# 17/1563

## B.C.A. (Fourth Semester) Examination, 2017

### First Paper

### *(Computer Graphics & Multimedia Application)*

***Time : Three Hours*** ***Maximum Marks : 75***

**Note**: Attempt any **five** questions. **All** questions carry equal marks.

**Note**: The answers to short questions should not exceed 200 words and the answers to long questions should not exceed 500 words.

1. (i) What do you mean by interactive graphics? Explain the framework for Interactive graphics. 8

   (ii) What do you mean by software? Write a program in Graphics to draw a circle. 7









2. Explain the following : 5+5+5

   (i) Dream weaver

   (ii) Random Scan display processor

   (iii) Video controller

3. Explain Southland-Cohen Algorithms with suitable examples. 15

4. Write short notes on any **three** : 5+5+5

   (i) 2-D Transformation

   (ii) Homogeneous co-ordinates

   (iii) Cubic Curves

   (iv) 3D effects.

5. (i) What do you mean by computer graphics? Write the characteristics of computer graphics application. 8

   (ii) Explain spatial partitioning Representation in details. 7

6. What do you mean by multimedia? Explain multimedia applications in details. 15

7. What is computer animation in multimedia? Explain the types of Animation which are used in multimedia. 15

8. Explain the following : 3×5=15

   (i) Quadric surface

   (ii) Authoring tools in multimedia

   (iii) Boundary Representation.

9. Explain midpoint subdivision Algorithms and trace it with a proper example. 15

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Roll No. _____

# 19/1563

## B.C.A. (Fourth Semester)

## Examination, 2019

### First Paper

### (Computer Graphics & Multimedia Application)

***Time : Three Hours*** ***Maximum Marks : 75***

**Note**: Attempt any **five** questions. **All** questions carry equal marks.

**Note** : The answers to short questions should not exceed 200 words and the answers to long questions should not exceed 500 words.

1. (a) Write the difference between graphical interaction and CUI. 5

   (b) Explain the need of computer graphics in brief. 5

**P.T.O.**









   (c) How pixels and resolution can increase or decrease the quality of image? Explain. 5

2. (a) Write the difference between raster-scan display and random-scan display. 7

   (b) What is video controller? Explain about input devices used for operator interaction. 8



3. (a) What is meant by 3D effect? How is it achieved in the world of computer graphics? 8

   (b) Write and explain about the Cohen-Southarland line clipping algorithm. 7

4. (a) Explain the use of mid point subdivision algorithm with an example. 7

(b) Explain the difference between LCD display and CRT display in brief. 8

5 (a) What is transformation? How it is helpful in computer graphics. 8

(b) Explain about the window-to-viewport transformation in brief. 7

6. (a) Explain the representation techniques of curves and surfaces in computer graphics. 8

(b) Explain about boundary representation for solid modeling. 7

7. (a) Write the difference between a video and an animation, in brief. 7

(b) What do you mean by multimedia highway? Explain the use of it in computer graphics. 8

8. Write Cyrus-Beck algorithm and explain it by taking an example. 15









9. Write and briefly explain about the different stages of multimedia project, required for creating quality multimedia project. 15

MGKVP University Question Paper
B.C.A. Examination, 2016

Fourth Semester

First Paper

(Computer Graphics & Multimedia Application)

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Time : Three Hours Maximum Marks : 75

Note: Attempt any five questions. All questions carry equal marks.

Note : The answers to short questions should not exceed 200 words and the answers to long question should not exceed 500 words.

1. What is Computer Graphics? What are the advantages of Interactive Graphics? Explain its framework for interactive graphics. (15)
2. What is Raster-Scan Display? Explain Southland- Cohen clipping algorithm. (15)
3. Explain any two Input and two Output devices used in Computer Graphics. (15)
4. Explain scaling and rotation with respect to 20 objects. Give suitable example. (15)
5. Write short notes on : (3×5=15)
   (a) Viewport
   (b) Random scan display
   (c) Applications of computer graphics
6. Explain polygon meshes and cubic curves. (15)
7. What is multimedia? Explain any two multimedia features which can be used in business. (15)
8. What is a multimedia component? Explain any four components of multimedia with an example of each. (15)
9. Describe the salient features of the application areas of multimedia technology. Name some software tools for Multimedia content development and discuss their working. (15)

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# 18/2663

## B.C.A. (Fourth Semester)

## Examination, 2018

### First Paper

### (Computer Graphics & Multimedia Application)

***Time : Three Hours*** ***Maximum Marks : 75***





**Note :** Attempt any **five** questions. **All** questions carry equal marks.

**Note :** The answers to short questions should not exceed 200 words and the answers to long questions should not exceed 500 words.

