 0.16 KW. The heat transfer coefficient on the outside wall to the air is  $17 \text{ W/m}^2$ . Find (i) the rate of heat loss per unit area of wall surface. (ii) the interface temperature throughout the wall, and (iii) the temperature of the outside surface of the wall. (10)
- 12 A slab of aluminium 6 cm thick initially at a temperature of  $250^{\circ}\text{C}$  is suddenly immersed in a liquid at  $70^{\circ}\text{C}$  for which the convective heat transfer coefficient is  $520 \text{ W.m}^2\text{-K}$ . Determine the temperature at a depth of 12.5mm from one of the face 1 minute after the immersion, also calculate the energy removed per unit area form the plate during 1 minute of immersion.  
 Take  $\rho=2700\text{kg/m}^3$ ,  $c=0.9\text{J/kg K}$ ,  $\alpha=8.4 \times 10^{-5} \text{ m}^2/\text{s}$  (10)
- 13 In a straight tube of 80 mm diameter, water is flowing at a velocity of 14 m/s. The tube surface temperature is maintained at  $80^{\circ}\text{C}$  and the flowing water is heated from the inlet temperature  $15^{\circ}\text{C}$  to an outlet temperature of  $45^{\circ}\text{C}$ . Take the physical properties of water at its mean bulk temperature, calculate the following:
  - (i) The heat transfer coefficient from the tube surface to water
  - (ii) The heat transfer and the length of the tube (10)

..2..

- 14 Assuming the sun as black body, it emits maximum radiation at  $0.5\mu\text{m}$  wavelength, Calculate (i) the surface temperature of the sun, (ii) its emissive power, (iii) the energy received by the sun surface of the earth and (iv) the energy received by a  $2\text{m} \times 2\text{m}$  solar collector whose normal is inclined at  $60^\circ$  to the sun. Take the diameter of the sun at  $1.4 \times 10^9 \text{ m}$ , diameter of the earth  $13 \times 10^6 \text{ m}$  and the distance of the earth from the sun as  $15 \times 10^{10} \text{ m}$ .
- 15 A counter flow heat exchanger is employed to cool  $0.55 \text{ kg/s}$  ( $C_p=2.45 \text{ kJ/kg K}$ ) of oil from  $120^\circ\text{C}$  to  $40^\circ\text{C}$  by the use of water. The inlet and outlet temperatures of cooling water  $15^\circ\text{C}$  and  $75^\circ\text{C}$  respectively. The overall heat transfer coefficient is expected to be  $1550 \text{ W/m}^2 \text{ K}$ . Using NTU method, calculate the following  
(i) Effectiveness of the heat exchanger (ii) Surface area required
- 16 An iron sphere of diameter  $5 \text{ cm}$ , initially at a uniform temperature of  $225^\circ\text{C}$ , has its surface suddenly exposed to an ambient temperature of  $25^\circ\text{C}$  with a heat transfer coefficient of  $500 \text{ W/m}^2\text{K}$ . Calculate (a) the centerline temperature  $2\text{min}$  after the start of cooling, (b) the temperature at a depth  $1 \text{ cm}$  from the surface  $2 \text{ min}$  after the start of cooling and (c) the energy removed from the sphere during this time. Take for iron,  $k = 60 \text{ W/m} \cdot \text{K}$ ,  $\rho=7850\text{kg/m}^3$ ,  $c=460\text{J/kg} \cdot \text{K}$  and  $\alpha = 1.6 \times 10^{-5}\text{m}^2/\text{s}$ . (10)
- 17 (a) Derive the expression for the local transfer coefficient in film wise condensation on a vertical plate.  
(b) State the Buckingham  $\pi$ -Theorem. Explain the significance of Prandtl number, Nusselt number and Grashoff number.

