

FACULTY OF ENGINEERING

B.E I-Semester (CBCS) (Backlog) Examination, November / December 2018

Sub: Engineering Chemistry-I

TIME: 3 Hours

Max. Marks: 70

Note: Answer All Questions from Part – A and Any Five Questions From Part–B.

PART–A (20 Marks)

1. Write the limitations of first law of thermodynamics 2
2. Calculate the efficiency of heat engine when operates between 27°C and 127°C 2
3. Define phase and component in a phase rule with example. 2
4. What is a triple point? Explain. 2
5. Calculate the carbonate and non carbonate hardness of a sample of water in ppm containing: Mg $[HCO_3]_2 = 73\text{mg.L}^{-1}$, Ca $[HCO_3]_2 = 16.2\text{mg.L}^{-1}$ Mg $Cl_2 = 19\text{mg.L}^{-1}$, $CaSO_4 = 27.2\text{mg.L}^{-1}$ and NaCl = 30 mg.L^{-1} 2
6. What is reverse osmosis? What are it's advantages 2
7. Differentiate between homo and copolymers with examples. 2
8. Generally polymers are insulators but why polyaniline is not an insulator? Explain 2
9. Classify the refractories and mention one example for each. 2
10. What are the functions of a Lubricant? 2

PART–B (50 Marks)

11. a) State and explain carnot theorem for the maximum convertibility of heat into work 6
b) Calculate the maximum work done when 5 moles of an ideal gas expands isothermally and reversibly from 20 liters to 100 liters at 27°C. 4
12. a) Draw a well labelled phase diagram of silver and lead system and explain desilverization of lead. 6
b) Write a short notes on (i) solders (ii) fuses. 4
13. a) What is meant by sterilization of water? Explain break – point chlorination 5
b) What are scales and sludges? Discuss their disadvantages. 5
14. a) Give preparation, properties and uses of (i) PVC (ii) Kevlar 5
b) Discuss the chemistry of vulcanization of rubber and compare the properties of Vulcanized rubber and raw rubber. 5
15. a) Explain the mechanism of extreme-pressure lubrication. 5
b) Explain the terms (i) refractoriness under load RUL (i) Thermal spalling 5
16. a) Discuss the entropy changes in a reversible and irreversible process. 5
b) Describe the softening of hard water by ion – exchange method. 5
17. a) Differentiate between thermoplastic and thermosetting polymers. 5
b) Explain the terms (i) glazing (ii) Viscosity index. 5

FACULTY OF ENGINEERING**BE 3/4 (CIVIL) II- Semester (Suppl) Examination, November / December 2018****Subject: Structural Engineering Design and Detailing - I****Note : Answer all question from part A and any ONE Questions from each unit
Assume suitable data if required****Time : 3 Hours****Max Marks : 75****Part - A (25 Marks)**

1. Explain the advantages of combined footing 2
2. Give any three differences between cantilever and counter fort retaining walls 3
retaining wills 3
3. What are permissible stresses required for the design of water tanks 2
4. Define elastic design and its limitations 3
5. Explain what is shear key and its advantages 3
6. Explain why stability analysis is required for structures 3
7. What are the different loads considered in bridge design 2
8. Explain width wise and length wise dispersions 2
9. Explain the effective width method 3
10. Explain what is design shear forces and design bending moments 2

Part - B (50 Marks)

11. Design a combined footing for the two columns of a multistoried residential building using the following data; 15
 Size of the column = 630 mmx630 mm
 Axial load on each column = 1100kN
 Spacing of the column = $4m_c / c$
 SBC of the soil = 260 ken/m²
 Materials used = M 25, Fe 500 grade steel
OR
12. Design a counter fort retaining wall for the following data; 15
 Height of fill retained by wall = 8 m
 Surcharge angle = 12°
 Density of the soil = 18 ken/m³
 Angle of internal friction = 32°
 Coefficient of friction between
 Soil and base slab = 0.70
 SBC of the soil = 300 m²
 Materials used M30 and fe 500
13. Design a rectangular water tank (resting on the ground) with an open top for a capacity of 80,000 liters. The inside dimensions of the tank may be taken as 6mx4m. Design the side walls of the tank using M30 grade concrete and fe500 grade steel. 15
- OR**
14. Design an Int z type of water tank to store 2.5 million liters of water. The height of the tank above ground level is 10 m. Depth of foundation is 1.8 m below ground level basic wind pressure 2.8 m². Number of supporting columns 10. Adopt M30 grade concrete and Fe 500 grade steel. Design the top ring beam, bottom ring beam, conical dome and bottom spherical dome. Use IS specifications. 15