1. (a) What is computer graphics? Indicate five practical application of computer graphics. 5

   (b) What role does CCD play in an image scanner? 4

**P.T.O.**

(c) Write short notes on: 6

(i) Resolution

(ii) Pixels

(iii) Aspect ratio

2. (a) Explain Raster Scan display and Random scan display. 5

(b) Explain the laser printer with reference to the following points: printing mechanism, speed, printing quality and application. 5

(c) Describe the touch-sensing mechanism as used in a touch panel & enumerate the difference between pointing devices and positioning devices. 5

3. (a) What do you understand by VGA and SVGA monitors? 5

(b) Explain color depth and resolution & how it related to the memory requirement? 5

(c) What role does CCD play in an image scanner? 5

4. (a) Bresenham's line drawing algorithm uses integer arithmetic. What is the justification for this approach? 8

(b) Explain Midpoint method for Generation of Ellipse. 7

5. (a) Why are homogeneous coordinates used for transformation computations in Computer Graphics? 5

(b) Define : 10

(i) Modeling coordinates

(ii) World coordinates

(iii) Viewport

(iv) Normalized device coordinates

6. (a) Explain the components of multimedia in detail. 7

(b) Elaborate the working of animation and authoring techniques. 8

7. Explain the Midpoint subdivision algorithm & trace it with suitable example. 15

8. How multimedia is useful in future education system? Explain the 12 principles of Animation. 15

9. (a) Write the matrix representation of rotation and explain. 7

   (b) Explain two applications of multimedia. Describe different types of requirements for multimedia computer system that will support your applications. 8

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# 23/3198

## B.C.A. (Fourth Semester) Examination, 2023

### First Paper

### (Computer Graphics & Multimedia Application)

*Time : 3:00 Hours ]* *[ Maximum Marks : 75*

**Note :** Attempt any **five** questions. **All** question carry equal marks.

**Note :** The answers to short questions should not exceed **200** words and the answers to long questions should not exceed **500** words.

1. Explain with a clear diagram (any **two**): 7½×2=15

   (i) Mouse and its operation

   (ii) Image Scanner

   (iii) Graph Plotter

**P.T.O.**





2. (a) What are the benefits of Interactive computer Graphics? Name a few areas where it may be applied. 7½×2=15

   (b) Write the algorithm for scan conversion of a circle and explain it.

3 Write and explain the Mid point Subdivisions Algorithm and illustrate it with an example. 15

4. Write a short note on: 7½×2=15

   (i) Sutherland Cohen A lgorithm

   (ii) Matrix Representation of different 2D transformations.

5. Explain how a solid surface in 3D may be represented by: 7½×2=15

   (i) Polygon mesh Paramentric

   (ii) Cubic curve

6. (i) What are the different types of 3-D transformations in computer Graphics? Explain each with its transformation matrix. 10+5

(ii) Explain with diagram, the working of a random scan display device.

7. (i) Define=Multimedia, Animation, Morphing, MIDI, JPEG. 5+5+5

(ii) What are the different from of a Animation explain how they are implemented in practice.

(iii) Write about the uses / applications of Multimedia

8. Write a brief account of the hardware and software, required for sitting up an application involving multimedia features. 15







9. Write short notes on (any **two**) $7\frac{1}{2} \times 2 = 15$

(i) Scan conversion of Ellipse

(ii) Dream weaver

(iii) Concept of Solid Modelling

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Roll No. _____

# 22/5064

## B.C.A. (Fourth Semester)

## Examination, 2022

### First Paper

### (Computer Graphics & Multimedia Application)

*Time : Three Hours ]* *[ Maximum Marks : 75*

**Note :** Attempt any **five** questions. **All** questions carry equal marks.

**Note :** The answers to short questions should not exceed **200** words and the answers to long questions should not exceed **500** words.







1. (i) Describe the working of any two interactive graphics devices with diagram. 5

(ii) What is Scan conversion and why is it needed? 5

(iii) Differentiate between Raster Scan display and Random scan (line drawing) display unit. 5

2. Write the Bresenham's Algorithm for drawing : 7½x2=15

(i) A circle in the first quadrant

(ii) A straight line, given the starting and ending coordinates

Explain the working of the algorithm in both the above cases.

3. Differentiate between the following with suitable examples : 5+5+5=15

(i) Graph plotter and Image scanner

(ii) Hardware and Software for computer Graphics.

(iii) Window and View port

4. Write a short note on the following : 7½x2

(i) Dream Weaver

(ii) Sutherland Cohen Algorithm

5. How are curves and surfaces represented in Computer graphics? Explain briefly how cubic curves and quadric surfaces are used in this representation. 15

OR (i) What are homogeneous coordinates? How are they used to represent transformations in 2-D and 3-D? 7

(ii) Write down the 3-D transformation matrix for Rotation, Shear, Reflection and Transiation. 8







7. (i) Define multimedia. What are the different types of multimedia.? 4

(ii) Differentiate between video and Animation with example. What is morphing? 4

(iii) With a diagram, explain how you can set up a multimedia project. What are the different steps in the creation of a multimedia project. 7

