FACULTY OF ENGINEERING

B.E. II– Semester (AICTE) (Main) Examination, May / June 2019

Subject: Chemistry

Time: 3 Hours   **Max. Marks: 70**

Note: Answer all questions from Part A & any Five questions from Part B.

PART – A (10 x 2 = 20 Marks)

1) Differentiate between Electrolytic and Galvanic cells.   2
2) Write the expressions for ΔH abd ΔS interms of cell e. m. f.   2
3) How are exhausted Ion-exchange resins regenerated?   2
4) What is pitting corrosion? Explain.   2
5) Write the structures of Nylon 6:6 and Buna-S rubber.   2
6) Explain the mechanism of conduction in poly acetylene.   2
7) What are the requirements of a good fuel? Explain.   2
8) What is LPG? What is its composition?   2
9) Write the properties of Biodiesel.   2
10) Discuss the applications of composites.   2

PART – B (50 Marks)

11. (a) Calculate the equilibrium constant for the following reaction at 298K.

$$Sn + CuSO_4 \rightleftharpoons Cu + SnSO_4$$ 5

$$E^0{}_{Cu^{2+}/C_u} = 0.337V \; ; E^0{}_{Sn^{2+}/Sn} = -0.136V$$

(b) Explain construction and applications of Methanol-Oxygen fuel cell.   5

12. (a) How do you estimate temporary and permanent hardness of water by EDTA method? Explain.   5
(b) What are the various methods of cathodic protection? Discuss impressed current Method?   5

13. (a) Write preparation, properties and uses of silicone rubber.   5
(b) Compare thermoplastics and thermosetting resins.   5

14. (a) Calculate the gross and net calorific value of coal having the following compositions: Carbon = 85%, hydrogen = 8%, Sulphur = 1%, nitrogen = 2%, ash = 4%. Latent heat of steam = 587 Cal g^{-1} 5
(b) What is Cracking? Explain catalytic cracking by moving bed method.   5

15. (a) Explain the concept of Quinhydrone electrodes and write electrodic reactions when they are used as anodes and cathodes in a cell.   5
(b) What are green catalysts? Give two examples. What is Atom economy?   5

16. (a) What are fuel cells? Describe the construction and working of CH_3OH-O_2 fuelcell.   6
(b) Derive Nern'st equation and mention its applications.   5

17. (a) Explain desalinations of water by Reverse Osmosis method.   5
(b) Write the composition and uses of Gasoline and Diesel.   5

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FACULTY OF ENGINEERING
B. E. II – Semester (Main) (AICTE) Examination, May / June 2019

Subject: Physics

Time: 3 Hours   Max. Marks: 70

Note: Answer all questions from Part-A & any five questions from Part – B.

PART – B (20 Marks)

1. In a crystal a=b=2.5 A^o and c = 1.8 A^o , then find the Interplanar distance between (1 1 1) planes.
2. Explain about Edge dislocation and Burger's Vector.
3. Explain about the Hall co-efficient.
4. Explain about Hysteresis behavior of Ferro electric Material.
5. Define electron volt (ev) and find its value.
6. Write Maxwell's equations in Integral form.
7. What are Magnetic dipoles and Domains.
8. Define critical current in superconductors.
9. Write four Applications of LASER.
10. Explain about Numerical aperture.

PART – B (50 Marks)

11. a) Explain powder Diffraction Method.   4M
    b) Derive the equation for concentration of Frenkel defects.   6M

12. a) Derive an equation for electrical conductivity of an Intrinsic Semi conductor.   5M
    b) Discuss determination of dielectric constant by capacitance Bridge Method.   5M

13. a) Explain Kronig Penney Model.   5M
    b) What are ferro electric crystals and Explain the Barium Titanite Crystal structure.   5M

14. a) Derive time Independent Schrodinger equation.   5M
    b) Find the relation between D, E and P.   5M