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15. An RCC deck slab bridge is to be constructed over a trapezoidal channel of 6.0 m base width and side slopes 1:1 laid at a bed slope of 0.35 m/km. Design the slab bridge with the following information.
 Chevy's constant : 70
 Bed level of stream : 100m
 Full supply level : 103 m
 Bottom level : 105 m
 Materials : M25 grade concrete Fe 500 grade steel
 Loading : IRC class – AA (Tracked vehicle)
 Road width : 7.0 m
 Foot path : 780 mm on either side 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 = 3.5 m
 Span of the T – beam = 15m
 Type of loading = IRC class AA tracked vehicles, no cross girders have been used
 Materials = M25, fee 500 Grade steel. 20

FACULTY OF ENGINEERING**B.E. 3/4 (EE/Inst.) II-Semester (Suppl) Examination, November / December 2018****Subject : Microprocessors and Micro Controllers****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 need of memory segmentation in 8086? | 2 |
| 2 | Mention the functions of SP and BP registers in 8086 Microprocessor. | 3 |
| 3 | What is difference between Assembler and Compiler tool in Programming? | 3 |
| 4 | Explain the operation of LEA and XLAT instructions in 8086. | 2 |
| 5 | List the various Bit manipulations in 8086 with an example for each. | 3 |
| 6 | Define Macro. | 2 |
| 7 | Write the important features of 8255. | 3 |
| 8 | Write a 8051 program to rotate a 8 bit number 4 times. | 2 |
| 9 | List various I/O Ports of 8051. | 2 |
| 10 | List various interrupts of 8051 Microcontroller. | 3 |

PART – B (50 Marks)

- | | | |
|-------|--|----|
| 11 a) | With an example explain the various addressing modes in 8086 Microprocessor. | 6 |
| b) | Draw and explain the PSW flag register of 8086. | 4 |
| 12 | Explain with examples any ten Assembler Directives of 8086 Microprocessor. | 10 |
| 13 a) | With necessary diagrams explain A/D and D/A interfacing of 8086 processor. | 6 |
| b) | List the interrupts and explain ISR of 8086 processor. | 4 |
| 14 a) | With a block diagram explain briefly the architecture of 8051 Microcontroller. | 6 |
| b) | Write a 8051 ALP to implement multi-byte addition for 32 bit two numbers. | 4 |
| 15 | With a interfacing diagram explain DAC Interfacing to 8051 microcontroller and write a program to generate a square wave at port P1 of 8051. | 10 |
| 16 a) | With a diagram explain key board interfacing in 8051. | 6 |
| b) | Write a program for 8086 to find factorial of a 8 bit number. | 4 |
| 17 a) | Explain the re-entrant and recursive procedures with examples. | 5 |
| b) | Explain the applications of Timers in 8051 microcontroller. | 5 |

FACULTY OF ENGINEERING

B.E. 3/4 (ECE) II - Semester (Old) Examination, November / December 2018

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 Define computer organization and computer architecture. (2)
- 2 Show the hardware for implementing Booth's algorithm. (3)
- 3 Define micro operation and micro instruction. (2)
- 4 Discuss various types of CPU organization. (3)
- 5 What are the basic differences between a branch instruction, a call subroutine instruction and program interrupt? (3)
- 6 Determine the number of clock cycles to process 200 tasks in a six-segment pipeline. (2)
- 7 What is the difference between isolated-mapped I/O and memory-mapped I/O? (2)
- 8 Explain the need for an I/O interface. (3)
- 9 How CAM is different from read / write memory? (2)
- 10 What do you mean by a page fault? Which hardware is responsible for detecting the page fault? (3)

PART – B (50 Marks)

