

G-2099

(Pages 2)

Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2010

Fourth Semester

Branch : Computer Science and Engineering

OBJECT ORIENTED PROGRAMMING (R)

(2008 admissions—Regular—2007 admissions—Improvement/Supplementary)

Time : Three Hours

Maximum : 100 Marks

Answer all questions.

Part A

Each question carries 4 marks.

1. What kind of things can become objects in OOP ?
2. What are the special properties of constructor functions ?
3. What is a virtual base class ?
4. What is a friend function ?
5. Explain how polymorphism is achieved at (i) Compile time ; (ii) run time.
6. What are the advantages of overloading operators ?
7. Differentiate between class and template class. Give examples for each.
8. What are the uses of named and unnamed name spaces ?
9. What is an in-line function ?
10. Discuss the object oriented features of Java.

(10 × 4 = 40 marks)

Part B

Each question carries 12 marks.

11. (a) Explain with examples the mechanism of creating and using object and classes.
Or
(b) Write a brief account on the evolution of object oriented languages.

Turn over

12. (a) Explain with examples the methods of member access control in classes.
Or

(b) Write a brief account on the types of inheritance.

13. (a) Explain with examples the need and method of function overloading.
Or

(b) Explain with an example the uses of abstract classes.

14. (a) Write a brief account on virtual destructors.
Or

(b) Differentiate between class template and template class. Explain the uses of each.

15. (a) Explain with an example the use of in line functions.
Or

(b) Discuss the object oriented features of Java.

(5 × 12 = 60 marks)

(10 × 4 = 40 marks)

Turn over

B.TECH. DEGREE EXAMINATION, MAY 2010**Fourth Semester**

Branch : Computer Science and Engineering

DATA STRUCTURES AND PROGRAMMING METHODOLOGIES (R)

(2008 admissions—Regular—2007 admissions—Improvement/Supplementary)

Time : Three Hours

Maximum : 100 Marks

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

1. Distinguish between Time Complexity and Space complexity in algorithm design.
2. Explain the significance of documentation.
3. What is an abstract data type ? Explain with example.
4. What is the value of the following postfix expression ?
5, 7, 9, *, +, 4, 9, 3, /, +, —.
5. Explain the sequential representation of strings.
6. What are the advantages and disadvantages of circular linked list ?
7. How would a binary tree look if the inputs were already ordered in ascending order ? Explain with an example.
8. Explain “in order” and “pre-order” traversal of a binary tree.
9. What according to you is the most efficient sorting algorithm ? Give reasons.
10. Compare selection sort and bubble sort.

(10 × 4 = 40 marks)

Part B*Answer all questions.**Each question carries 12 marks.*

11. Explain scalar, primitive and enumerated data types with examples.

Or

12. Describe any *two* algorithm design techniques with examples.

Turn over

13. Develop an algorithm to add two sparse matrices. Assume that matrices are stored in Triplet form.

Or

14. Describe priority queue. Explain the manipulations on this ADT with suitable pseudocode.

15. Develop an algorithm to insert and delete elements into and from a doubly linked list.

Or

16. Write an algorithm for the implementation of linked stack and explain how insertion and deletion are done.

17. Write an algorithm for finding the shortest path between two nodes of a directed, weighted graph. What is its complexity?

Or

18. Explain the following with examples : —

(a) Height of a binary tree.

(b) Sibling.

(c) Skewed binary tree.

(d) Complete binary tree.

19. Develop an algorithm for Quick Sort. Trace it with the following data 7, 6, 2, 3, 5, 4, 9, 1. Write Best Case average case and worst case time complexity.

Or

20. Write the algorithm of merge sort. Explain it with examples.

(5 × 12 = 60 marks)

(10 × 4 = 40 marks)

Part B

Answer all questions.

Each question carries 12 marks.

11. Explain scalar, primitive and enumerated data types with examples.

Or

12. Describe any two algorithm design techniques with examples.

Turn over

G 2124

(Pages : 2)

Reg. No.....