\*\*\*\*\*

**FACULTY OF ENGINEERING**  
**B.E. 3/4 (M/A.E.) II - Semester (New)(Main) Examination, May / June 2017**

**Subject : Heat Transfer**

**Time : 3 Hours**

**Max. Marks: 75**

**Note: Answer all questions from Part - A and answer any five questions from Part-B.**

**PART – A (25 Marks)**

- 1 List the basic law which govern the heat transfer. (2)
- 2 Define thermal diffusivity and explain its significance. (3)
- 3 What are the considerations in determining the proper length of fins attached to a surface? (2)
- 4 What is lumped system analysis? When it is applicable? (3)
- 5 Define skin friction coefficient. (2)
- 6 What do you mean by hydrodynamic and thermal entry length? (3)
- 7 Define total and monochromatic emissive power of a body. (2)
- 8 What is the shape factor with respect to itself if the surface is concave, convex or flat? (3)
- 9 What do you mean by fouling factor? What are the causes of fouling? (2)
- 10 What is critical heat flux? Explain its importance. (3)

**PART – B (50 Marks)**

- 11 A steam pipe, 12cm ID and 13cm O.D is covered with an insulating substance ( $k = 1.1 \frac{W}{mK}$ ). The steam temperature and the ambient temperature are 220°C and 25°C, respectively. If the convective heat transfer coefficient between the insulations surface and air 10W/m<sup>2</sup>K, find the critical radius of insulation. For this value  $r_c$ . Calculate the heat lose per meter of pipe and the outer surface temperature. Neglect resistance of the pipe material. (10)
- 12 A turbine blade 8 cm long having a cross sectional area 4.65cm<sup>2</sup> and perimeter 12cm, is made of stainless steel ( $K=23.1 \text{ W/m K}$ ). the temperature at the root is 550°C. The blade is exposed to a hot gas at 880°C. The heat transfer coefficient between the blade surface and gas is 440 W/m<sup>2</sup>K. Determine the temperature distribution and rate of heat flow at the root of the blade. Assuming the tip of the blade to be insulated.
- 13 A nuclear reactor with its core constructed of parallel vertical planes 2.2m high and 1.4m wide has been designed on free convection heating of liquid bismuth. The maximum temperature of the plate surface is limited to 960°C while lowest allowable temperature of bismuth is 340°C. Calculate the maximum possible heat dissipation from both sides of each plate. For the coefficient, the appropriate correlation is  $Nu = 0.13 (Gr.Pr)^{0.333}$ . (10)

..2..

- 14 A bed of burning coal in a furnace radiates as a plane rectangular black surface, 3m by 2m, at  $1500^{\circ}\text{C}$ , to an opaque bank of black tubes of the same projected area. These are at surface temperature of  $300^{\circ}\text{C}$  and such a distance from the fire bed that the shape factor is 0.5. Determine net radiant heat flow to the tube bank and show that enclosing the furnace with adiabatic vertical black walls increases the heat flow by 50 per cent. (10)
- 15 A counter flow heat exchanger is employed to cool  $0.55\text{ kg/s}$  ( $C_p=2.45\text{ kJ/kg K}$ ) of oil from  $120^{\circ}\text{C}$  to  $40^{\circ}\text{C}$  by the use of water. The inlet and outlet temperatures of cooling water  $15^{\circ}\text{C}$  and  $75^{\circ}\text{C}$  respectively. The overall heat transfer coefficient is expected to be  $1550\text{ W/m}^2\text{ K}$ . Using NTU method, calculate the following (i) Effectiveness of the heat exchanger (ii) Surface area required (10)
- 16 Air at a temperature of  $50^{\circ}\text{C}$  flows over a hot surface of temperature  $160^{\circ}\text{C}$ . The length of the plate is 6m. Calculate (a) the hydrodynamic boundary layer thickness at the end of the plate, (b) The total drag on the surface per unit width, (c) The thermal boundary layer thickness at end of the plate, (d) local heat transfer  $h_x$  at end of the plate and (e) the total heat flux from the surface. Assume the air flows at the rate of  $1.6\text{ m/s}$ . (10)
- 17 (a) Derive the average heat transfer coefficient correlation for film wise condensation. (5)  
(b) Derive the radiation exchange between two non-black infinite parallel planes. (5)