- 11 (a) Draw the flow chart for a sign magnitude addition and subtraction algorithm. (5)
(b) Describe the characteristics of various generations of computer. (5)
- 12 (a) Explain the common bus system of a basic computer with a neat sketch. (6)
(b) Explain the operation of an address sequencer in a microprogrammed control unit. (4)
- 13 (a) Explain instruction formats for various types of computer organizations as single accumulator, general register and stack. (6)
(b) Compare CISC and RISC architectures. (4)
- 14 (a) Explain the operation of Daisy chaining method of priority interrupt. (6)
(b) Write the sequence of steps to be followed for DMA transfer. (4)
- 15 (a) Why page-table is required to a virtual memory system? Explain different ways of organizing a page table. (5)
(b) What do you mean by memory hierarchy? Describe in detail. (5)
- 16 (a) Explain pipeline conflicts and discuss the remedies for those conflicts. (6)
(b) Explain any four data manipulation instructions. (4)
- 17 Write short notes on any **two** of the following: (10)
(a) CPU-IOP communication
(b) Cache memory
(c) Array processors

FACULTY OF ENGINEERING**B.E. 3/4 (ECE) II-Semester (Suppl.) Examination, November / December 2018****Subject: Microprocessor and Microcontroller****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. Differentiate between 8086 and 8088 microprocessor. [2]
2. How are segment registers used to form a 20 bit address? [3]
3. Write an ALP in 8086 to add two packed decimal numbers with the sum exceeding 8 bits. [3]
4. Name the dedicated interrupt vectors of 8086 with their type numbers. [2]
5. What is meant by handshaking mode in 8255 PPI? [2]
6. Sketch the organization of on chip RAM in 8051 showing the address locations. [3]
7. Write a program using 8051 to
 - a) Clear accumulator 10, then
 - b) Add 03 to the accumulator 10 times. [3]
8. Write the function of each bit in SCON register. [2]
9. What is indexed addressing mode of 8051? Illustrate with an example. [2]
10. Interface an 8-bit DAC to 8051 and write a program to generate triangular Wave. [3]

PART-B [50 Marks]

11. a) Explain the function of the following 8086 instructions with an example. [5]
 - i) AAM
 - ii) IN
 - iii) INT
 - iv) DAS
 - v) LOCK
- b) Draw the 8086 maximum mode block diagram and explain the significance of various signals. [5]
12. a) Distinguish between a near call and far call instruction in 8086 with an example. [5]
- b) Write an ALP for 8086 to produce a packed BCD from two ASCII digits. [5]
13. a) Draw the interfacing diagram of 8251 USART with 8086 and explain. [5]
- b) What is IVT? Explain its structure in 8086. [5]
14. a) Draw the port 0 structure of 8051 and explain. How is it different from other ports of 8051? [5]
- b) Write an ALP for 8051 to read 10 bytes of data from internal ROM starting at 0400H and save the data in external RAM starting at 70H. Assume suitable data. [5]
15. a) Mention the interrupts of 8051. How are they enabled and disabled? [5]
- b) How do you program 8051 timer in mode 1 to generate a delay of 5 msec. [5]
16. a) Interface ADC808 converter with 8051 and write a program to read the data from the converter. List all the conversion steps. [5]
- b) Write an 8051 program to transfer 'M' serially at 4800 baud rate continuously. Show the configurations of all the registers used. [5]
17. Write any Two of the following [5 x 2= 10]
 - a) Addressing modes of 8051.
 - b) Stepper motor interfacing with 8051.
 - c) 8257 DMA controller

FACULTY OF ENGINEERING**B.E. 3/4 (Mech. /AE) II - Semester (Supple.) Examination, Nov/Dec 2018****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 (25 Marks)**

1. Define Fourier's law of heat conduction, Newton's law of cooling and Steffen – Boltzmann law of thermal radiation. [3]
2. Define thermal conductivity and convective heat transfer coefficient. Diamond has a very high thermal conductivity. Explain why? [2]
3. Define a semi-infinite solid. Can earth be considered a semi-infinite solid? [2]
4. Derive expression for temperature distribution and heat dissipation in a straight fin of rectangular profile for infinitely long fin. [3]
5. What is the Dittus-Boelter equation? Where and when does it apply? [2]
6. What is the physical significance of Grashof number with reference to heat transfer by natural convection? What is Rayleigh number? [3]
7. Define monochromatic and total emissivity and absorptivity. [2]
8. What is a gray body? How does it differ from a real body and black body? [3]
9. Define effectiveness and NTU. Explain the physical significance of NTU. [2]
10. Draw a temperature-controlled saturated pooling boiling curve for a liquid and explain its various regimes. [3]