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B.TECH. DEGREE EXAMINATION, MAY 2010

Fourth Semester

Branch : Computer Science and Engineering

ADVANCED MICROPROCESSORS AND PERIPHERALS (R)

[2008 admissions—Regular/2007 admissions—Improvement/Supplementary]

Time : Three Hours

Maximum : 100 Marks

Part A

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

1. Explain the various modes of operation of 8255.
2. Explain the basic functions and applications of 8251 interface.
3. Explain the salient features and advantages of microcontrollers over microprocessors.
4. Draw the interfacing of a D/A converter with 8085 processor.
5. Explain the use of segment registers in 8086.
6. List the stack memory addressing modes in 8086.
7. What are the string instructions in 8086 ?
8. What are the additional features of 80286 over 8086 ?
9. Explain the paging mechanism in 80386.
10. Write a short note on RISC architecture.

(10 × 4 = 40 marks)

Part B

*Answer either (a) or (b) of each module.
Each question carries 12 marks.*

Module I

11. (a) Explain with neat block diagram the functions of 8279 keyboard and display interface.

Or

- (b) (i) Explain the BSR mode of operation of 8255.
(ii) Draw the internal block diagram of 8252.

Module II

12. (a) With neat diagram, explain the interfacing of keyboard with 8085 processor.

Or

- (b) Explain the interfacing of an ADC with 8085 processor with necessary diagrams.

Turn over

Module III

13. (a) Draw the block diagram of 8086 processor architecture and explain each block.

Or

- (b) (i) List the differences between 8086 and 8088 processors.
- (ii) What are the various memory addressing modes in 8086 ? Give one example in each.

Module IV

14. (a) (i) What are the various flag bits in 8086 ?

(ii) Write an assembly language programme using 8086 instruction set to find the number of even and odd numbers from a given series of 16 bit hexadecimal numbers.

Or

- (b) (i) What do you mean by a descriptor ? Discuss the structure of a 80286 descriptor.
- (ii) Discuss the real mode and protected mode of operation of 80286.

Module V

15. (a) (i) Explain the interfacing of coprocessors in 80386.

(ii) What are the special features of Pentium Processors ?

Or

(b) Write short notes on the following :—

- (i) Latest Intel Processors.
- (ii) Hyperthreading in advanced processors.
- (iii) Advantages of RISC processors.

(5 × 12 = 60 marks)

(10 × 4 = 40 marks)

Part B

Answer either (a) or (b) of each module.
Each question carries 12 marks.

Module I

11. (a) Explain with neat block diagram the functions of 8278 keyboard and display interface.

Or

- (b) (i) Explain the BSR mode of operation of 8255.
- (ii) Draw the internal block diagram of 8255.

Module II

12. (a) With neat diagram explain the interfacing of keyboard with 8086 processor.

Or

(b) Explain the interfacing of an ADC with 8086 processor with necessary diagrams.

Turn over

VIII. (a) The probability that a pen manufactured by a company will be defective is 0.15. A random sample of 10 pens are chosen. What is the probability that in the sample (i) not more than one is defective; (ii) at least 7 are good; and (iii) all are good. (10 marks)

(b) Fit a Poisson distribution for the following data and hence calculate the theoretical frequencies:—

x :	0	1	2	3	4	5
f :	142	156	69	27	5	1

(10 marks)

Module 5

IX. (a) A normal population has a mean 0.1 and S.D. 2.1. Find the probability that the mean of a sample of size 900 will be negative. (10 marks)

(b) A random sample of size 18 is taken from a normal population with mean 28 and variance 49. Find the probability that the sample variance S^2 will be less than the population variance. (10 marks)

Or

X. (a) In a random sample of size 500, the mean is found to be 20. In another independent sample of size 400, the mean is 18. Could the samples have been drawn from the same population with S.D. 4. (10 marks)

(b) In a large city A, 20% of a random sample of 900 school boys had a slight physical defect. In another city B, 18.5% of a random sample of 1600 school boys had the same defect. Is the difference between the proportions significant. (10 marks)

(10 marks)

[5 × 20 = 100 marks]

B.TECH. DEGREE EXAMINATION, MAY 2010

Fourth Semester

ENGINEERING MATHEMATICS—III (CMELRPTANUS)

(Common for all Branches)

[2008 admissions—Regular/2007 admissions—Improvement/Supplementary]

Time : Three Hours

Maximum : 100 Marks

Answer one full question from each module. Statistical tables permitted.

