Max Time: 2½ hrs | SYIT Semester IV | Max Marks: 75

COST

Instructions:

1. **All** questions are **compulsory.**
2. Mixing of sub questions is not allowed.
3. Write in clear, legible, writing.

Q1) Attempt any three: (15)

A. Calculate P_{35} and P_{80} from the following data.

Marks	10-20	20-30	30-40	40-50	50-60	60-70
No.of students	1	3	11	21	43	32

B. Calculate the MD , SD of the following data (by using formula)

X	20	18	16	14	12	10	8	6
f	2	4	9	18	27	25	14	1

C. Calculate the arithmetic mean of the following observations:

Marks	0-10	10-20	20-30	30-40	40-50
No.of students	7	10	14	9	3

D. Find the median of the following data.

Age group	Frequency (f_i)
0-10	40
10-20	53
20-30	58
30-40	64
40-50	72
50-60	49
60-70	36
70-80	25

E. Find the Range and coefficient of range of the following data.

i) 80,90,60,63,68,61,67,65,100,75,89,84,86

ii)

Class interval	45-49	50-54	55-59	60-64	65-69
Frequency	37	26	8	5	1

F. Find RMS of the following data -2,5,-8,9,-4

Q2) Attempt any three: (15)

A. Compute s_k for the following observation 2,3,5,7,4,8,1

B. given mean=32, median=27 and variance 50 find s_k

C. A random variable X has the following probability distribution value of X

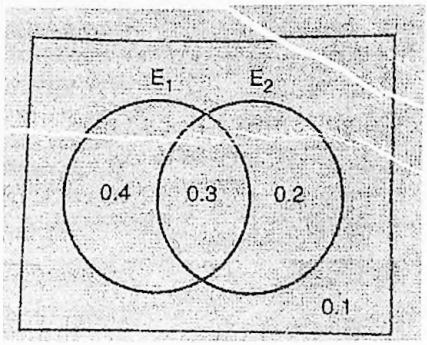
X	0	1	2	3	4	5	6	7
P(x)	0	k	2k	2k	3k	k^2	$2k^2$	$7k^2+k$

Find each of the following

(i) k (ii) P(X<6) (iii) P(0<X<5) (iv)$P(X \geq 6)$

D. if pair of dice is thrown and X denotes the sum of the number the sum of the numbers onthem. Find the probability distribution of X. also find the Expectation of X.

E. Find $P\{E_1\}, P\{E_2\} and\ P\{E_1 + E_2\}$ by use of venn diagram shown in figure.



F. The p.d.f of a continuous random variable X is

$$f(x) = \frac{x}{8} \quad , 0 < x < 4$$

= 0 otherwise find P[X<1], P[X>3]

Q3) Attempt any three: (15)

A. Explain the terms: a) Hypothesis b) Null Hypothesis c) Alternative Hypothesis d) Level of significance e) critical region f) Types of error.

B. write the short note on null hypothesis.

C. Define: a) one tailed test b) two tailed test

D. Among 70 fishes caught from certain lake,14 were inedible for the chemical pollution of their environment. Construct a 99% confidence interval for the probability that a fish caught from this lake will be inedible for given reason

E. For a given sample of 100, 35 are working as a professor. Construct a 95% confidence interval for the probability that almost of the education people from the samples working as a professor.

F. In a box, there are six balls of which n are red and the rest are green. It is known that the number of red balls n is either three or four but the exact number is not known. However it is bet that n=3 is much more likely than n=4. To take a decision on the value of n, two balls are drawn and n=3 is rejected only if both the balls are drawn are red. Find :

a) H_0 b) H_1 c) state whether the hypothesis is simple or composite

d) define critical region e) compute the size of error for both f) level of significan

Q4) Attempt any three: (15)

A. The amount poured by an automatic machine on an average is 180 ml of milk with a S.D 2ml. find the probability that the average volume of milk filled in 100 cans from a lot is
(i) at most 180.2 ml (ii) between 179.9 ml and 180.1 ml
(use t-test , P(0<t<1)=0.3413 . p(0<t<0.5)=0.1915)

B. If x is a chi-square variate with S.D 4. Find the mean, median and mode x

C. Data represent the last digit of the scooter passing at a certain traffic signal; observe during last one hour for 180 scooter.

Last digit	0	1	2	3	4	5	6	7	8	9
frequency	12	20	14	12	21	18	17	26	19	21

Claim that all the digits one equally like to a occurs 5% of level of significance?
(use test for goodness fit , given $\chi^2_{(9,\ 0.05)} = 16.9$)

D. write the properties of chi-square test.

E. The shape and the colour of a certain variety of pea that can be classified into four categories round and yellow , round and blue , angular and yellow & angular and blue occur in proportion in 9:3:3:1 . Treat for goodness fit for 128 sample; observed frequencies are :

RY	66	RB	28
AY	29	AB	5

Structure the chi-square test for goodness of fit (given $\chi^2_{(3,\ 0.05)} = 7.82$)

F. In an experiment on immunization of cattle from tuberculosis the following results were obtained. (given $\chi^2_{(1,0.01)} = 6.635$)

	Affected	Unaffected
Inoculated	11	31
Not inoculated	14	4

Examine the effective of vaccine in control the incidence of the disease at 1% level of significance.