PART – B (5x10=50 Marks)

11. A furnace wall is made up of three layers, inside layer with thermal conductivity 8.5 W/mk, the middle layers with conductivity 0.25 W/mk, the outer layer with conductivity 0.08 W/mk respectively. The inside and outside wall temperatures are 600° C and 50 °C respectively. Draw the equivalent electrical circuit for conduction of heat through the wall and find thermal resistance, heat flow/m² and interface temperatures.
12. The temperatures on the two surfaces of a 25 mm thick steel plate, (K=58 W/m°C) Having uniform volumetric heat generation of 35 MW/m³. Are 200°C and 120°C. Neglecting the end effects, determine (i) The temperature distribution across the plate, (ii) The value and position of the maximum temperature and (iii) heat flow from each surface of the plate.

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13. An aluminum alloy fin of 9 mm thick and 50 mm long protrudes from a wall, which is maintained at 120°C . The ambient air temperature is 24°C . The heat transfer coefficient and conductivity of the fin material are $160\text{ W/m}^2\text{k}$ and 55 W/mk respectively. Determine (a) Temperature at the end of the fin, (b) Temperature at the middle of the fin, and (c) Total heat dissipated by the fin.
14. Air at 30°C flows over a flat plate at a velocity of 5 m/s . The plate dimension is $90 \times 30\text{ cm}^2$. Calculate the heat transfer for the (i) half of the plate, (ii) Full plate, and (iii) Next half of the plate.
If air at 30°C and 1 bar plate at a velocity of 5 m/s . 150 cm long and is maintained at 70°C , find the heat transfer for unit width of the plate, taking into consideration both laminar and turbulent portion of the boundary layer.
15. A dead black cylinder of emissivity 0.95 is kept at 90°C in a large enclosure at 10°C . Find the radiation heat loss per square meter of its surface. What would the radiation loss become if the cylinder were surrounded by a concentric cylinder with its inner surface having a brightly polished metal of emissivity 0.1 ?
16. Hot engine oil available at 150°C flowing through the shell side is used to heat 2.4 kg/s of water from 20°C to 80°C in a shell-and-tube in a shell-and-tube heat exchanger. Water flows through eight tubes of 25 mm diameter. Each tube makes six passes through the shell. The exit oil temperature is 90°C . Neglecting the wall resistance, find the oil flow rate and the length of the tubes. Take oil side heat transfer coefficient as $400\text{ W/m}^2\text{k}$. For engine oil at 120°C , $C_p = 2.34\text{ KJ/Kg K}$.
17. (a) What are fundamental dimensions? Express thermal resistance and heat transfer coefficient in fundamental dimensions. [5]
(b) Explain the flow regimes in two phase flow through a tube. What is the difference between slug-flow regime and annular-flow regime. [5]

FACULTY OF ENGINEERING

B.E 3/4 (PROD.) II-Semester (Suppl.) Examination, November / December 2018

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 are the characteristics of Bezier curve?
2. What are the advantage of parametric representation of entities.
3. Explain how mass property of a model is evaluated.
4. What is meant by surface of revolution and tabulated cylinder.
5. In terms of natural coordinates, write the expressions for shape functions of one dimensional linear element.
6. Calculate ϵ_z , in a plane stress problem given $\sigma_x=100$ Mpa, $\epsilon_y=0.001$, $E=200$ GPA and $\nu=0.25$.
7. Determine the shape functions for a four node quadrilateral elements.
8. Write short notes on any one FEA Software and its features.
9. Determine the shape functions for a four node quadrilateral element.
10. What is the importance of convergence requirement?