15. a) Find deBroglies wave length of Oxygen Molecule (O_2) ($_8O^{16}$) is your exam hall.   5M
    [1 amu = 1.6 x 10^{-27} kg and room temp is 27°C] (k=1.38 x 10^{-23} J/K)
    b) Derive E.M. Wave equation in free space.   5M

16. a) Explain B-H curve of a Magnetic Material and what are soft & Hard Magnetic Materials.   5M
    b) What are High Tc Superconductors and write some applications of superconductors.   5M

17. a) Explain about Helium-Neon LASER.   5M
    b) Explain about different Fiber drawing process, and discuss Double crucible Method.   5M

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FACULTY OF ENGINEERING

B.E. 3/4 (Civil) II - Semester (Backlog) Examination, May / June 2019

Subject : Structural Engineering Design and Detailing – I (RCC)

Time : 3 hours   **Max. Marks : 75**

Note: Answer all questions from Part-A. Answer any One question from each unit from Part-B. Assume suitable data if required.

PART – A (25 Marks)

1	What is the need for the combined footing?	2
2	Define cantilever and counter fort retaining walls.	3
3	What is trapezoidal footing?	2
4	What do you understand from elastic design?	3
5	What is need for the design of domes?	2
6	What are different stresses in water tanks?	2
7	How do you obtain dispersion length?	3
8	What is importance of IRC 21, explain?	2
9	Define effective width, with equation.	3
10	Define bridge deck slab.	3

PART – B (50 Marks)

Unit-I

11 Design a combined footing for two reinforced concrete columns using following ; size of the column is 500 x 500mm, spacing of the columns 5m, load transmitted by each column 800kN, and soil bearing capacity is 180kN/m^2. Adopt M35 grade concrete and Fe500 grade steel. Sketch the reinforcement details.   15

OR

12 Design a rectangular type retaining wall to retain the earth embankment of 6.75m above the ground level, density of the earth is 19.5kN/m^3, angle of internal friction is 32 degrees, SBC of soil is 250kN/m^2, coefficient of friction between soil and concrete is 0.5, use M40 and Fe550 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 98,000 liters, the inside dimensions of the water tank may be taken as 8m x 6m. Design the side walls of tank using M25 grade concrete and Fe500 grade steel. Sketch the reinforcement details.   15

OR

14 Design a RC Intze type water tank supported on 10 columns is required to store 2,20,000 liters of water. Design the water tank for a height of staging above 15m, from ground level, SBC is 200kN/m^3, use M30 grade concrete and Fe500 grade steel. Sketch the reinforcement details.   15

Unit-III

15 Design a deck slab for the following particulars :   20
    Clear span   : 6.5 meters
    Width of the foot path   : 1m on either side
    Wearing coat   : 110mm
    Loading IRC   :   IRC class AA (Tracked)
    Materials used   :   M40, Fe500

OR

16 Design the reinforced concrete slab of an RC T-beam bridge and slab deck using
   the following data :   20

    Spacing of the main T-beam   = 3.5m
    Span of the T-beam   = 12m
    Type of loading   = IRC class AA tracked vehicles, no cross
                                     girders have been used
    Materials   = M35, Fe550 Grade steel

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FACULTY OF ENGINEERING

B.E. 3/4 (EE/Inst.) II-Semester (Backlog) Examination, May / June 2019

Subject : Microprocessors & Micro Controllers

Time : 3 Hours   Max. Marks: 75

Note: Answer all questions from Part-A & any five questions from Part-B.

PART – A (25 Marks)

1   Explain operation of the following pins of 8086.   (3)
    (i) ALE   (ii) HOLD (iii) INTR
2   List the various addressing modes of 8086 microprocessor.   (3)
3   Explain the following 8086 directives with an example.   (3)
    (i) SEGMENT (ii) DB (iii) DW
4   What is the role of a debugger program in any Assembly Language Programming? (2)
5   List the software interrupts of 8086.   (2)
6   List the various modes of operation of programmable interval timer.   (3)
7   Mention special function registers of 8051.   (2)
8   What is PSW (status register) of 8051?   (2)
9   List the special functions registers responsible for serial I/O in 8051.   (2)
10 Write various applications of 8051 Micro controller.   (3)