Module 1

I. (a) Solve $\frac{d^2y}{dx^2} + 4\frac{dy}{dx} + y = \sin 4x \sin 2x$. (7 marks)

(b) Solve $(D^2 - 2D + 1)y = e^{-2x} \cos 2x + (2x^2 + 1)e^x$. (7 marks)

(c) Solve $x^2y'' + 5xy' + 4y = \cos(2 \log x)$. (6 marks)

Or

II. (a) Solve $(D^2 + 1)y = (x^2 - 1) \cos 2x$. (7 marks)

(b) Solve by the method of variation of parameters $y'' + y = \operatorname{cosec} x$. (6 marks)

(c) Solve the system of simultaneous linear equations

$$\begin{aligned} (5D+4)x - (2D+1)y &= e^{-t} \\ (D+8)x - 3y &= 5e^{-t} \end{aligned}$$

where $D = d/dt$.

Module 2

III. (a) Form the partial differential equation from $z = (x-a)^2 + (y-b)^2$. (6 marks)

(b) Solve $(x^2 - y^2 - z^2)p + 2xyq = 2xz$. (7 marks)

(c) Solve $\frac{\partial^2 z}{\partial x^2} - \frac{\partial^2 z}{\partial x \partial y} = \sin x \cos 2y$. (7 marks)

Or

Turn over

- VIII. (a) The probability that a pen manufactured by a company will be defective is 0.15. A random sample of 10 pens are chosen. What is the probability that in the sample (i) not more than one is defective ; (ii) at least 7 are good ; and (iii) all are good. (10 marks)

- (b) Fit a Poisson distribution for the following data and hence calculate the theoretical frequencies:—

x :	0	1	2	3	4	5
f :	142	156	69	27	5	1

(10 marks)

Module 5

- IX. (a) A normal population has a mean 0.1 and S.D. 2.1. Find the probability that the mean of a sample of size 900 will be negative. (10 marks)

- (b) A random sample of size 18 is taken from a normal population with mean 28 and variance 49. Find the probability that the sample variance S^2 will be less than the population variance. (10 marks)

Or

- X. (a) In a random sample of size 500, the mean is found to be 20. In another independent sample of size 400, the mean is 15. Could the samples have been drawn from the same population with S.D. 4. (10 marks)

- (b) In a large city A, 20 % of a random sample of 900 school boys had a slight physical defect. In another city B 18.5 % of a random sample of 1600 school boys had the same defect. Is the difference between the proportions significant. (10 marks)

[5 × 20 = 100 marks]

- IV. (a) Solve $(p^2 + q^2)y = qz$. (6 marks)

- (b) Solve $\frac{\partial^3 z}{\partial x^3} - 3 \frac{\partial^2 z}{\partial x \partial y} + 4 \frac{\partial z}{\partial y^3} = e^{x+2y}$. (7 marks)

- (c) Find the solution of the one-dimensional wave equation using the method of separation of variables. (7 marks)

Module 3

- V. (a) Express $f(x) = \begin{cases} 1, & \text{for } 0 \leq x \leq \pi \\ 0, & \text{for } x > \pi \end{cases}$ as a Fourier sine integral and hence evaluate

$$\int_0^{\infty} \frac{1 - \cos(\pi\lambda)}{\lambda} \sin(\lambda x) d\lambda.$$

(10 marks)

- (b) Find the Fourier cosine transform of $f(x) = \frac{1}{(1+x^2)}$ and hence derive the Fourier sine transform

of $\phi(x) = \frac{x}{(1+x^2)}$.

(10 marks)

Or

- VI. (a) Find the Fourier transform of $f(x) = \begin{cases} 1-x^2, & |x| \leq 1 \\ 0, & |x| > 1 \end{cases}$ and hence evaluate

$$\int_0^{\infty} \left\{ \frac{x \cos x - \sin x}{x^3} \right\} \cos\left(\frac{x}{2}\right) dx.$$

(8 marks)

- (b) Find the Fourier sine transform of $\frac{1}{x(x^2+a^2)}$. (6 marks)

- (c) Find the Fourier cosine transform of $e^{-x^2/2}$. (6 marks)

Module 4

- VII. (a) Define binomial distribution. Find the mean and variance of the binomial distribution. (10 marks)

- (b) In a normal distribution 7 % of the items are under 35 and 10 % of the items are above 55. Find the mean and variance of the distribution. (10 marks)

Or

G 2108

(Pages : 2)

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B.TECH. DEGREE EXAMINATION, MAY 2010

Fourth Semester

Branch : Computer Science and Engineering

INTEGRATED CIRCUITS (R)

[2008 admissions—Regular/2007 admissions—Improvement/Supplementary]

Time : Three Hours

Maximum : 100 Marks

Answer all questions.