PART- B (50 Marks)

11. a) What do you understand by design criteria.
b) List the benefits of computer aided design in a manufacturing process.
12. a) What are the characteristics of Bezier curves
b) Find the equation of a Bezier curve defined by the following control point $P_0 = [2 \ 2 \ 0]^T$, $P_1 = [2 \ 3 \ 0]^T$, $P_2 = [3 \ 3 \ 0]^T$, and $P_3 = [3 \ 2 \ 0]^T$. Find the points on the curve for $U = 0, \frac{1}{4}, \frac{1}{2}, \frac{3}{4}$ and 1
13. a) Derive an expression for the stress in truss element.
b) Determine nodal displacements and element stresses of the truss shown in Fig 1. The truss members are subjected to a temperature rise of 50°C .

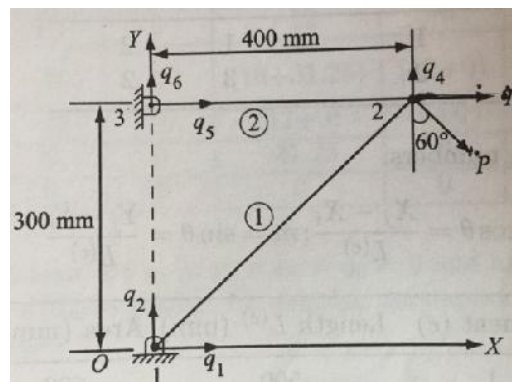


Fig. 1

-2-

14. a) Write the equation of stress strain relations for linear isotropic materials.
 b) For a bar shown in Fig 2. Find nodal displacements and stress using penalty approaches for $E = 200 \text{ GPA}$, $P = 50 \text{ KN}$.

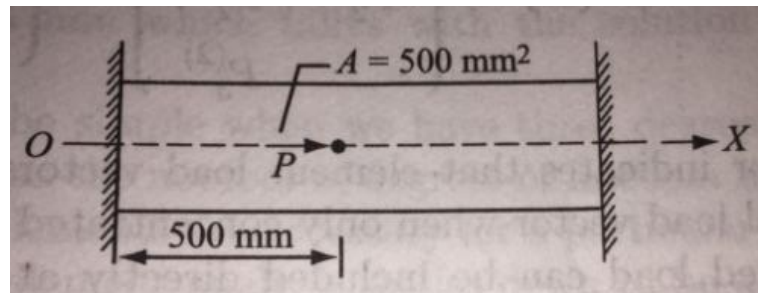


Fig-2

15. A four node – quadrilateral is shown in fig. 4 the coordinates of each node are given in can indicated in figure. The element displacement vector is given as $\{q\} = [0 \ 0 \ 0.20 \ 0 \ 0.15 \ 0.10 \ 0.015]^T$
- The x, y coordinates of a point P whose location in the master element are given by $(\xi) = 0.5$ and $(\eta) = 0.5$
 - The u, v displacement of a point p .

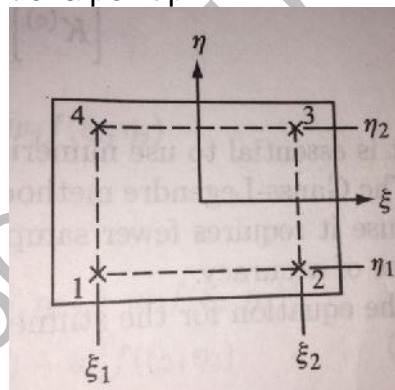


Fig - 2

16. For a simply supported beam using one element.
- Calculate first two natural frequencies.
 - Corresponding eigenvector.

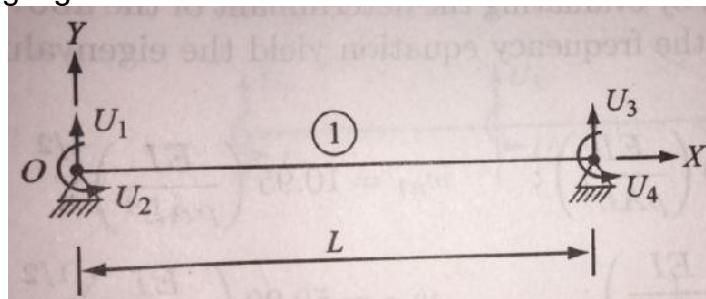


Fig -3

17. a) Explain C-rep and B- rep approaches.
 b) Reflect the polygon whose vertices are $A(-1, 0)$ $B(0, -2)$ $C(1, 0)$ and $D(0,2)$ about the lines i) Horizontal line $y = 2$ and ii) Vertical line $x = 3$