PART – B (50 Marks)

11 (a) Explain the architecture of 8086 microprocessor with the help of neat sketch. (7)
    (b) List the various operations of flag register 8086 processor.   (3)

12 Explain the following 8086 instructions with examples.   (10)
    (i) Arithmetic & logical instructions (ii) Data transfer instructions

13 (a) Write 8086 assembly Language Program to find largest number of 8 bit ten
        numbers n an array.   (6)
    (b) Compare procedures and macros.   (4)

14 Draw the block diagram of 8255 and explain the features in detail with its control
    words format.   (10)

15 Explain in detail with examples all the addressing modes of 8051 Microcontroller. (10)

16 Explain the following 8051 instructions with examples   (10)
    (i) Rotate and Logical instructions   (ii) Jump and call instruction

17 (a) With a diagram explain keyboard interfacing with 8051 microcontroller.   (5)
    (b) Explain briefly the timer operations of 8051.   (5)

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FACULTY OF ENGINEERING

BE ¾ (ECE) II Semester (Old) Examinations, May / June 2019

Subject: Computer Organization and Architecture

Time: 3 Hours   **Max. Marks: 75**

Note: Answer All Questions from Part – A, & any Five Questions from Part – B.

Part – A (25 Marks)

1. Differentiate between restoring and non-restoring algorithm?   3M
2. Show the hardware required for addition and subtraction?   2M
3. Write the basic computer instruction formats of the memory, register and I/O reference instructions?   3M
4. How many T states are required for LDA and STA instructions?   2M
5. What is the need for addressing mode?   2M
6. What are the applications of stack organized computer?   3M
7. Compare and contrast between memory mapped I/O and I/O mapped I/O?   3M
8. What is the need for I/O interface?   2M
9. How many 128x8 RAM chips are needed to provide a memory capacity of 2048 bytes? 2M
10. What is cache HIT and MISS?   3M

Part – B (5x10 = 50 Marks)

11. a) Describe booths multiplication algorithm with the help of an example?   7M
    b) What are the IEEE standards for binary floating point number?   3M

12. a) Explain in detail about micro program sequencer?   7M
    b) Draw the microinstruction format and explain each field in detail?   3M

13. a) What are the different addressing modes in general purpose computer and explain with an example?   7M
    b) Write the differences between RISC and CISC characteristics?   3M

14. a) Explain CPU –IOP communication with the flowchart?   5M
    b) Explain Daisy chain priority interrupt data transfer method?   5M

15. Describe the different addressing mapping techniques in the cache memory?   10 M

16. a) Explain floating point addition and subtraction with the help of an example?   5M
    b) Explain an interrupt cycle of the general purpose computer.   5M

17. Write short notes on two:
    a) Stack Organization   5M
    b) DMA Controller   5M
    c) Virtual memory   5M

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FACULTY OF ENGINEERING

BE 3/4 (ECE) II Semester (Backlog) Examination, May / June 2019
Subject: Microprocessor and Microcontroller

Time: 3 Hours   **Max. Marks: 75**

NOTE: Answer all questions from Part A & any five questions from Part-B

PART – A (25 Marks)

1. Write the differences between 8086 and 8088 Microprocessor.   3M

2. Explain the operation of $\overline{BHE}$ and A0 pins in the 8086.   2M

3. What is the interrupt vector table? Explain function of types interrupt?   2M

4. Explain BSR control word format of 8255 and write the program to set PC_5.   3M

5. Explain the following pin functions with the help of an example.   2M
   i) SWAP A   ii) XCH

6. Explain four addressing modes of 8051 with an example.   3M

7. What is the purpose of TMOD register?   2M

8. Write a program for decimal addition of two numbers using internal RAM of 8051?   3M

9. What is the size of ROM and RAM capacity of 8051 and 8031 microcontroller?   3M

10. What is the purpose of ULN 2003 placed between the 8051 and the stepper motor?   2M

PART – B (5 x 10 = 50 Marks)

