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S.Y.B.Sc. (Computer Science)
CS 231 : DATA STRUCTURES AND ALGORITHMS - I
(2019 CBCS Pattern) (Semester - III) (23121)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:
1) *All questions are compulsory*
2) *Figures to the right indicate full marks.*
3) *Neat diagrams must be drawn wherever necessary.*
3) *Your answers will be values as a whole.*

Q1) Attempt any Eight of the following. [8×1=8]

a) Define Data Object.

b) Define stable sorting.

c) List Linear search variations.

d) What is time complexity of merge sort?

e) Define the term null list.

f) Write any two applications of linked list.

g) Write node structure of doubly linked list.

h) What is Top of the stack?

i) Define Recursion.

j) What is circular queue?

Q2) Attempt any Four of the following. [4×2=8]

a) Describe the term ADT.

b) What is the best case and worst case efficiency of quick sort?

c) What is divide and conquer strategy?

d) Justify true or false: "A linked list can only be traversed sequentially".

e) Define the following terms.

   i) Stack overflow.

   ii) Stack underflow.

Q4) Attempt any TWO of the following. [2×4=8]

a) Write a program to search an element using linear search algorithm.

b) Write a C function to reverse a string using stack.

c) Write a C function to delete a node from singly circular linked list at any position.

Q4) Attempt any TWO of the following. [2×4=8]

a) Sort the following elements using bubble sort algorithm.

89 29 39 79 59 49 69 19

b) Convert the following infix expression into postfix expression.

P * Q + R / S - T

c) Define Deque. List types of Deque and explain any two operations performed on Deque.

Q5) Attempt any ONE of the following. [1×3=3]

a) Define the following terms.

i) Data Structure.

ii) Omega Notation.

iii) Time Complexity.

b) Write a short note on priority queue.

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S.Y.B.Sc. (Computer Science)
CS 232 : SOFTWARE ENGINEERING
(2019 CBCS Pattern) (Semester - III) (23122)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:
1) *All questions are compulsory.*
2) *Neat diagrams must be drawn if necessary.*

Q1) Attempt any EIGHT of the following.   [8×1=8]

a) What is a unified process?

b) What is ASD?

c) List the goals of Software Engineering.

d) What is elicitation?

e) What is negotiation?

f) Draw a symbol of extend.

g) Define : Association.

h) List of UML diagrams (any Two).

i) What is software design?

j) Define : data Abstraction.

Q2) Attempt any FOUR of the following.   [4×2=8]

a) What is system software and Application Software?

b) What are the advantages of scrum?

c) What is class and object?

d) What is Actor?

e) What are the elements of design model?

Q3) Attempt any TWO of the following. [2×4=8]

    a)   Define terms:

        i)   Agile Method

        ii)   Agile Process

    b)   What is software requirement specification?

    c)   What is modularity? Explain its benefits.

Q4) Attempt any TWO of the following. [2×4=8]

    a)   Explain advantages and disadvantages of spiral model.

    b)   Define terms:

        i)   Active class

        ii)   Component

        iii)   Artifact

        iv)   Node

    c)   Describe component diagram in brief and draw a component diagram for online shopping.

Q5) Attempt any ONE. [1×3=3]

    a)   Explain any three notation of activity diagram with each notation symbols.

    b)   Explain water fall model with diagram.

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S.Y. B.Sc. (Computer Science)
ELECTRONICS (Paper - I)
ELC - 231 : Microcontroller Architecture & Programming
(2019 Pattern) (Semester - III) (23321)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:
1) Q.1 is compulsory.
2) Solve any three questions from Q.2 to Q.5.
3) Figures to the right indicate full marks.
4) Neat diagrams must be drawn wherever necessary.
5) Use of calculator is allowed.

Q1) Attempt any five. [5×1=5]

a) What is the size of address and data bus of 8051 Microcontroller?

b) Define step angle of stepper motor.

c) Which special function register is used to keep track of priority of interrupts?

d) Which Pin of LCD is used for controlling its contrast?

e) List any two assembler directives of 8051 microcontroller?

f) State the role of C/$\overline{T}$ in TMOD register?

Q2) Answer the following. [2×5=10]

a) Explain the function of following pins of 8051 microcontroller?

   i)   ALE

   ii) $\overline{PSEN}$

   iii) $\overline{EA}$

   iv) RESET

   v)   RXD

b) Explain addressing modes of 8051 micro controller. (Any Five)

P.T.O.

Q3) Answer the following. [2×5=10]

a) Write 8051 C - program to generate 4 kHz square wave on port pin $P_{1.2}$ using timer 0 in auto reload mode? [Assume XTAL = 12 MHz]

b) Explain the function of following instructions.

i) Mov A, @R0

ii) CPL bit

iii) djNz R$_3$, Next

iv) RR A

v) SUBB A, B

Q4) Answer the following. [2×5=10]

a) Draw block diagram to interface DAC 0808 with 8051 microcontroller. Write a C-program to generate triangular waveform.

b) Write any five features of 8051 micro controller.

Q5) Write a short note on any four of the following. [4×2.5=10]

a) Stepper motor.

b) Register banks in 8051 micro controller.

c) Data types used for 8051 C-program.

d) Logical instructions. (any three)

e) TCON register.

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S.Y. B.Sc. (Computer Science)
ELECTRONICS
ELC - 232 : Digital Communication and Networking
(23322) (2019 Pattern) (Semester - III) (Paper - II)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:
1) *Q.1 is compulsory.*
2) *Solve any three questions from Q.2 to Q.5.*
3) *Figures to the right indicate full marks.*
4) *Neat diagrams must be drawn wherever necessary.*
5) *Use of calculator is allowed.*

Q1) Attempt any five.