8. Write a short note on any **two** of the following : 7½x2=15

(i) Solid Modelling

(ii) Cyrus Beck Algorithm

(iii) Plasma Panel Display

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# 22/5068

# B.C.A. Examination, 2022

**(Fourth Semester)**

**Fifth Paper [E - I]**

**(Graph Theory and Combinatorics)**

*Time : Three Hours ]* *[ Maximum Marks : 75*

**Note :** Attempt any **five** questions. **All** questions carry equal marks.

1. (a) Define a simple graph. Draw all simple graphs with the four vertices {u,v, w, x} and two edges, one of which is (u, v) 10







(b) Suppose a graph has vertices of degrees 1, 1, 4, 4 and 6. How many edges does the graph have? 5

2. (a) State and prove the handshaking theorem. 6

(b) Draw a graph with specified properties or explain why on such graph exists 9

(i) Graph with four vertices of degrees 1, 2, 3 and 3

(ii) Graph with four vertices of degrees 1, 2, 3 and 4

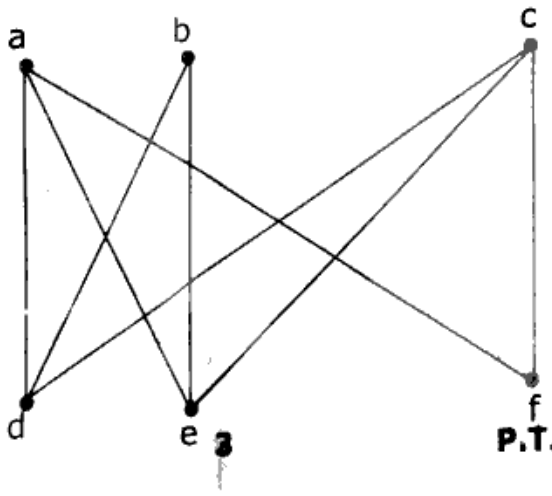
(iii) Simple graph with four vertices of degrees 1,2,3 and 4

3. (a) Define the directed graph with the help of suitable example. 7

(b) Find directed graph that has the adjacency https://www.mgkvponline.com matrix $A = \begin{bmatrix} 1 & 0 & 1 & 2 \\ 0 & 0 & 1 & 0 \\ 0 & 2 & 1 & 1 \\ 0 & 1 & 1 & 0 \end{bmatrix}$

4. (a) Define planar graph with the help of suitable example. 7

(b) Determine Whether the graph below is planar. If so, draw it so that no edges cross. 8









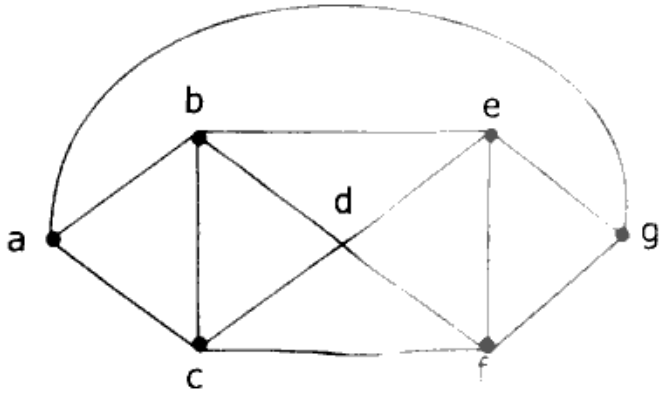

5. (a) What is tree? Give the properties of tree and explain with diagram. 5

(b) Explain why graphs with the given specification do not exist. 10

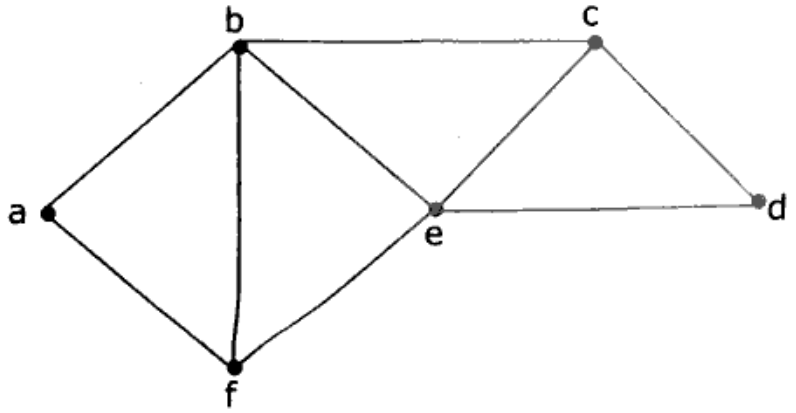
(i) Tree, twelve vertices fifteen edges.

(ii) Tree, five vertices , total degree.