11. a) Explain programming model of the 8086 with a neat diagram.   7M
    b) Draw and explain the flag structure of the 8086.   3M

12. a) Explain the architecture of 8255 programmable Peripheral Interface   6M
    b) Explain control word format of 8255 in I/O and BSR mode with an examples.   4M

13. a) Explain the architecture of 8051 with a neat circuit diagram.   5M
    b) Write a program to find the sum of series of 8-bit numbers using external RAM and 8051 instruction set.   5M

14. a) Describe various modes of operation of timer/ counter in 8051   5M
    b) Write an ALP in 8051 to transfer "ECE" serially at 9600 baud rate continuously.   5M

15. a) Interface a stepper motor to 8051 and write a program to rotate clock wise and anti clock wise direction.   5M
    b) Explain ADC interface to 8051Microcontroller?   5M
       5M

16. a) Explain I/O port structure of 8051 Microcontroller?   5M
    b) Write a program to generate a square wave of 1KHZ frequency on pin P1.2. Assuming that XTAL= 11.0592 MHZ.   5M

17. Write any two of the following   (2X5=10M)
    a) Addressing modes of 8086
    b) Interrupts in 8051
    c) DMA controller 8257.

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FACULTY OF ENGINEERING

B.E. ¾ (Mech. /AE) II - Semester (New)(Backlog) Examination, May / June 2019

Subject: Heat Transfer

Time: 3 Hours **Max. Marks: 75**

Note: Answer all questions from Part A and any five questions from Part B

PART – A (25Marks)

1. Explain thermal conductivity and thermal diffusivity [2]
2. Why does metal feel colder than wood, even if both are at the same temperature? [2]
3. List out the application of lumped parameter analysis? [3]
4. Why fins are used? How to increase the effectiveness of the fin? [2]
5. Differentiate between mean film temperature and bulk mean temperature [3]
6. Differentiate between Velocity and thermal boundary layer. [3]
7. What is black body? How does it differ from gray body? Give examples of each. [3]
8. Enumerate the factors on which the energy exchange through radiation depends. [2]
9. Discuss the importance of heat exchangers for industrial applications. [3]
10. Differentiate between nucleate boiling and pool boiling. [2]

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PART – B (5 x 10 = 50 Marks)

11. A steel pipe having internal diameter of 2 cm, outer diameter of 2.4 cm and thermal conductivity of steel of 54 W/mk carries hot water at 95°C. Heat transfer coefficient between the inner surface of steel pipe and the hot water is 600 W/m^{2}K. An asbestos insulation with thermal conductivity of 0.2 W/mk and thickness 2 cm in but on the steel pipe. Heat is lost from the outer surface of the asbestos insulated pipe to the surrounding air at 30°C, heat transfer coefficient for the outer surface of the insulation being 8 W/m^{2}K

   i) The rate of heat transfer per meter length of the pipe.

   ii) Determine the temperatures at the inner, outer surfaces of the steel pipe and the outer surface of the insulation.

   iii) What do you understand by the term "critical radius of insulation"? What is the value of critical radius in the above question? What is the rate of heat loss, if thickness of insulation were to correspond to critical radius? [10]

12. The aluminium square fins(0.5 mm x 0.5 mm) 10 mm long are provided on the surface of semiconductor electronic device to carry 1 W of energy generated: The temperature at the surface of the device should not exceed 80 C, when the

surrounding temperature is 40°C. K(aluminium) = 200 W/m°C; h = 15 W/m²C. Determine the number of fins required to carry out the above duty. Neglect the heat loss from the end of the fin. [10]

13. A vertical pipe 80 mm diameter and 2m height is maintained at a constant temperature of 120°C. The pipe is surrounded by still atmospheric air at 30°C. Find heat loss by natural convection. [10]