\*\*\*\*\*

**FACULTY OF ENGINEERING**  
**B.E. 3/4 (Prod.) II - Semester (Old) Examination, May / June 2017**

**Subject : CAD/FEM**

**Time : 3 Hours**

**Max. Marks: 75**

**Note: Answer all questions from Part - A and answer any five questions from Part-B.**

**PART – A (25 Marks)**

- 1 What are the advantages of implementing CAD? Explain.
- 2 Write the characteristics of Bezier curve.
- 3 Give the concept of NURBS.
- 4 Distinguish between C-rep and B-rep in solid modeling approach.
- 5 Explain the significance of 2D and 3D transformations in CAD system.
- 6 Describe the role of FEM in designing process.
- 7 What are the properties of a shape function and stiffness matrix?
- 8 How a 3D problem can be reduced to a 2D problem? Explain.
- 9 Write the shape function of 1D quadratic iso parametric element.
- 10 Write the applications of axi-symmetric element.

**PART – B (50 Marks)**

- 11 (a) Discuss how computer aided design differ form conventional design.  
 (b) What are the limitations of wire frame modeling? Explain.
- 12 (a) Describe the parametric representation of a cubic spline.  
 (b) Discuss the basic curve fitting techniques.
- 13 (a) Fit a Bezier curve with the following control points.  
 $P_0(1, 2)$ ,  $P_2(2, 2)$ ,  $P_3(3, 1)$  and  $P_4(4, 0)$ .  
 (b) Explain how a Bezier curve is superior to a cubic spline curve form the designer point of view.
- 14 (a) Explain the concept of local and global coordinate system with respect to truss elements.  
 (b) Discuss the automatic mesh generation with an example.
- 15 Find the nodal displacements, displacement at 1500 mm and 3500 mm from the left hand support and element stresses for the stepped bar shown in figure 1 below.

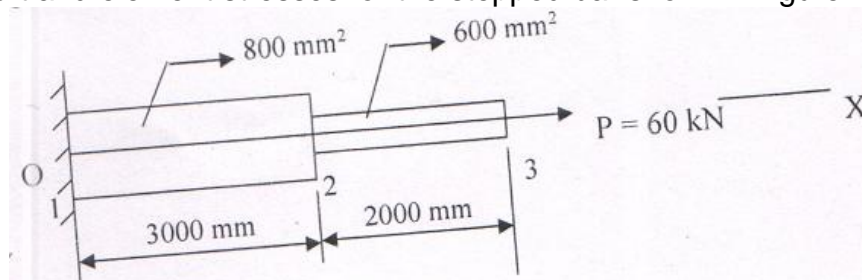
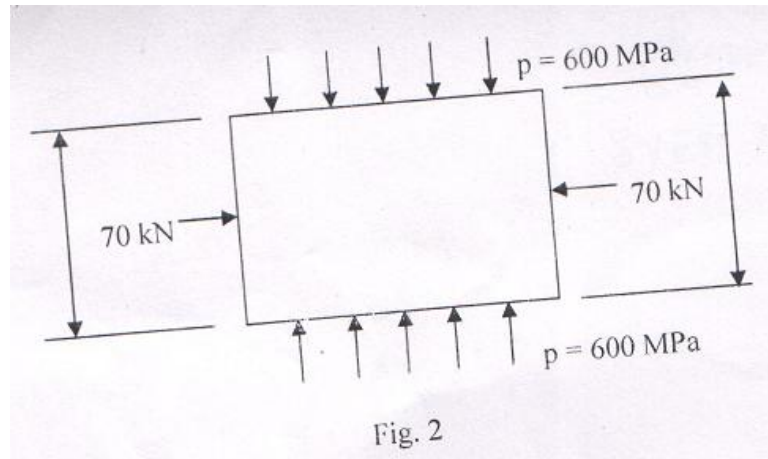


Fig. 1

..2..

- 16 Determine the nodal displacements for a plate shown in figure 2 below, subjected to the given loading  $E = 210 \text{ GPa}$ , and  $\alpha = 0.25$ . Take thickness = 30 mm and  $p = 600 \text{ MPa}$ , consider plane stress condition



- 17 (a) What do you understand by Eigen values and Eigen vectors? Explain in detail.  
(b) What are the various types of Finite elements methods software? Mention their features and applications.