Q5) Attempt any three: (15)

A. find slope, equation, y-intercept and x-intercept of the line that passes through the points (3,-2) and (-1,6). Find the value of y corresponding to x=3 and x=5.

B. Draw the scatter diagram for the data and state the type of correlation between variables

(i)

X	3	4	5	8	7	9	6	2	1
y	6	3	4	7	9	8	6	1	2

(ii)

X	4	8	7	6	1	3	5	2
y	30	10	20	60	80	40	25	75

(iii)

X	10	20	30	40	50	60
y	50	10	35	20	40	55

C. If for bivariate data $\sum xy = 7.8, \sum x^2 = 10, \sum y^2 = 8$, than find correlation coefficient

D. find (a)σ_x (b) σ_y (c)v(x) (d) v(y) (e) cov(x,y) for the following data

X	1	3	4	6	8	9	11	14
Y	1	2	4	4	5	7	8	9

E. The total value of disinvestment in SPU in crores are given for the year 2000 to 2006 in below table

Year	2000	2001	2002	2003	2004	2005	2006
PSU marks	265	270	280	290	300	320	310

(a) find the equation of the least square line fitting the data (y on x)

(b) estimate the value for the year 1999 and year 2007

F. fit a least squares line to the data

X	1	3	4	6	8	9	11	14
y	2	4	5	6	7	10	9	12

(a) regression line of y on x (b) regression line of x on y

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Max Time: 2½ hrs SYIT Semester IV Max Marks: 75

Core Java

Instructions:

1) **All** questions are **compulsory**.
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3) Write in clear, legible, writing.

Q1) Attempt any three: (15)

A) Explain the terms public, static,void, string args[] in the main function

B) What are the primitive datatypes

C) What are Arithmetic operators

D) What are assignment operators

E) Explain the increment and decrement operator

F) What are relational operator

Q2) Attempt any three: (15)

A) Write a program to compare IF...Else IF ... Else Statement to Switch ... Case Statement with the help of a program describing various seasons of the year.

B) Describe the While Loop with ethe help of a program

C) Describe the Do... While Loop with the help of a program

D) Describe the For Loop and For Each loop with the help of a program

E) Describe Labels in a program

F) Describe break and continue statements with an example of a program

Q3) Attempt any three: (15)

A) Explain with example a base class and its derived class. Use any example

B) Describe all access Modifiers wtth example

C) Define Inheritance

D) Compare Abstract class and Interface

E) What is Multiple Inheritance . with example

F) Define packages. How will you use it in a program.

Q4) Attempt any three: (15)

A) Explain the concept of dynamic storage. Compare it to static storage.

B) WAP to add elements to a vector, how to access them and search in them.

C) WAP to manipulate the size of a vector

D) Compare process and thread.

E) Describe the thread lifecycle.

F) WAP to show various features of a thread.

Q5) Attempt any three: (15)

A) What is AWT? What are its classes?

B) What is Panel and Frame?

C) What is Component and Container?

D) How do you set dimensions of a window

E) How do you hide and show a window?

F) How do you handle events in a Frame Window

Max Time: 2½ hrs | SYIT Semester IV (SE) | Max Marks: 75

Instructions:

1) **All** questions are **compulsory**.
2) Mixing of sub questions is not allowed.
3) Write in clear, legible, writing.

Q1) Attempt any three: (15)

A) What is SDLC? Explain in brief.
B) Write a short note on Software Requirements?.
C) What is Waterfall Model? Explain its limitations in brief?.
D) What is Prototyping Process Model?.
E) Distinguish between context and behavioral model.
F) What is feasibility study. Explain in brief.

Q2) Attempt any three: (15)

A) Explain Gantt chart and Pert chart in brief.
B) What do you mean by Critical System .Discuss its types?
C) Write a short note on Time boxing Model in detail.
D) Discuss the Project Scheduling in brief.
E) Distinguish between functional and non-functional requirements?
F) Explain the different types of maintenance in brief.

Q3) Attempt any three: (15)

A) State the difference between Cohesion and Coupling in brief.
B) What is RAD Model? Explain in brief.
C) Explain Software configuration management process.
D) State the properties to be focused on during architectural design process.
E) Write the difference between Software Quality Assurance and Software Quality control.
F) Distinguish between alpha and beta testing.