FACULTY OF ENGINEERING**B.E. 3/4(CSE)II-Semester (Supply) Examination, November / December 2018****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 a Model? [2]
- 2 "UML is a language for visualization ". Justify. [3]
- 3 What is Structural Modeling? [2]
- 4 Differentiate between a Class and an Active Class. [2]
- 5 What are the different kinds of Interaction diagrams ? [3]
- 6 What is a state Machine? What is a composite state? [3]
- 7 What is an Artifact diagram? [2]
- 8 What is the importance of a unified approach? [3]
- 9 What are 4 Ps is unified approach? [3]
- 10 What is the importance of testing in unified approach? [2]

PART – B (50 Marks)

- 11 a) What is a Class diagram? Explain with an example. [6]
b) What are the Stereotypes that apply to use cases? [4]
- 12 a) Explain the concept of Swimlanes in Activity diagrams with an example. [6]
b) What is a state Machine? Explain composite state history state and transition state with an example. [4]
- 13 a) What is a Deployment diagram? Explain with a neat diagram, how we can deploy a Banking System. [6]
b) Define the terms
i) Events and Signals
ii) Process and Thread [4]
14. What is a unified software development process? Explain its characteristics in detail. [10]
15. a) What are core workflows? Explain. [6]
b) Explain how requirements are Captured as use cases. [4]
16. What are the phases in a unified process? Explain in detail. [10]
17. Explain the workers, Artifacts, workflows of
i) Design [5]
ii) Implementation [5]

FACULTY OF ENGINEERING**B.E. 3/4 (IT) II-Semester (Supple.) Examination, November / December 2018****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 "UML is a language for construction". Justify. 2
- 2 Define classifier. Write the difference between instance scope and static scope of the classifier. 2
- 3 What is dependency relationship? Give and define stereotypes that apply to dependency relationship. 3
- 4 Name the five standard stereotypes that apply to artifacts. 2
- 5 What are the different types of messages that can be represented in a sequence diagram? Give examples. 3
- 6 What is realization how it is related with collaboration? 2
- 7 Sketch a state chart diagram and explain briefly. 3
- 8 What is an artifact diagram and explain how is it different from deployment diagram? 3
- 9 Explain core workflow of 'Requirement capture'. 2
- 10 Describe about "Deployment Model". 3

PART – B (50 Marks)

- 11 a) Explain the architecture of UML with neat diagram. 6
b) What are the common modeling techniques for modeling structural relationships? 4
- 12 Assume that a professor is planning to write a book. In this process three people are involved; author, reviews and publishes. The author writes a chapter and submits provided that the reviewer accepts the previous one. After all the chapters are completed, the book is given to publisher who in turn makes the book in a ready-to-print form. The books is printed after the author and reviewer approve. Accomplish the following for the above.
a) Use case diagram b) Activity diagram using swim lanes
c) State chart diagram 10
- 13 a) Draw a class diagram to model the following : 6
i) A university consists of a number of colleges
ii) A college offers number of courses
iii) Each course consists of number of students
iv) A college also has teaching staff and non-teaching staff
b) Briefly explain the differences between class diagram and object diagram with example. List any three common uses of both. 4
- 14 a) What are the particulars of component diagram that distinguish them from other kinds of diagram? 5
b) Explain the contents of deployment diagram and its common uses with suitable examples. 5

- 15 a) What is business model? How do you develop it? Illustrate the conversion of requirements to use cases with suitable examples. 6
b) Explain about 4P's in software development process with a neat diagram. 4
- 16 a) What are the responsibilities of i) Software architect ii) Use case engineer iii) Component engineer in implementation model. 5
b) Briefly describe the workflow during testing, including the participating workers and their activities with neat diagram. 5
- 17 Write short notes on : 10
a) Core workflows
b) Component design
c) Systems and models
d) "The unified process is use case driven"

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