[5×1=5]

a) What is meant by Noise Figure?

b) What is quantization error in PCM?

c) Define multiplexing technique.

d) What is meant by CSMA/CD?

e) List any two types of Ethernet.

f) Comment : "Star topology is widely used in LAN".

Q2) Answer the following.

[2×5=10]

a) Explain simplex and Half duplex transmission modes of communication system.

b) Explain concept of TDM.

Q3) Answer the following.

[2×5=10]

a) Differentiate between asynchronous and synchronous communication.

b) Explain OSI model in brief.

Q4) Answer the following. [2×5=10]

   a)   List any five features of FDMA.

   b)   Describe in brief LAN and WAN.

Q5) Write a short note on any four of the following. [4×2.5=10]

   a)   Any two internal noise.

   b)   Channel capacity and data rate.

   c)   Token passing protocol.

   d)   Reservation protocol.

   e)   Bus topology.

   f)   Switch networking device.

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S.Y. B.Sc. (Computer Science)/(Biotech.)/(Animation) (HS)/B.C.A.

(ABILITY ENHANCEMENT COMPULSORY COURSE)

AECC - Environmental Awarness / Studies

(2019 Pattern) (2021 Pattern) (Semester - III) (Paper - I)

Time : 2 Hours]   [Max. Marks : 35

Instructions to the candidates:

1) *Question 1 is compulsory.*
2) *Solve any Three questions from Question No. 2 to Question No. 5.*
3) *Question No. 2 to Question No. 5 carry equal marks.*

Q1) Attempt any Five of the following :   [5]

a) Define Environment.   [1]

b) What is an aquifer?   [1]

c) Define Ecology & Ecosystem?   [1]

d) Define Eutrophil?   [1]

e) What is Red data book?   [1]

f) What is the full form of NBPGR.   [1]

Q2) Answer the following :

a) What are renewable & Non-renewable resources? Give example.   [6]

b) What is the Scope of Environmental Studies?   [4]

Q3) Answer the following :

a) Discuss the models of energy flow in an ecosystem.   [6]

b) What are the major threats to Biodiversity.   [4]

Q4) Answer the following :

    a)   What is mean by Insitu & Exsitu conservation of Biodiversity? Give example. **[6]**

    b)   What are Hotspots of Biodiversity. **[4]**

Q5) Write a short note on any Four of the following : **[10]**

    a)   Scope of Environmental Study **[2½]**

    b)   Soil erosion. **[2½]**

    c)   Ecological Succession. **[2½]**

    d)   Food chain & food web. **[2½]**

    e)   Trophic level. **[2½]**

    f)   Deforestation.

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S.Y. B.Sc.(Computer Science/Bio-technology/B.C.A./Animation)
ENGLISH ABILITY ENHANCEMENT COURSE
AECC-II : Language Communication - I
(CBCS) (2019 Pattern) (Semester - III) (23922)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates :
1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q1) Attempt any one of the following in about 150-200 words: **[15]**

a) Describe the last scene of the story A Shadow.

b) Write a detailed note on the supernatural element used in the poem La Belle Dame Sans Merci.

Q2) Attempt any two of the following in about 50-80 words: **[10]**

a) As an anchor for the Prize Distribution Ceremony at your college, introduce the chief guest of the programme.

b) Frame a dialogue on the police authorities refusing the permission to organize a public meeting on the street.

c) As a Fitness Trainer describe your daily routine.

Q3) Attempt any two of the following in about 50-80 words: **[10]**

a) Write a resume for the rest of a website developer.

b) Write a note on the tips and techniques of Group Discussion.

c) Prepare a power point presentation of five slides on newly laurened electric vehicle.

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S.Y. B.Sc. (Computer Science)
MATHEMATICS (Paper - II)
MTC - 232 : Numerical Techniques
(2019 Pattern) (Semester - III) (23222)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:
1) *All questions are compulsory.*
2) *Figures to the right indicate full marks.*
3) *Non-programmable scientific calculator is allowed.*

Q1) Attempt any five questions out of seven: [5×2=10]

a) Find percentage error of the number 5/9 whose approximate value is 0.56.

b) Prove that : $E\nabla = \Delta$ by usual notations.

c) Let $f(x) = 1/x$, find divided difference $[a, b, c]$

d) Given that $f(1) = 1, f(2) = 4, f(3) = 9, f(4) = 16$ and $f(5) = 25$. Find $\int_{1}^{5} f(x)dx$ using Trapezoidal rule.

e) Using Euler's method find $y(0,1)$ given that $\frac{dy}{dx} + 2y = 0$ with $y(0)=1$.

f) Write Simpson's $(3/8)^{th}$ formula for numerical integration.

g) Evaluate Δx^2 with $h = 1$.

Q2) Attempt any three of the following: [3×5=15]

a) Derive Newton's forward Interpolation formula for equal intervals.

b) Find the real root of the equation $x^3 - x - 4 = 0$ in the interval $[1, 2]$ correct upto 2 decimal places by using Regula Falsi method.

c) Using Lagrange's Interpolation find $f(2)$ given that $f(1) = 1, f(3) = 27, f(4) = 64$.

d) Evaluate $\int_{0}^{6} \frac{1}{1+x} dx$ by using Simpson's $(1/3)^{rd}$ rule. Take $h = 1$.

e) Find the missing value of the data:

x	1	2	3	4	5
$f(x)$	7	-	13	21	31

Q3) Attempt any one of the following: [1×10=10]

a) Evaluate $\sqrt{12}$ correct upto four decimal places by Newton-Raphson method.

b) Derive Trapezoidal rule of integration for the function $f(x)=0$.

c) Solve $\frac{dy}{dx}=x+y$ with $y(0)=1$. Find $y(0.1)$ and $y(0.2)$ by using Runge-Kutta method of fourth order.

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