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Reg. No. : .....

**Code No. : 20368 E      Sub. Code : CECS 62**

B.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2025.

Sixth Semester

Computer Science

Major Elective – INTRODUCTION TO DIGITAL  
IMAGE PROCESSING

(For those who joined in July 2021 and 2022 only)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. A  $128 \times 128$  image with 64 gray levels requires \_\_\_\_\_ bits of storage.
- (a) 4096                      (b) 8192  
(c) 12288                    (d) 98304

2. A good image is difficult to define because image quality \_\_\_\_\_.  
(a) high subjective, weakly dependent  
(b) lowly subjective, weakly dependent  
(c) high subjective, strongly dependent  
(d) lowly subjective, strongly dependent
3. Which means the assigning meaning to a recognized object?  
(a) Interpretation              (b) Recognition  
(c) Acquisition                (d) Segmentation
4. If  $f(x, y)$  is an image function of two variables, then the first order derivative of a one dimensional function,  $f(x)$  is \_\_\_\_\_.  
(a)  $f(x+1) - f(x)$               (b)  $f(x) - f(x+1)$   
(c)  $f(x-1) - f(x+1)$           (d)  $f(x) + f(x-1)$
5. Human perception of colour closely resembles the \_\_\_\_\_ colour model.  
(a) CMY                              (b) RGB  
(c) HSI                                (d) CMYK

6. \_\_\_\_\_ is mathematical models using which colours are represented, created and visualized.
- (a) Image (b) Colour  
(c) Colour space (d) White space
7. Which is a colour attribute that describes a pure colour?
- (a) Saturation (b) Hue  
(c) Brightness (d) Intensity
8. Filter that replaces pixel value with medians of intensity levels is \_\_\_\_\_.
- (a) arithmetic mean filter  
(b) geometric mean filter  
(c) median filter  
(d) sequence mean filter
9. Inverse of image convolution is \_\_\_\_\_.
- (a) image nonconvolution  
(b) image inconvolution  
(c) image deconvolution  
(d) image byconvolution

10. Low frequency components are passed by \_\_\_\_\_.
- (a) lowpass filter (b) bandpass filter  
(c) highpass filter (d) max filter

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).  
Each answer should not exceed 250 words.

11. (a) Point out the examples of digital image.
- Or
- (b) Explain the zooming and shrinking of digital image.
12. (a) Describe the 2D discrete Fourier transform.
- Or
- (b) Summarize the functions of Homomorphic filtering.
13. (a) Determine the pseudo color image processing with diagram.
- Or
- (b) What are the advantages of color image processing? Explain.

14. (a) Elaborate the basic concept of set theory.

Or

- (b) Write down the dilation and erosion in morphological image processing.

15. (a) Bring out the classification of features.

Or

- (b) Evaluate the methods of image segmentation.

PART C — ( $5 \times 8 = 40$  marks)

Answer ALL questions, choosing either (a) or (b).  
Each answer should not exceed 600 words.

16. (a) Elucidate the components of an image processing system.

Or

- (b) Outline the techniques of image acquisition with diagram.

17. (a) Discuss the mathematical Analyze of enhancement in spatial domain.

Or

- (b) Devise the one dimensional Fourier transform and its inverse.

18. (a) Explain the steps to conversions between color models.

Or

- (b) Compare the primary and secondary colors for pigments.

19. (a) Analyze the various types of data redundancies.

Or

- (b) Examine the logic operations involving binary images.

20. (a) Demonstrate the methods of region based segmentation.

Or

- (b) Estimate the Thresholding in feature extraction and image segmentation.

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**Code No.: 20350 E      Sub. Code: CMCS 61**

**B.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2025.**

**Sixth Semester**

**Computer Science – Core**

**OPERATING SYSTEM**

(For those who joined in July 2021 and 2022 only)

**Time : Three hours**

**Maximum : 75 marks**

**PART A — (10 × 1 = 10 marks)**

**Answer ALL questions.**

**Choose the correct answer :**

1. Submission of subsequent task for processing to the time its result becomes available \_\_\_\_\_.
- (a) Throughput      (b) Turnaround Time  
(c) Response Time      (d) Service Time

2. Systems with more than 1 processor is called \_\_\_\_\_.
- (a) Multiprocessor system  
(b) Multiple processing system  
(c) Multi-threaded systems  
(d) Distributed systems
3. For waiting state, a process can only enter into \_\_\_\_\_.
- (a) ready state      (b) running state  
(c) new state      (d) terminated state
4. An application process can create \_\_\_\_\_ to execute.
- (a) Two threads      (b) Three threads  
(c) One thread      (d) Many threads
5. A semaphore that does not specify the order in which processes are removed from the queue is a \_\_\_\_\_.
- (a) weak semaphore  
(b) strong semaphore  
(c) general semaphore  
(d) binary semaphore