\*\*\*\*\*

**FACULTY OF ENGINEERING**  
**B.E. 3/4 (Prod.) II - Semester (New)(Main) Examination, May / June 2017**

**Subject : CAD / FEM**

**Time : 3 Hours**

**Max. Marks: 75**

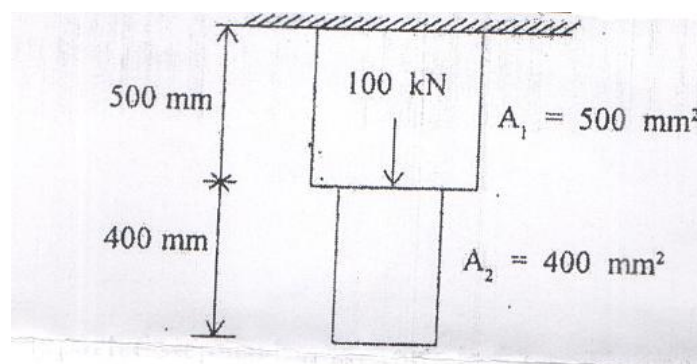
**Note: Answer all questions from Part - A and answer any five questions from Part-B.**

**PART – A (25 Marks)**

- 1 Define CAD and CAE.
- 2 What are the various graphic I/O devices?
- 3 What do you mean by Homogeneous Co-ordinates?
- 4 Differentiate Non-parametric and parametric representation of curves.
- 5 Write any four properties of Bezier curves.
- 6 What do you mean by concatenation?
- 7 State the properties of stiffness matrix of a  $C^a$  element.
- 8 Explain how the principle of minimum potential energy is applied in formulation of a finite element problem.
- 9 Explain the term Eigen values, Eigen vectors in a stepped bar problems.
- 10 Explain why isoparametric formulation is most relevant for practical problems.

**PART – B (50 Marks)**

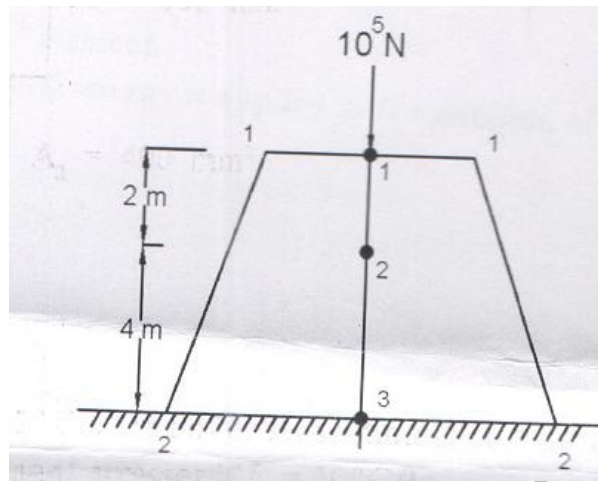
- 11 (a) Explain B-REP and C-rep approach of solid modeling with examples.  
 (b) The triangle A(1, 1), B (2, 1) and C(1, 3) is scaled by a factor of 2. Find the co-ordinates of the triangle.
- 12 (a) Write short notes on : (i) Mechanical Tolerance (ii) Mass property calculations  
 (b) What is FEA ? What are the basic steps involved in it.
- 13 (a) Write any four properties of Bezier curves.  
 (b) Four vertices of Bezier polygon are  $P_0(1, 1)$   $P_1(2, 3)$ ,  $P_2(4, 3)$  and  $P_3(3, 1)$ . Determine seven points on the Bezier curve.
- 14 The vertically supported stepped bar is shown in figure 1. The specific weights is  $75 \text{ kN/m}^2$ . A point load of 100 kN acts at the middle node. Determine the each element and support reaction. Take  $E = 2 \text{—GPa}$ .



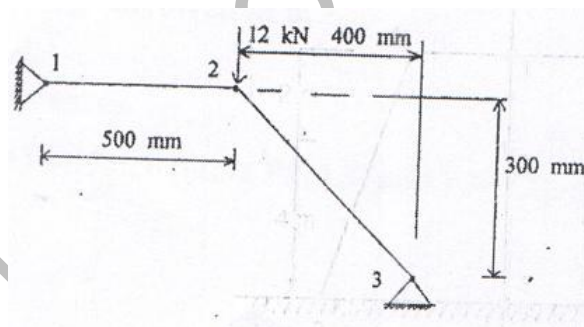
**Fig. 1**

..2..