6. (a) Define the chromatics number of a graph. What is the chromatic number of the graph G shown below? 7



(b) What is meant by the spanning tree of a graph? Find all the spanning tree for the graph below: 8




7. (a) What is the transpose of a matrix.

if $A = \begin{bmatrix} 4 & -2 & 0 & 6 \\ 2 & -3 & 1 & 9 \\ 0 & 7 & 5 & -1 \end{bmatrix}$ the find $A^t$=? 7

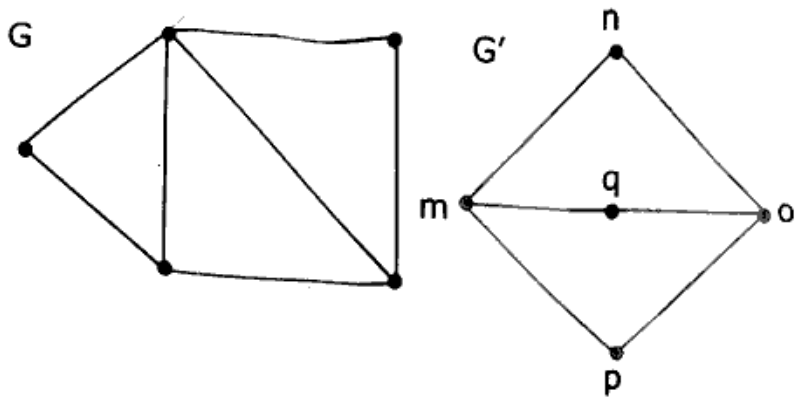
(b) What are isomorphic graphs? Determine whether the graph G and $G^1$ giv-







en below are isomorphic 8




8. (a) Find the number n of ways that an organization consisting of 15 members can elect a president, treasurer and secretary (assuming no person is elected to more than one position. 7

(b) There are four bus lines between A to B, and three bus lines between B and C. Find the number of ways a person can travel : 8

(i) By Bus from A to C by way of B.

(ii) Round trip by bus from A to C by way of B.

(iii) Round trip by bus from A to C by way of B, if the person does not want to use a bus line more than once.

C

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Roll No. _____

# 19/1567

## B.C.A. Examination, 2019

### Fourth Semester

### Fifth Paper

### (Mathematics-III)

***Time : Three Hours*** ***Maximum Marks : 75***

**Note**: Attempt any **five** questions. **All** questions carry equal marks.

1. (a) Find the amplitude and argument of $5 - 4i$. Also convert it into polar form. 4

   (b) Find all the roots of the equation $x^5-x^4+x^3-x^2+x-1 = 0$. 5

   (c) Find the square root of $4 + 3i$. 6

2. (a) Find $\lim_{x\to 0}\frac{1-\cos 2x}{x^2}$. 3

   (b) Show that every absolutely convergent series is always convergent. 5

**P.T.O.**







   (c) Test the convergence of the series : 7

$$1+\frac{x^2}{2^2}+\frac{L^2}{3^2}x^4+\frac{L^3}{(4)^2}x^3.....\text{adinfinite.}$$

3. (a) Define Fourier series of even and odd functions with examples. 4

   (b) Define Directional derivatives with an example. Also give the physical meaning of curl of a vector function. 4

   (c) If $\bar{r}=xi+yi+zk$ and $r=|\bar{r}|$, then Show that grad $(\log r) = \frac{\bar{r}}{r^2}$. 7

4. (a) Solve the differential equation : 6

$$\frac{dy}{dx}=\frac{3x+2y+2}{6x+4y+2}.$$

   (b) Solve : $\frac{dy}{dx}+\text{cosec } x.y = x^2$. 6

   (c) Solve : $\frac{dy}{dx}=\frac{1-x+x^2}{1-y-y^2}$. 3

5. (a) Solve : $x\sin x\frac{dy}{dx}+y(x\cos x+\sin x)=3$. 5

(b) What do you mean by an integrating factor of a differential equation? Give an example also. 5

(c) Solve : $\frac{d^4y}{dx^4}+\frac{d^2y}{dx^2}-6y=0$ 5

6. (a) Solve : $(D^2+3D+2)\ y = e^{-2x}\cos x$. 7½

(b) $\frac{d^3y}{dx^3}-3\frac{d^2y}{dx^2}+2\frac{dy}{dx}=e^{3x}$. 7½

7. (a) Define Cauchy differential equation with an example. 7

(b) Solve : $y \sin 2x\, dx - (y^2+\cos^2 x)dy = 0$. 8

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# 3050

## B.C.A. Examination, 2016

## Fourth Semester

## Fifth Paper

## (Mathematics-III)

*Time : Three Hours* *Maximum Marks : 75*

**Note :** Attempt any **five** questions. All questions carry equal marks.

1. (a) Express the complex number $z = 2 + 2\sqrt{3}\,i$ in polar form. 5

(b) Find the square roots of $-15-8i$. 5

(c) If $z_1 = r_1(\cos\theta_1 + i\sin\theta_1)$, $z_2 = r_2(\cos\theta_2 + i\sin\theta_2)$, then prove that $z_1 z_2 = r_1 r_2\{\cos(\theta_1+\theta_2) + i\sin(\theta_1+\theta_2)\}$. 5



2. (a) Define a sequence of real numbers. Show that every convergent sequence is bounded. 4

(b) Show that the alternating series 4



$1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \ldots\ldots$ is convergent.