6. Safe state is one where \_\_\_\_\_.  
(a) It is deadlock  
(b) It is not a deadlocked state  
(c) It is deadlock avoidance  
(d) It is process and resource
7. The page replacement policy which uses the principle of locality of reference for its replacement decision  
(a) FIFO (b) Clock  
(c) Optimal (d) LRU
8. Memory compaction is used to eliminate \_\_\_\_\_.  
(a) Page fault  
(b) Swapping  
(c) External fragmentation  
(d) None of these
9. The physical order of a record in a file, as determined by the access method, is known as \_\_\_\_\_.  
(a) file management system  
(b) file structure  
(c) file allocation table  
(d) file organization

10. A record contain \_\_\_\_\_.  
(a) multiple data (b) single data  
(c) logical flags (d) related fields

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).  
Each answer should not exceed 250 words.

11. (a) Outline the generation of operating system.  
Or  
(b) Differentiate between mainframe and personal computers.
12. (a) Describe the subsequent :  
(i) throughput  
(ii) turnaround time  
(iii) response time  
Or  
(b) Define thread. Also explain about thread scheduling.
13. (a) How the deadlock can be prevented? Explain.  
Or  
(b) Analyze Peterson's solution for critical section problem.

14. (a) Comment on Demand Paging.

Or

(b) Explain any one paging algorithm.

15. (a) Draw and explain the structure of file system.

Or

(b) Discuss about SSTF scheduling.

PART C — ( $5 \times 8 = 40$  marks)

Answer ALL questions, choosing either (a) or (b)  
Each answer should not exceed 600 words.

16. (a) Demonstrate the functions of operation system.

Or

(b) Write a detailed note on system calls.

17. (a) Summarize about IPC. Explain with an example of IPC system.

Or

(b) Describe about preemptive scheduling.

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18. (a) Discuss the deadlock avoidance with an algorithm and example.

Or

(b) Illustrate the following :

(i) Critical section problem

(ii) Semaphores

19. (a) Discuss about virtual memory with example.

Or

(b) Describe the most common techniques used for structuring the page table.

20. (a) Classify and explain the methods of file allocation.

Or

(b) Explain in detail about disk management.

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B.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2025.

Sixth Semester

Computer Science – Core

**SOFTWARE ENGINEERING AND TESTING**

(For those who joined in July 2021 and 2022 only)

Time : Three hours                      Maximum : 75 marks

**PART A — (10 × 1 = 10 marks)**

Answer ALL questions.

Choose the correct answer :

1. A step by step instruction used to solve a problem is known as \_\_\_\_\_.  
(a) Sequential structure  
(b) A List  
(c) A plan  
(d) An Algorithm

2. Which is the first step in the Software development life cycle?  
(a) Analysis  
(b) Design  
(c) Problem/Opportunity Identification  
(d) Development and Documentation
3. The fundamental notions of software engineering does not account for  
(a) Software processes  
(b) Software Security  
(c) Software reuse  
(d) Software Validation
4. What are the types of requirements?  
(a) Availability  
(b) Reliability  
(c) Usability  
(d) All of the mentioned
5. Which one of the following is not a step of requirement engineering?  
(a) elicitation                      (b) design  
(c) analysis                        (d) documentation

6. In Design phase, which is the primary area of concern?
  - (a) Architecture
  - (b) Data
  - (c) Interface
  - (d) All of the mentioned
7. The importance of software design can be summarized in a single word which is \_\_\_\_\_.
  - (a) Efficiency
  - (b) Accuracy
  - (c) Quality
  - (d) Complexity
8. Program modularization and source code translation are the activities of
  - (a) Forward engineering
  - (b) Reverse Engineering
  - (c) Reengineering
  - (d) Reverse Engineering and Reengineering
9. Changes made to an information system to add the desired but not necessarily the required features is called \_\_\_\_\_.
  - (a) Preventative maintenance
  - (b) Adaptive maintenance
  - (c) Corrective maintenance
  - (d) Perfective maintenance

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10. Choose an internal software quality from given below \_\_\_\_\_.
  - (a) scalability
  - (b) usability
  - (c) reusability
  - (d) reliability

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Elaborate the difference between programs and products in software.  
Or  
(b) Determine the evolution of an art into an engineering discipline.
12. (a) Describe the responsibilities of a software project manager.  
Or  
(b) What are the approaches of risk management? Explain.
13. (a) Explain the overview of SA/SD methodology.  
Or  
(b) Show the steps to develop the DFD model of a system.