- 15 For tapered bar shown in figure 2 at '1-1' and '2-2' the area of cross section is  $10^{-6} \text{ m}^2$  and  $10^{-4} \text{ m}^2$ . Find the deflection at node 2 and element stresses if  $E = 200 \text{ GPa}$ .



- 16 (a) Determine the displacements of node 2 and the stress in the element 2 for the bar truss shown in figure 3. Area of cross section of each element if  $A = 200 \text{ mm}^2$ ,  $E = 70 \text{ GPa}$ .



- 17 Write the shape function for  
 (a) (i) 2-noded beam element  
 (ii) 3-noded triangular element  
 (b) Derive the stiffness matrix for 2 noded bar element

\*\*\*\*\*



**FACULTY OF ENGINEERING****B.E. 3/4 (CSE) II – Semester (New) (Main) Examination, May/June 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)**

- 1 What is an Iterative process? (2)
- 2 Define the elements of structural modeling. (2)
- 3 “UML is a language for specification”. Justify. (3)
- 4 Differentiate between Association and Aggregation. (2)
- 5 Define Interface and Package with notations. (3)
- 6 Differentiate between sequence and collaboration diagrams. (3)
- 7 What are swimlanes? (3)
- 8 Define composite and history states of a state machine. (3)
- 9 What are 4 ps? (2)
- 10 What is a use case Process? (2)

**PART – B (5x10 = 50 Marks)**

- 11 a) Define class and explain the concept of classes and their relationships with an example. (5)  
b) Explain different stereotypes that apply to usecases. (5)
- 12 a) What are the elements of basic behavioral modeling? Discuss with examples. (5)  
b) What are the steps involved in forward Engineering? Explain. (5)
- 13 a) Differentiate between component and deployment diagrams. (5)  
b) What is an Artifact? Explain with an example how to develop an Artifact diagram. (5)
- 14 Define the following:
  - a) Process and Thread (3)
  - b) Pattern and Framework (4)
  - c) System and model. (3)
- 15 a) What is a State chart diagram ? Explain with an example. (5)  
b) Explain Joins and Forks in an Activity diagram. (5)
16. Explain in detail the features of a Unified process. (10)
- 17 a) What is a workflow? What are core workflows of a Unified process? (5)  
b) Explain the steps involved in Elaboration. (5)

\*\*\*\*

**FACULTY OF ENGINEERING****B.E. 3/4 (CSE) II – Semester (Old) Examination, May/June 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)**

- |    |  |   |
|----|--|---|
| 1  | How does UML help us to model a software system?             | 3 |
| 2  | What is a Class? Give an example.                            | 3 |
| 3  | What is a relationship? Define advanced relationships.       | 3 |
| 4  | Differentiate between an Active class and an advanced class. | 3 |
| 5  | Define a) Process b) Thread.                                 | 2 |
| 6  | What are structural diagrams? Name them.                     | 3 |
| 7  | What is Reverse engineering?                                 | 2 |
| 8  | Define 4 P's of a Unified process.                           | 2 |
| 9  | Differentiate between a Use case and a Collaboration.        | 2 |
| 10 | What is a Deployment diagram?                                | 2 |

**PART – B (5x10 = 50 Marks)**

- |    |  |    |
|----|--|----|
| 11 | a) What are the building blocks of UML? Explain.   | 5  |
|    | b) Explain the importance of Use case diagrams with an example.  | 5  |
| 12 | a) Explain the concept of Swim lanes in activity diagrams.   | 8  |
|    | b) What is a Pattern?  | 2  |
| 13 | What is Forward engineering? Explain the steps involved in modeling a software system with an example. | 10 |
| 14 | a) Differentiate between Artifact diagram and Component diagram.                                       | 5  |
|    | b) Define and explain the terms System and Model.  | 5  |
| 15 | a) What is a Unified process? Explain its core work flows.   | 5  |
|    | b) Draw the class diagram for a bank application.  | 5  |
| 16 | a) How can you say a Unified process is Iterative and Incremental?                                     | 5  |
|    | b) Explain capturing requirements as Use cases.  | 5  |
| 17 | a) Explain the Workers, Artifacts and Work flows of Implementation phase.                              | 5  |
|    | b) Differentiate between Analysis and Design phases.   | 5  |