(c) Test the convergence of the series: 7

$$x + \frac{2^2x^2}{2!} + \frac{3^3x^3}{3!} + \frac{4^4x^4}{4!} + \ldots\ldots$$

3. (a) Define curl of a vector point function $F = F_1\hat{i} + F_2\hat{j} + F_3\hat{k}$. Find the curl of the vector $f = xyz\,\hat{i} + 3x^2y\,\hat{j} + (xz^2 - y^2z)\hat{k}$. 7



(b) Find the directional derivative of $\frac{1}{r}$ in the direction of $\vec{r}$ where $\vec{r} = x\,\hat{i} + y\,\hat{j} + z\,\hat{k}$. 8

4. (a) Describe even and odd functions with examples. 7

(b) Obtain the Fourier series of the periodic function defined as: 8



$$f(x) = \begin{cases} -\pi\ ; 0 < x < \pi \\ x - \pi ; \pi < x < 2\pi \end{cases}$$

5. (a) Solve the differential equation: 8

$$x(x-1)\frac{dy}{dx} - (x-2)y = x^2(2x-1)$$



(b) Solve by variable separable method. 7

$$(x+1)\frac{dy}{dx} = x(y^2+1)$$

6. (a) Obtain the complete solution of 7

$$\frac{d^2y}{dx^2} + 6\frac{dy}{dx} + 9y = 5e^{3x}$$

(b) Solve the equation- 8

$$\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + y = x.\sin x$$

7. (a) Solve the homogeneous differentia equation -  8

$$x^2dy + y(x+y)\,dx = 0$$

(b) Define the gradient of a scalar field and divergence of a vector field. 7

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# 18/2667

## B.C.A. Examination, 2018

### Fourth Semester

### Fifth Paper

### (Mathematics-III)

***Time : Three Hours*** ***Maximum Marks : 75***

**Note :** Attempt any **five** questions. **All** questions carry equal marks.

**Note :** The answers to short questions should not exceed 200 words and the answers to long questions should not exceed 500 words.

1 (a) Convert 3+4i into its polar form. Also find its arguments. 4









(b) Find $|Z|$ where $Z = (1+2i)(3-4i)$ 3

(c) Find all the roots of the equation

$x^4-x^3+x^2-x+1=0$ 8

2. (a) Find $\lim_{n\to\infty} \frac{3+4n}{2n}$ 3

(b) Prove that the series :

$1-\frac{1}{2}+\frac{1}{3}-\frac{1}{4}+\frac{1}{5}.....$ 4

is conditionally convergent.

(c) Test the convergence of the series :

$1+\frac{1}{2}x+\frac{\lfloor 2}{3^2}x^2+\frac{\lfloor 3}{4^3}x^3+.....+$ ad.infi. 8

3. (a) If $\vec{a}$ and $\vec{b}$ are constant vectors, $\omega$ is a constant and $\vec{r}$ is a vector function of the scalar t given by $\vec{r} = \cos \omega t \vec{a} + \sin \omega t \vec{b}$, then prove that: 8

(i) $\frac{d^2\vec{r}}{dt^2} = -\omega^2 \vec{r}$

(ii) $\vec{r} \times \frac{d^2\vec{r}}{dt^2} = \omega^2(\vec{a} \times \vec{b})$

(b) If $\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$ and $r = |\vec{r}|$, then prove that 7

$$\text{grad } (\log r) = \frac{\vec{r}}{r^2}$$

4. (a) Define periodic functions. Prove that sin2x is a periodic function. Also find its period. 7

(b) Define even and odd functions. Write a short note on half range series. 8

5. (a) Solve : $\frac{dy}{dx} = \frac{3x+2y}{x-y}$ 8

(b) Solve : $\frac{dy}{dx} + \frac{y}{x} = x^2$ 7





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6. (a) Solve:

$$x \cos x \frac{dy}{dx} + y(x \sin x + \cos x) = 1$$ 7

(b) Define exact differential equations and then solve : 8

$$y \sin 2x\, dx - (y^2 + \cos^2 x)dy = 0$$

7. (a) Solve : $\frac{d^2y}{dx^2} - 3\frac{dy}{dx} + 2y = e^x$ 7

(b) Solve : $(D^2 + 3D + 2)y + e^{2x}\sin x$ 8



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Roll No.

# 23/3203

# B.C.A. (Fourth Semester) Examination, 2023

## Paper - V (B) Optional

## (Mathematics - III)

*Time : Three Hours ]* *[ Maximum Marks : 75*

**Note :** Attempt any **five** questions. **All** questions carry equal marks.

1. (a) Find the number A and B, if

$$A + iB = \frac{3-2i}{7+4i}$$ 5

(b) Prove that

$$\cos(\alpha+i\beta)+i\sin(\alpha+i\beta)=e^{-\beta}(\cos\alpha+i\sin\alpha)$$

5

(c) Resolve $\tan(\alpha+i\beta)$ into real and imaginary parts. 5

**P.T.O.**





2. (a) Test the convergence of the sequence $\{S_n\}$, where

$$s_n = \frac{1}{n+1} + \frac{1}{n+2} + \text{--------} + \frac{1}{n+n}$$ 5

(b) Prove that the sequance whose $n^{th}$ term $a_n = \left(1+\frac{2}{n}\right)^n$ is convergent and converges to $e^2$. 5