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[P.T.O.]

14. (a) Point out the basic concepts and terminologies of testing.

Or

- (b) Elucidate the different types of user interface.

15. (a) Distinguish between the hardware and software reliability.

Or

- (b) Summarize the ISO 9000 for software industry.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Discuss the various phases of the spiral model with diagram.

Or

- (b) Examine the working of Rapid Application Development.

17. (a) Conclude the important categories of customer requirements.

Or

- (b) Outline the software requirements gathering and analysis.

18. (a) Illustrate the develop the DFD model of a system using context diagram.

Or

- (b) What are the detailed design of functional oriented software design? Explain.

19. (a) Compare and construct internal and external software documentation.

Or

- (b) Evaluate the equivalence class partitioning in black box testing.

20. (a) Formulate the various level of SEI capability maturity model with diagram.

Or

- (b) Analyze the implementation of software quality management system.

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B.Sc. (CBCS) DEGREE EXAMINATION,  
APRIL 2025

Sixth Semester

Computer Science – Core

COMPUTER GRAPHICS AND VISUALIZATION

(For those who joined in July 2021 and 2022 only)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Video devices with reduced volume, weight and power consumption are collectively known as \_\_\_\_\_
  - (a) Light weight monitors
  - (b) Flat-panel displays
  - (c) CRT
  - (d) Portable display

2. Expansion of DDA is \_\_\_\_\_
  - (a) Device Display Analyzer
  - (b) Digital Differential Analyzer
  - (c) Digital Device Analyzer
  - (d) Digital Display Analyzer
3. The basic transformations include \_\_\_\_\_
  - (a) Translation
  - (b) Rotation
  - (c) Scaling
  - (d) All of the above
4. The transformation that produces a parallel mirror image of an object are called \_\_\_\_\_
  - (a) Rotation
  - (b) Reflection
  - (c) Translation
  - (d) Scaling
5. Which of the following is not a rigid body transformation?
  - (a) Translation
  - (b) Rotation
  - (c) Shearing
  - (d) Reflection
6. Coordinates of viewport are known as \_\_\_\_\_
  - (a) World coordinates
  - (b) Polar coordinates
  - (c) Screen coordinates
  - (d) Cartesian coordinates

7. A video consists of a sequence of \_\_\_\_\_
- (a) Frames (b) Signals  
(c) Packets (d) Slots
8. If frames are displayed on screen fast enough, we get an impression of \_\_\_\_\_
- (a) Signals (b) Motions  
(c) Packets (d) Bits
9. In Audio and Video Compression, each frame is divided into small grids, called \_\_\_\_\_
- (a) Frame (b) Packets  
(c) Pixels (d) Mega Pixels
10. In lowest resolution a color frame is made of \_\_\_\_\_
- (a)  $1024 \times 768$  pixels  
(b)  $800 \times 600$  pixels  
(c)  $1152 \times 864$  Pixels  
(d)  $1280 \times 1080$  pixels

**PART B — (5 × 5 = 25 marks)**

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Summarize the primary goal of standardized graphics software.  
Or  
(b) Distinguish between the CRT and LCD display devices.
12. (a) Describe the basic attributes of line attributes.  
Or  
(b) Enumerate the shearing transformation with diagram.
13. (a) Point out the two-dimensional viewing functions.  
Or  
(b) What are the various operations of clipping? Explain.
14. (a) Elaborate the scaling an object with 3D transformation.  
Or  
(b) How the coordinate-Axes 3D rotation works?

15. (a) Bring out the classification of visible surface detection methods.

Or

- (b) Elucidate the advantages of YIQ color model.

PART C — ( $5 \times 8 = 40$  marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Enumerate the Bresenham's approach for line drawing.

Or

- (b) Devise the concept of DDA line drawing algorithm.

17. (a) Discuss the reflection and shearing 2D transformations.

Or

- (b) Highlight the matrix representation and homogenous coordinates.

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18. (a) Draw and explain the window-to-viewport coordinate transformation.

Or

- (b) Compare and construct point clipping and line clipping.

19. (a) Analyze the three-dimensional display methods.

Or

- (b) How the 3D translation works? Explain.

20. (a) Justify the use of back-face detection with neat diagram.

Or

- (b) Evaluate the HSV color model with neat diagram.
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