F 3473 (Pages : 3) Reg. No.....CS.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2010

Fourth Semester

ENGINEERING MATHEMATICS—III

(Common for all branches)

[Prior to 2007 Admissions—Supplementary]

Time : Three Hours Maximum : 100 Marks

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

Module 1

1. (a) Solve $y'' + 3y' + 2y = e^{-2x} + \sin 2x$. (7 marks)

(b) Solve $(D^2 + 6D + 9)y = (x^2 + 1)\sinh x$. (7 marks)

(c) Solve by the method of variation of parameters $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + 2y = e^x \tan x$. (6 marks)

Or

2. (a) Solve $(D^2 + 4)\, y = x^2e^{-x} + \sin 2x$. (7 marks)

(b) Solve $x^2 \frac{d^2y}{dx^2} + 2x \frac{dy}{dx} - 12y = x^3 (\log x)^2$. (6 marks)

(c) Solve the system of simultaneous equations :

$$\frac{dy}{dx} + 2y - 3z = x$$

$$\frac{dz}{dx} + 2z - 3y = e^{2x}.$$

(7 marks)

Module 2

3. (a) Solve $2zx - px^2 - 2pxy + pq = 0$. (5 marks)

(b) Solve $\frac{\partial^2 z}{\partial x^2} + 3\frac{\partial^2 z}{\partial x \partial y} + 2\frac{\partial^2 z}{\partial y^2} = x + y$. (5 marks)

Turn over

(c) A tightly stretched string with fixed end points $x = 0$ and $x = l$ is initially at rest in its equilibrium position. If it is set vibrating by giving to each of its points a velocity $\lambda x\ (l - x)$, find the displacement of the string at any distance x from one end at any time t.

(10 marks)

Or

4. (a) Form the partial differential equation from $z = f(x + it) + g(x - it)$. (5 marks)

(b) Solve $\frac{\partial^2 z}{\partial x^2} + \frac{\partial^2 z}{\partial x\, \partial y} - 6\frac{\partial^2 z}{\partial y^2} = y \cos x$. (5 marks)

(c) An insulated rod of length 'l' has its ends A and B maintained at 0°C and 100°C respectively until steady state conditions prevail. If B is suddenly reduced to 0°C and maintained at 0°C find the temperature at a distance x from A at time t. (10 marks)

Module 3

5. (a) Express $f(x) = \begin{cases} 1, \text{ for } |x| \le 1 \\ 0, \text{ for } |x| > 1 \end{cases}$ as a Fourier integral. (5 marks)

(b) Find the Fourier transform of $e^{-x^2/2}$. (7 marks)

(c) Find the Fourier sine and cosine transforms of $f(x) = e^{-ax}\ (a > 0)$. (8 marks)

Or

6. (a) Using Fourier integral prove that $\int_0^\infty \frac{\cos \lambda x}{1 + \lambda^2}\, d\lambda = \frac{\pi}{2} e^{-x}\ (x \ge 0)$. (6 marks)

(b) Find the Fourier transform of $f(x) = \begin{cases} 1, |x| < 1 \\ 0, |x| > 1 \end{cases}$. Hence evaluate $\int_0^\infty \frac{x \sin x}{x}\, dx$. (7 marks)

(c) Find the Fourier sine transform of $e^{-|x|}$ and hence evaluate $\int_0^\infty \frac{x \sin mx}{1 + x^2}\, dx$. (7 marks)

Module 4

7. (a) In a certain factory producing cycle tyres there is a small chance of one in 500 tyres to be defective. The tyres are supplied in lots of 20. Calculate the approximate number of lots containing no defective, one defective and two defective tyres in a consignment of 20000 tyres.

(10 marks)

(b) In an intelligence test conducted on 1000 students the mean was 42 and S.D. 24. Assuming the normality of the distribution, find (i) how many students score between 30 and 54 ; (ii) how many score about 60.

(10 marks)

Or

8. (a) Fit a binomial distribution for the following data and calculate the theoretical frequencies :

x :	0	1	2	3	4	5	6
f :	13	25	52	58	32	16	4

(10 marks)

(b) Define Poisson distribution. Determine its mean and variance. (10 marks)

Module 5

9. (a) An I.Q. test was given to two different sets of college students and the results are given below :

	Mean	S.D.	Size
Set I ...	75	7	90
St II ...	73	5	120

Is the difference between the means significant ?

(10 marks)

(b) Out of a consignment of one lakh tennis balls, 400 were selected and out of them 20 were found to be defective. How many defective balls you can reasonably expect to have in the consignment at 5% level of significance ?