(c) Test the convergence of the series whose $n^{th}$ term is : $\frac{\sqrt{n+1}-\sqrt{n-1}}{n}$ 5

3. (a) If $\bar{r} = 4a\sin^3 t\,\hat{i} + 4a\cos^3 t\,\hat{j} + 3b\cos^2 t\hat{k}$ then find $\frac{d\bar{r}}{dt} \cdot \frac{d^2\bar{r}}{dt^2}$. 5

(b) If $\bar{F} = \text{grad}\,(x^2+y^2-3xyz)$, then find div $\bar{F}$. 5

(c) Find a unit normal to the surface $xy^2+2xz=4$ at the point. 5

4. (a) Find the Fourier series corresponding to the function. 7

$$F(x) = \begin{cases} 0, -5 < x < 0 \\ 3, 0 < x < 5 \end{cases}$$

(b) If $F(x)=x$, $\forall\ x \in (0, 2)$ then find the half range (i) sine series (ii) cosine series 4+4=8

5. (a) Solve $(D^3-3D^2+4D-2)\ y=e^x$ 5

(b) Solve $(D^2+4)y=\cos 2x$ 5

(c) Solve $\frac{d^3y}{dx^3}-3\frac{d^2y}{dx^2}-6\frac{dy}{dx}+8y = x$ 5

6. (a) Solve $x^2ydx-(x^3+y^3)dy=0$ 5

(b) Solve $x\frac{dy}{dx} = y(\log y - \log x + 1)$ 5

(c) Solve $(1+y^2)dx=(\tan^{-1}y-x)dy$ 5







7. (a) Solve $\frac{dy}{dx}-y\tan x = -y\sec^2 x$ 5

(b) Solve $\frac{d^4y}{dx^4}+y = 0$ 5

(c) Solve $x^3\frac{d^3y}{dx^3}+2x^2\frac{d^2y}{dx^2}+2y = 0$ 5

# 17/1564

## B.C.A. (Fourth Semester)

## Examination, 2017

### Second Paper

### *(Operating System)*

***Time : Three Hours*** ***Maximum Marks : 75***

**Note**: Attempt any **five** questions. **All** questions carry equal marks.

**Note**: The answers to short questions should not exceed 200 words and the answers to long question should not exceed 500 words.

1. (a) Define operating systems. Explain the essential properties of multiprograming and Time sharing systems. 7½

   (b) Explain segmentation with paying. 7½

**P.T.O.**







2. (a) What is demand paging and how is it implemented? 7½

   (b) What is a safe state? Illustrate with a neat example. 7½

3. (a) What is meant by CPU scheduling? Explain different scheduling algorithms with examples. 7½

   (b) Write a short note on semaphores and their relevance in OS design. 7½

4. (a) Define the term process and threads. How an operating system deals with inter-process communication? 7½

   (b) Write a short note on the methods for handling Deadlocks. 7½

5. (a) Why should there be a need for disk scheduling? Briefly describe and compare the FCFS and Scan disk scheduling. 7½

(b) Define the following : 7½

(i) Memory management.

(ii) Disk structure.

6. (a) What is a file system? What are the main responsibilities of a file system? 7½

(b) Explain with the help of necessary diagrams the file allocation methods. 7½

7. (a) Explain the different page replacement algorithms by taking suitable example. 7½









(b) What are the common security threats and how an OS deals with them? 7½

8. Write short notes on : 5+5+5

(a) Swapping

(b) Critical-Section Problem

(c) File Access methods.

C

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# B.C.A. (Fourth Semester) Examination, 2019

## Second Paper

## (Operating System)

***Time : Three Hours*** ***Maximum Marks : 75***

**Note**: Attempt any **five** questions. **All** questions carry equal marks.

**Note** : The answers to short answer type questions should not exceed 200 words and the answers to long answer type questions should not exceed 500 words.

1. (a) Write briefly about the following:

(i) Parallel systems. 2×4=8

(ii) Distributed systems.

(iii) Real Time systems.

**P.T.O.**







(iv) Time sharing systems.

(b) Given five memory partitions of 100 KB, 500 KB, 200 KB, 300 KB and 600 KB (in order), how would the first-fit, best-fit and worst-fit algorithms place processes of 212 KB, 417 KB, 112 KB and 426 KB (in order)? Which algorithm makes the most efficient use of memory? 7

2. (a) Consider a logical address space of 64 pages of 1024 words each, mapped onto a physical memory of 32 frames. 2

(i) How many bits are there in the logical address?

(ii) How many bits are there in the physical address?

(b) Compare the memory organization schemes of contiguous memory allo-

cation, pure segmentation and pure paging with respect to external fragmentation, internal fragmentation and ability to share code across processes. 6

(c) What is an operating system? Can we work upon a computer system without an operating system? Explain briefly. 7

3. (a) How does the signal ( ) operation associated with monitor differ from the corresponding operation defined for semaphores? 4

(b) What is Producer-consumer problem? Explain. 3



(c) Define the following terms: 2×4=8

(i) Dispatcher.