Q4) Attempt any three: (15)

A) Explain Software metrics and measurement?
B) Explain COCOMO Model in brief.
C) Distinguish between White box and black box testing.
D) State and brief the User interface design principles.
E) Explain Reverse engineering in detail.
F) Explain the prototyping model in brief.

Q5) Attempt any three: (15)

A) Explain CMM (Capability Maturity Model) in detail.
B) What do you mean by Software Re-engineering?.
C) What are the different levels of software testing?.
D) Explain Software documentation in detail.
E) Define software reuse. Discuss its different types.
F) Explain the ER diagram and state its importance in software engineering.

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Max Time: 2½ hrs | SYIT Semester IV | Max Marks: 75

Computer Graphics and Animation

Instructions:

1) **All** questions are **compulsory**.
2) Mixing of sub questions is not allowed.
3) Write in clear, legible, writing.

Q1) Attempt any three: (15)

A) Explain the construction and working of Cathode Ray Tube (CRT)
B) Explain the term computer graphics and its applications
C) State and explain DDA line drawing algorithm.
D) Briefly explain Cohen-Sutherland Line clipping algorithm
E) Write short note on Random Scan Display
F) Differentiate between Raster Scan and Random Scan systems

Q2) Attempt any three: (15)

A) Explain the following 2D Transformations and and give their matrix representations:-
   i) Translation
   ii) Scaling
B) Explain the process of Rotation of a 2D object About an Arbitrary Point
C) Write a short note on Orthographic Projections
D) Explain the 3D Reflection Transformation and give the matrix representations
E) Explain the process of Scaling Transformation of a Unit Square by two times along X axis and three times by Y axis
F) Perform mapping from Window to Viewport coordinate Transformations

Q3) Attempt any three: (15)

A) Explain the following terms in relation to Color Appearance:- Hue, Brightness, Saturation
B) Write a short note on Chromatic Adaptation
C) Explain Grassman's law in detail
D) What is Colorimetry? Explain the sensitivity of human eye to different colors and response of cones to a spectrum
E) Write a short note on XYZ color space
F) Explain the following terms:- Radiant Flux, Spectral Radiant Flux

Q4) Attempt any three: (15)

A) Explain the different Techniques for efficient Visible-Surface Algorithms
B) Write a short note on Z-Buffer Algorithm.
C) Write a short note on Bezier Curves
D) Write a short note on Visible-Surface Ray Tracing
E) Write a short note on Depth Sorting Algorithm
F) Write a short note on Back face removal Algorithm

Q5) Attempt any three: (15)

A) Explain the different types of Deformations
B) Explain the following principles of animation:- Ease In and Out (or Slow In and Out), Follow Through and Overlapping Action
C) Explain the different physics based animations:- particle system, fluid dynamics
D) What is an image? Explain the different file formats of images :- JPEG/JPG, WebP
E) Explain the following principles of animation:- Follow Through and Overlapping Action, Solid Drawing
F) Explain the different physics based animations:- rigid body, flexible dynamics

Max Time: 2½ hrs | SYIT Semester IV | Max Marks: 75

Introduction to Embedded System

Instructions:

1) **All** questions are **compulsory**.
2) Mixing of sub questions is not allowed.
3) Write in clear, legible, writing.

Q1) Attempt any three: (15)

A) Differentiate general purpose computing system & embedded systems.
B) Explain the brief history of Embedded system
C) Give a classification of embedded systems.
D) Explain the applications of Embedded System.
E) Explain the use of data communication in embedded system.
F) Explain the use of data storage in embedded systems.

Q2) Attempt any three: (15)

A) Explain the working of washing machine in embedded system.
B) Explain the inner working of automotive embedded system.
C) Explain the working of memory map with diagram.
D) Explain the working of I/O map.
E) Explain the working of Interrupt map with communication devices.
F) Explain the importance of processor family in embedded system.

Q3) Attempt any three: (15)

A) When comparing a system board based on a microcontroller and general-purpose microprocessor which one is cheaper?
B) Explain the embedded applications.
C) Explain the working of 8051 microcontroller with diagram.
D) Explain the 8051 family in Brief.
E) What the use of 8051 microcontroller hardware is in embedded.
F) Write a short note on Input/output pins Ports and Circuits.

Q4) Attempt any three: (15)

A) Which hardware factors are used in selecting controller.
B) What is the use of CPU in microcontroller.
C) What is the use of interrupts in microcontroller.
D) Explain the working of BUS in microcontroller.
E) Working of memory in microcontroller.
F) Explain the structure of embedded program.

Q5) Attempt any three: (15)

A) State the explain THE KERNEL process in operating system.
B) Explain the concept of kernel space and user space.
C) Explain the concept of monolithic kernel and microkernel.
D) Explain the types of operating system.
E) State characteristics of Real time operating system.
F) What is the process behind selection of RTOS.