14. Two very long concentric cylinders of diameters D_1 = 0.2 and D_2 = 0.5 m are maintained at uniform temperatures of T_1 = 950 K and T_2 = 500k and have emissivities $v_1 = 1$ and $v_2 = 0.7$, respectively. Determine the net rate of radiation heat transfer between the two cylinders per unit length of the cylinders. [10]

15. A counterflow double pipe heat exchanger is used to heat water using oil as the heating fluid. The heat exchanger area is 16 sq. m and its is observed that water inlet and outlet temperatures are 35°C and 75°C while the corresponding oil temperatures are 110°C and 75°C. If water flows at the rate of 68 kg/min, calculate the overall heat transfer coefficient for the heat exchanger. Take specific heat of oil as 1.9kJ/ kg° C. [10]

16. a) Explain the Boiling Heat Transfer Phenomena, its types and applications. [4]

b) Determine the stable film boiling heat transfer coefficient for the film boiling of saturated water at atmospheric pressure on an electrically heated 1.5 mm dia horizontal platinum wire with temperature difference of 250°C. What would be the power dissipation per unit length of the heater. [6]

17. (a) Explain Wein's displacement law of radiation. [4]

(b) A long cylinder of 30 mm diameter, initially at a uniform temperature of 1000K, is suddenly quenched in a large, constant-temperature oil bath at 350K. The cylinder properties are k=1.7W/m K, c= 1600J/kg. K and … = 400 kg/m³, while the convection coefficient is 50 W/m².K. Calculate the time required for the surface cylinder to reach 500k. [6]

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FACULTY OF ENGINEERING
B.E. 3/4 (PROD.) II-Semester (Backlog) Examination, May / June 2019

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 (25 MARKS)

1. What is parametric modeling and when it is used?

2. Write short notes on Bezier Curve.

3. What is the application of synthetic surfaces?

4. What is concatenated Matrix?

5. Write the element stiffness matrix for 1D quadratic bar element   .

6. Explain the procedure for calculation of stress in a truss element.

7. Express the Hermit shape functions of beam element.

8. Write the D matrix for plane stress and plane strain conditions.

9. Write the formula for shape functions N_1, N_2, N_3 & N_4 of quadrilateral element.

10. Derive the consistent mass matrix for bar element.

PART-B (50 MARKS)

11. a) Draw the Bezier Curve by 3 control points (4, 2), (0, 0), (2, 8).

    b) Write the differences between parametric and non-parametric curves.

12. a) Differentiate between B-Rep and C-rep of solid modelling.

    b) What is the need of synthetic surfaces? Enlist different synthetic surfaces.

13. Find the homogeneous concatenated matrix and transformed coordinates when a square [(1, 1), (2, 1), (1, 2) and (2, 2)] is rotated by 90^0 anticlockwise about a line passing through one of its vertex (1, 1) and parallel to x-axis.

14. Calculate the nodal displacements and element stresses of the truss shown in fig 1. The truss members are subjected to a temperature rise of 50^0C. [E= 200 GPa, A= 500 mm^2 for all members and = 10 X 10 $^{-6}$ per ^{0}C].
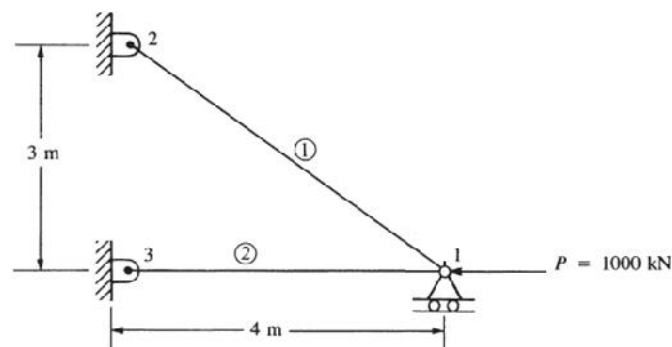