Part A

Each question carries 4 marks.

1. What is noise margin ?
2. Define fan-in and fan-out. Explain their significance.
3. What is a buffer ? What are its applications ?
4. Differentiate between PLA and PAL.
5. Compare weighted resistor and R-2R ladder DACs.
6. Which is the fastest ADC and why ?
7. What is virtual ground ? Why is it so called ?
8. What are the characteristics of an ideal Op-amp ?
9. Draw and explain an op-amp comparator circuit.
10. What are the advantages of an op-amp square wave generator ?

(10 × 4 = 40 marks)

Part B

Each question carries 12 marks.

11. (a) Compare different logic families in terms of propagation delay, power dissipation, noise margin, fan-in and fan-out.

Or

- (b) Draw and explain the circuit of a tristate logic. What are its characteristics and applications ?

12. (a) What is a multiplexer ? Explain with a circuit diagram its principle of operation. Discuss its applications.

Or

- (b) Explain with diagrams the working of a MOS RAM cell. Discuss its organization as an array. Compare the performance of the above RAM cell with those of a BJT RAM cell.

Turn over

13. (a) Explain with circuit diagram the working of a ladder type DAC. Derive an expression for its output voltage.

Or

(b) Explain with circuit diagrams the working principle of successive approximation type ADC. What are its advantages?

14. (a) Draw the block schematic diagram of an op-amp and explain the functions of each block.

Or

(b) Define the following parameters as applied to op-amps:—

(i) Input bias current.

(ii) Input offset current.

(iii) CMRR.

(iv) PSRR.

(v) Slew rate.

15. (a) Explain with diagrams the working of op-amp differentiator and integrator circuits. Derive necessary equations.

Or

(b) Draw and explain the op-amp triangular waveform generator. Discuss which components affects the parameters of the waveform.

(5 × 12 = 60 marks)

(10 × 4 = 40 marks)

Part B

Each question carries 12 marks.

11. (a) Compare different logic families in terms of propagation delay, power dissipation, noise margin, fan-in and fan-out.

Or

(b) Draw and explain the circuit of a tristate logic. What are its characteristics and applications?

12. (a) What is a multiplexer? Explain with a circuit diagram its principle of operation. Discuss its applications.

Or

(b) Explain with diagrams the working of a MOS RAM cell. Discuss its organization as an array. Compare the performance of the above RAM cell with those of a BJT RAM cell.

G 2090

(Pages : 2)

Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2010

Fourth Semester

Branch : Computer Science and Engineering

COMPUTER ORGANIZATION (R)

[2008 admissions—Regular/2007 admissions—Improvement/Supplementary]

Time : Three Hours

Maximum : 100 Marks

Part A

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

1. Compare single bus and 2 bus CPU organization.
2. Describe the different types of interconnection structures in a processor.
3. What is CLA ?
4. Describe the working of an array multiplier.
5. What is the need for a control unit ?
6. Differentiate between Micro and Macro instructions.
7. Write short notes on Cache Memories.
8. Differentiate between Semiconductors RAM and ROM memories with respect to their characteristics, design, cost and performance.
9. Write short notes on different types of displays.
10. What is the need for an I/O interface ?

(10 × 4 = 40 marks)

Part B

*Answer either (a) or (b) of each module.
Each full question carries 12 marks.*

Module 1

11. (a) Explain in detail the different steps required for the execution of an instruction.

Or

- (b) Describe the layered view of a computer system.

Module 2

12. (a) Describe Booth's algorithm with an example.

Or

- (b) Describe the different steps required for ALU design.

Turn over

Module 3

13. (a) Briefly describe the implementation of a microprogram control unit.

Or

(b) Describe the different steps involved in control logic design.

Module 4

14. (a) Describe the needs and uses of having different types of memories.

Or

(b) Write down the characteristics of different types of memories that you are familiar with.

Module 5

15. (a) Explain in detail the different types of I/O standard interface.

Or

(b) Describe the different types of input devices that you are familiar with.

(5 × 12 = 60 marks)

Part B

Answer either (a) or (b) of each module.
Each full question carries 12 marks.

Module 1

11. (a) Explain in detail the different steps required for the execution of an instruction.

Or

(b) Describe the board view of a computer system.

Module 2

12. (a) Describe Booth's algorithm with an example.

Or

(b) Describe the different steps required for ALU design.