(ii) Thrashing.

(iii) Multilevel Queue scheduling.

(iv) CPU Scheduler.

4. (a) Consider the following set of processes with the length of the CPU burst given









in milli seconds: 4+8=12

| Process | Burst Time | Priority |
|---|---|---|
| $P_1$ | 10 | 3 |
| $P_2$ | 1 | 1 |
| $P_3$ | 2 | 3 |
| $P_4$ | 1 | 4 |
| $P_5$ | 5 | 2 |

The processes are assumed to have arrived in the order $P_1$, $P_2$, $P_3$, $P_4$, $P_5$ all at time 0.

(i) Draw four Gantt charts that illustrate the execution of these processes using the following scheduling algorithms: FCFS, SJF, nonpreemptive priority and RR (quantum = 1).

(ii) What is the turnaround and waiting time of each process for each of the scheduling algorithms in part (i)?

(b) What is the critical section problem? Explain. 3

5. (a) Define Deadlock. 2

(b) Consider the following snapshot of a system: 1+4+1=6

| | Allocation | | | | Max | | | | Available | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | A | B | C | D | A | B | C | D |
| $P_0$ | 0 | 0 | 1 | 2 | 0 | 0 | 1 | 2 | 1 | 5 | 2 | 0 |
| $P_1$ | 1 | 0 | 0 | 0 | 1 | 7 | 5 | 0 | | | | |
| $P_2$ | 1 | 3 | 5 | 4 | 2 | 3 | 5 | 6 | | | | |
| $P_3$ | 0 | 6 | 3 | 2 | 0 | 6 | 5 | 2 | | | | |
| $P_4$ | 0 | 0 | 1 | 4 | 0 | 6 | 5 | 6 | | | | |

Answer the following questions using the Banker's algorithms:

(i) What is the content of the matrix Need?

(ii) Is the system in a safe state?

(iii) If a request from process $P_1$ arrives for (0, 4, 3, 0) can the request be granted immediately?









(c) What is Deadlock prevention and how it can be achieved? Explain by giving example. 7

6. (a) Suppose that a disk drive has 5000 cylinders numbered 0 to 4999. The drive is currently serving a request at cylinder 143, and the previous request was at cylinder 125. The Queue of pending request in FIFO order is: 9

86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130.

Starting from the current head position. What is the total distance that the disk arms moves to satisfy all the pending requests for FCFS disk-scheduling algorithms?

(b) What are dedicated devices, shared devices and virtual devices? 6

7. (a) What are different File allocation methods? Explain each of them in brief. 8

(b) Consider a file system that used an inodes to represent files. Disk blocks are 8KB in size, and a pointer to a disk block requires 4 bytes. This file system has 12 direct disk blocks, as well as single, double and triple indirect disk blocks. What is the maximum size of a file that can be stored in this file system? 7

8. (a) Consider the following page reference string 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1. 9

How many page faults would occur for the following replacement algorithms? Assume three frames and all frames are initially empty.









(i) LRU replacement.

(ii) FIFO replacement.

(iii) Optimal replacement.

(b) Consider a system that allocates pages of different sizes to its processes. What are the advantages of such a paging scheme? 6

MGKVP University Question Paper
B.C.A. Examination, 2016
Fourth Semester
Second Paper
(Operating System)
MGKVPonline.com

Time : Three Hours Maximum Marks : 75

Note: Attempt any fh.re questions. All questions carry equal marks.

Note : The answers to short questions should not exceed 200 words and the answers to long question should not exceed 500 words.

1. (a) Explain Real Time and Distributed operating systems and their characteristics. (7½)
   (b) Explain the purpose and importance of system calls in detail with examples. (7½)
2. (a) What is deadlock detection and recovery? Describe the methods for recovering from deadlock. (7½)
   (b) How does deadlock avoidance differ from deadlock prevention? Write about deadlock avoidance algorithm in detail. (7½)
3. Describe the following : (3×5= 15)
   (a) Process State
   (b) Process control block
   (c) Thrashing
4. (a) Explain the different page replacement algorithms with neat examples. (7½)
   (b) Explain file system along with its different components. (7½)
5. (a) Describe the ways of implementing semaphores. (7½)
   (b) Explain the various CPU scheduling algorithm with example. (7½)
6. (a) Explain the different file allocation methods with their advantages and disadvantages. (7½)
   (b) What is disk scheduling? Explain the different types of disk scheduling by giving an example. (7½)
7. (a) What is demand paging? Describe the process of demand paging in operating system. (6)
   (b) Describe the essential properties of the following types of operating system.
      (i) Multiprogrammed OS (9)
      (ii) Time Shared OS
      (iii) Batch Systems
8. Write short notes on : (5+5+5)
      (i) Free space management
      (ii) Critical section problem
      (iii) Disk Reliability

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C

(Printed Pages 4)

Roll No. _____

# 18/2664

## B.C.A. (Fourth Semester)

## Examination, 2018

### Second Paper

### (Operating System)

***Time : Three Hours*** ***Maximum Marks : 75***

**Note:** Attempt any **five** questions. **All** questions carry equal marks.

**Note:** The answers to short questions should not exceed 200 words and the answers to long questions should not exceed 500 words.