Or

(10 marks)

10. (a) S^2 is the variance of a sample of size 10 taken from a normal population with S.D. 5. Find the probability that S^2 will lie between 8.4 and 42.3.

(10 marks)

(b) If two independent sample of sizes $n = 26$ and $n_2 = 8$ are taken from a normal population, what is the probability that the variance of the second sample will be at least 2.4 times the variance of the first sample.

(10 marks)

[5 × 20 = 100 marks]

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Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2010

Fourth Semester

Branch—Computer Science and Engineering

COMPUTER ORGANIZATION (R)

(Prior to 2007 Admissions—Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

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

1. Describe the situation when single bus CPU organization is suited.
2. Describe the steps required for execution of an instruction.
3. Give the basic block diagram of a 4 bit serial adder.
4. Differentiate between restoring and non restoring division.
5. What are the factors that influence the design of a control unit ?
6. Differentiate between horizontal and vertical Micro instructions.
7. Write short notes on interleaved memories.
8. What are the advantages of dividing the main memory into different modules.
9. Write short notes on different types of plotters.
10. Differentiate between OMP and OCR.

(10 × 4 = 40 marks)

Part B

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

MODULE 1

11. (a) Explain in detail about CPU organization. (12 marks)

Or

(b) Describe the different interconnection structures. (12 marks)

MODULE 2

12. (a) Describe in detail the circuits required for arithmetic addition and subtraction. (12 marks)

Or

Turn over

F 3487 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2010

Fourth Semester

Computer Science and Engineering

OBJECT ORIENTED PROGRAMMING (R)

(Prior to 2007 admissions)

[Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*

Each question carries 4 *marks.*

1. Distinguish between objects and classes.
2. What are the advantages of function prototypes ?
3. What are the different forms of inheritance ?
4. When do we make a class virtual ?
5. What is Polymorphism ? How is it achieved at run time ?
6. What is an abstract class ?
7. What are the uses of virtual destructors ?
8. Discuss the syntax of name spaces.
9. What are the characteristics of dynamic objects ?
10. What are the requirements of object oriented programming languages ?

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. (a) What is a friend function ? What are its characteristics ? Discuss the merits and demerits of using friend functions.

Or

(b) What is meant by dynamic initialization of objects ? Why do we neat it and how is it achieved ?

Turn over

12. (a) Differentiate between multilevel and multiple inheritances. Explain with an example how they could be implemented.

Or

(b) Explain with an example the situation where we need to apply hybrid inheritance.

13. (a) How does function overloading implement polymorphism ? Explain with an example.

Or

(b) Illustrate the uses of abstract classes.

14. (a) Explain with an example how virtual base class could be implemented ?

Or

(b) Explain with an example how name spaces are defined, how they are nested and how the members in various name spaces are accessed.

15. (a) Illustrate with an example the method of allocation of dynamic objects.

Or

(b) Compare the object oriented features of C++ and Java.

(5 × 12 = 60 marks)

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Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2010

Fourth Semester

Branch : Computer Science and Engineering

INTEGRATED CIRCUITS (R)

(Prior to 2007 admissions)

[Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*

Each question carries 4 *marks.*

1. What is window profile ?
2. Compare the power dissipation of different logic families.
3. Differentiate between flip flop and latch. Discuss their applications.
4. What are the characteristics of flash memories ?
5. Define Resolution, Accuracy and Conversion time for DAC.
6. Explain the selection criteria for ADC.
7. What is an op-amp ? Why is it called so ?
8. Compare the characteristics of ideal and practical op-amps.
9. What are the advantages of op-amp waveform generators ?
10. Draw and explain the circuit of an op-amp differentiator circuit.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. (a) Draw and explain the circuit of a two input TTL NAND gate. What are the characteristics of this circuit ?

Or

(b) Explain the method of determination of fan-in and fan-out of a logic circuit. Discuss the parameters on which the above are dependent.

Turn over

12. (a) What is a decoder ? Explain with figures the working of a decoder circuit. What are its applications ?

Or

(b) Write a note on FPGA.

13. (a) Explain with necessary diagrams the working principle of a binary weighted resistor DAC. Derive the expression for the output voltage.

Or

(b) Explain with diagrams the working of a dual slope ADC. What are the advantages of this circuit ?

14. (a) Explain with a block schematic diagram the necessity and functions of different stages of an op-amp.

Or

(b) Explain why the characteristics of a practical op-amp are different from those of an ideal op-amp.