Figure 1

15. Determine the deflection and slope at 2m from the left end of the cantilever beam shown in fig2. Take $I_1 = 4 \times 10^{-6} m^4$; $I_2 = 2 \times 10^{-6} m^4$; E=200 GPa.
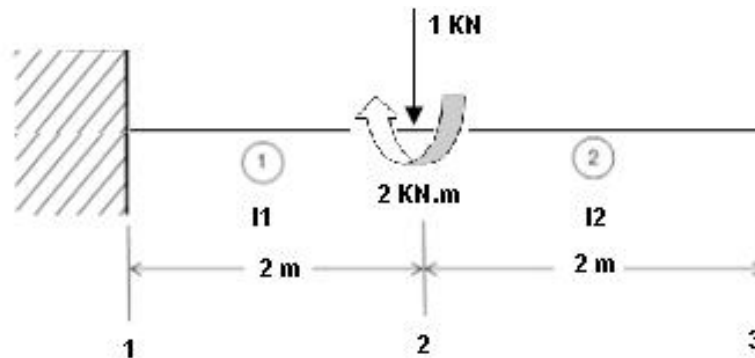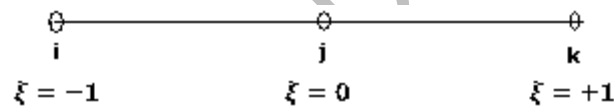

Figure2

16. Evaluate $\int_{-1}^{1} [N]^T [N] d\xi$ for following element to illustrate the application of Gaussian quadrature method. $[= \frac{\xi(\xi-1)}{2}$; $N_2 = (1 - \xi^2)$; $N_3 = \frac{\xi(1+\xi)}{2}]$.

17. Explain the following
    a. Different types of synthetic curves
    b. Different type of analytical surfaces
    c. Eigen values and Eigen Vectors

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FACULTY OF ENGINEERING

B.E. 3/4 (CSE) II – Semester (Backlog) Examination, May / June 2019
Subject: Object Oriented System Development

Time: 3 Hours   **Max.Marks:75**

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

1 What are the aims of modeling?	2
2 Define component.	2
3 Write short notes on usecases.	2
4 Which UML diagrams give static and dynamic view of a system?	3
5 Differentiate systems and subsystems	3
6 What is a use case process?	3
7 Name the workers involved in the design workflow	3
8 What is an Artifact?	2
9 Define requirements capture.	2
10 Write the difference between sequence and collaboration diagrams	3

PART – B (5 x 10 = 50 Marks)

11. a) How do you model a Class diagram using classes and all possible relationships? Explain with an example.   6

    b) Explain Forward and Reverse Engineering for a class diagram   4

12. What are the elements of Basic Behavior modeling ? Discuss with examples?   10

13. Differentiate between Artifact diagram and Component diagram with neat Examples. 10

14. Describe Unified software Development process in detail with a neat diagram   10

15. Describe the following

   a) Design workflow   4

   b) Implementation workflow   3

   c) Analysis workflow   3

16. Explain in detail about the common mechanism in UML.   10

17. What is Activity diagram? Explain Join and Fork in an Activity diagram with example.   10

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FACULTY OF ENGINEERING

B.E. 3/4 (IT) II - Semester (Backlog) Examination, May / June 2019

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	What is the use of UML?	2
2	Define "Classifier" in object oriented systems.	2
3	Define the different states of state machine.	3
4	What are events : Describe different types of events.	3
5	Differentiate between generalization and realization.	3
6	What are four P's in object oriented design?	3
7	What are swimlanes?	3
8	What is the importance of requirements capture?	2
9	What is the role of a component?	2
10	Write notes on different types of roles.	2

PART – B (50 Marks)

11	What are the elements of basic behaviour modeling? Discuss with examples.	10
12	Explain the forward and reverse engineering of class diagram with example.	10
13	Differentiate between artifact diagram and component diagram with neat examples.	10
14	Describe unified software development process in detail with a neat diagram.	10
15	Explain in detail the implementation and test phase and core workflows carried out in them.	10
16	Explain the common modeling techniques of time and space.	10
17	What is activity diagram? Explain join and fork in activity diagram with example.	10

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