\*\*\*\*

**FACULTY OF INFORMATICS**  
**B.E. 3/4 (IT) II - Semester (New)(Main) Examination, May / June 2017**

**Subject : Object Oriented System Development**

**Time : 3 Hours**

**Max. Marks: 75**

**Note: Answer all questions from Part - A and answer any five questions from Part-B.**

**PART – A (25 Marks)**

- 1 What is UML and where it can be used? (2)
- 2 What are stereotypes and constraints in UML? (2)
- 3 Write any four principles of modeling. (2)
- 4 What is sequence diagram explain with example? (3)
- 5 What are tagged values in UML explain with example. (3)
- 6 What is an artifact? (2)
- 7 Define the following mechanism in UML (3)
  - (i) specification (b) Adornments (c) Common divisors
- 8 Define Unified process. (2)
- 9 Write about iterative and incremental process. (3)
- 10 Write about the role of Design in software life cycle. (3)

**PART – B (50 Marks)**

- 11 (a) UML is a language for visualizing, specifying, constructing and documenting the artifacts of software intensive systems – justify. (5)
- (b) Discuss various Relationship in UML with examples. (5)
- 12 (a) Explain about advanced classes and its common modeling techniques. (5)
- (b) Explain about use cases and use case diagrams with example. (5)
- 13 (a) Explain about four Ps in software development. (5)
- (b) Explain the concept of patterns and frameworks and where they are used. (5)
- 14 (a) What is state chart diagrams? Explain its contents, used and common modeling techniques. (6)
- (b) Discuss the understanding of system content using Domain model. (4)
- 15 (a) Explain the activity diagram with swim lanes and illustrate with example. (4)
- (b) What is software architecture? Why we need it? Explain briefly. (6)
- 16 (a) Define object. Explain object diagram with example. (6)
- (b) Write the differences between sequence and collaboration diagram. (4)
- 17 (a) What is Deployment diagram? What are the common modeling Techniques for deployment diagram. (6)
- (b) Discuss the role of analysis in software life cycle. (4)

**FACULTY OF INFORMATICS**  
**B.E. 3/4 (IT) II - Semester (Old) Examination, May / June 2017**

**Subject : Object Oriented System Development**

**Time : 3 Hours**

**Max. Marks: 75**

**Note: Answer all questions from Part - A and answer any five questions from Part-B.**

**PART – A (25 Marks)**

- 1 Write any two reasons, why we go for the modeling. (2)
- 2 Define any three applications of UML. (3)
- 3 Define interface, package, component with UML notation. (3)
- 4 Define action states and activity states that are presented in the activity diagram. (3)
- 5 Define fork and join in activity diagram. (2)
- 6 Define Event and signal in state machines. (2)
- 7 Define White Box and Black Box Testing. (2)
- 8 Define following Relationships in UML. (3)
  - (i) Aggregation (ii) Association (iii) Composition
- 9 Define the following common mechanisms in the UML. (3)
- 10 Write the difference between processes and threads. (2)

**PART – B (50 Marks)**

- 11 (a) Explain the different types of things in the UML. (5)
  - (b) Explain different diagrams in the UML. (5)
- 12 Explain the Life cycle of unified software development process. (10)
- 13 Explain the steps in requirements capture with an example. (10)
- 14 (a) Define class and draw a class diagram for a student registering for a course in a University. (5)
  - (b) Explain Architecture of the UML with a neat diagram. (5)
- 15 (a) Explain the time and space. How do we specify timing constraints and location in behavioural modeling? (5)
  - (b) What is forward and reverse engineering? (5)
- 16 (a) Discuss what can be done for building a system that encompasses multiple flow of control (5)
  - (b) Explain activity diagram with swimlanes and illustrate with an example. (5)
- 17 (a) Draw the state machine for the life time of an object. (6)
  - (b) Explain the following states machines with an example. (4)
    - (i) History states (ii) Concurrent Substates