15. (a) Explain with a diagram the working of a summing amplifier. Derive an expression for its output voltage.

Or

(b) Explain with a circuit diagram, the working of a triangular waveform generator. Discuss the role of each component on the parameters of the waveform.

(5 × 12 = 60 marks)

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B.TECH. DEGREE EXAMINATION, NOVEMBER 2010

Fourth Semester

Branch—Computer Science and Engineering

DATA STRUCTURES AND PROGRAMMING METHODOLOGIES (R)

(Prior to 2007 Admissions—Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*

1. What is meant by efficiency of an algorithm ? How it can be improved ?
2. Explain how recursion can be removed.
3. What is a sparce matrix ? Explain with example.
4. Write down the equivalent infix expression for the following post fix expression.

   A, B, C, –, /, A, D, E, +, *, –.
5. Describe the applications of stack.
6. List and explain the operations that are allowed in a doubly linked list.
7. What is a complete binary tree ? Explain with an example.
8. Explain directed a cyclic graph with example.
9. Differentiate between internal and external sorting.
10. Explain Radix sort algorithm.

(10 × 4 = 40 marks)

Part B

Answer **all** *questions.*

11. What are recursive algorithms ? How they are analysed ? Explain with example.

Or

12. Write notes on :
    (a) Time complexity and space complexity.
    (b) System life cycle.

Turn over

13. Describe the implementation of circular queue using array. Bring out advantages compared to priority queue.

Or

14. Write the algorithm which converts the post-fix expression to infix expression. Trace the algorithm with an example showing the status of the stack.

15. A singly linked list is used to represent a circular queue. Write an algorithm to find the duplicate data element in it.

Or

16. What is meant by pattern matching ? Explain it with any one algorithm.

17. Write the three tree traversal algorithms and explain it with examples.

Or

18. Write the algorithm to implement BFS of a graph. Explain it with example.

19. Write and explain the Heap sort algorithm with an example. Analyse it and write Best case, average case and worst case time complexities.

Or

20. Write the insertion sort algorithm and explain it with an example. Also analyse the time complexities.

(5 × 12 = 60 marks)

F 3512 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2010

Fourth Semester

Branch—Computer Science and Engineering

ADVANCED MICROPROCESSORS AND PERIPHERALS (R)

(Prior to 2007 Admissions—Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

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

1. Explain the model operation of 8255.
2. List the functions and applications of 8252.
3. What are the additional facilities in microcontrollers compared to a microprocessor ?
4. Draw the interfacing of a seven segment display with 8085 processor.
5. What is meant by pipelining ? How pipelining is incorporated in 8086 architecture ?
6. Explain the flag register and its functions in 8086.
7. What are the different types of shift instruction in 8086 ?
8. What is meant by protected mode of operation ? Explain with respect to 80286.
9. Explain the descriptors and selectors in 80336.
10. List the latest AMD processors and explain their salient features.

(10 × 4 = 40 marks)

Part B

Answer **either** (*a*) **or** (*b*) *of each module.*

MODULE I

11. (a) Explain with a neat block diagram the functions of 8251 interface. Show how it can be connected to 8085 processor.

Or

(b) (i) What are the various modes of operation of 8255 ?

(ii) Show how can be interfaced to 8085 microprocessor.

Turn over

MODULE II

12. (a) Draw the interfacing diagram of an 8 bit ADC with 8085 processor and explain. Write a programme to read the analog input connected to the ADC.

Or

(b) Discuss the interfacing of a 4 × 4 matrix keyboard with 8085 processor. Draw the flowchart to read the data of any key pressed.

MODULE III

13. (a) (i) What are the various registers in 8086 ? Explain their functions.

(ii) What is meant by memory segmentation ? What are its advantages ?

Or

(b) What are various addressing modes in 8086 ? Explain with examples.

MODULE IV

14. (a) (i) Explain the string manipulation instructions in 8086.

(ii) Write an assembly language program to find out the largest number from a given array of 8 bit numbers stored in memory starting from an offset address 2000 H. The length of the array is 100.

Or

(b) Discuss the salient features and architecture of 80286 processor.

MODULE V

15. (a) (i) Describe the paging mechanism in 80386. What are the advantages of paging ?

(ii) Explain the address translation for logical address to physical address in 80386 in protected mode.

Or

(b) Write short notes on the following :—

(i) Branch prediction in pentium processor.

(ii) RISC processors.

(iii) Superscalar Architecture.

(5 × 12 = 60 marks)