1. (a) Explain various resource management modules of the operating systems and their responsibilities in detail. 7½

**P.T.O.**

(b) Explain the techniques used to prevent deadlock. 7½

2. (a) Explain the different file allocation methods with neat diagrams. Mention their advantages and disadvantages. 7½

(b) Describe the differences among short term, medium-term and long term scheduling. 7½

3. (a) Describe the differences between symmetric and asymmetric multiprocessing. What are the advantages and disadvantages of multiprocessor systems? 7½

(b) Why are segmentation and paging sometimes combined into one scheme? Explain them in detail with an example. 7½

4. (a) Under what circumstances do page faults occur? Describe the actions taken by the operating system when a page fault occurs. 6

(b) Consider the following page reference string 1, 2, 3, 4, 5, 3, 4, 1, 6, 7, 8, 7, 8, 9, 7, 8, 9, 5, 4, 4, 5, 3. How many page fault would occur for the following replacement algorithms? Assume four frames and all frames are initially empty. 9

(i) LRU replacement

(ii) FIFO replacement

(iii) Optimal replacement

5. (a) Briefly discuss about the various directory structures. 7

(b) Compare the functionalities of FCFS, SSTF, CSCAN and C-LOOK disk scheduling algorithms with an example for each. 8



6. (a) Discuss process synchronization. Illustrate any two classical problems of synchronization. 7½

(b) What is a critical section? Discuss the solution of the critical section problem. 7½

7. (a) Explain deadlock avoidance process using Banker's algorithm. 7½

(b) Explain the purpose and importance of system calls in detail with examples. 7½

8. Write short notes on: 5+5+5

(a) Thrashing

(b) Swap-space management

(c) Distributed systems.

C

(Printed Pages 4)

Roll No. _____

# 23/3199

## B.C.A. (Fourth Semester) Examination, 2023

### Second Paper

### (Operating System)

*Time : 3:00 Hours ]* *[ Maximum Marks : 75*

**Note :** Attempt any **five** questions. **All** question carry equal marks.

**Note :** The answers to short answer type questions should not exceed **200** words and the answers to long answer type questions should not exceed **500** words.

1. What are the various criteria for a good process scheduling algorithm? Explain any two preemptive scheduling Algorithm. 15

2. (a) Explain the concept of thrashing with the help of diagram. How can we prevent it? 7½

**P.T.O.**





(b) What is critical section problem? Discuss any one solution of critical section problem. 7½

3. (a) Explain with a diagram, how paging supports the virtual memory. Also explain how a logical address is translated into a physical address in paging with the help of diagram. 7½

(b) Consider the following set of processes with the arrival time and the CPU burst times given in milliseconds What is the average turn around time with round robin (RR) scheduling algorithm if time quantum is 3 millisecond. Also draw the Gantt chart of scheduling. 7½

| Process | Arrival time | CPU Burst time |
|---|---|---|
| Po | 0 | 5 |
| $P_1$ | 1 | 3 |
| $P_2$ | 2 | 8 |
| $P_3$ | 3 | 6 |

4 Describe the process states with the help of a state diagram. Define process control block (PCB) and it's role in the context of switching of the process. 15

5. (a) Differentiate between Fixed and variable partition. 5

(b) Give five memory partitions of 100KB, 500KB, 200KB, 300KB. and 600KB (in order), how would each of the First-fit, best fit and worst fit algorithms place process of 212Kb, 417KB, 112 KB and 426KB (In order)? Which algorithm makes the most efficient use of memory? 10

6. Discuss the following in brief: 15

(a) Internal and External fragmentation

(b) Time sharing systems and Real time systems.

(c) Logical file system and physical file system. 

7. (a) Discuss in detail about different file access methods. 5

(b) What is disk scheduling? Compare various scheduling algorithms and sugest best algorithm for you own snapshot. 10

8. (a) What is a deadlock? Explain the necessary and sufficient condition for deadlock occurrence. 5









(b) Consider the following snapshot of a system: 10

| | Allocation | | | Maximum | | | Available | | |
|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | A | B | C | A | B | C |
| $P_0$ | 0 | 1 | 0 | 7 | 5 | 3 | 3 | 3 | 2 |
| $P_1$ | 2 | 0 | 0 | 3 | 2 | 2 | | | |
| $P_2$ | 3 | 0 | 2 | 9 | 0 | 2 | | | |
| $P_3$ | 2 | 1 | 1 | 2 | 2 | 2 | | | |
| $P_4$ | 0 | 0 | 2 | 4 | 3 | 3 | | | |

Answer the following questions using Bankers Algorithm:

(i) Is the system in a safe state?

(ii) Can request for (0, 2, 0) by $P_0$ be granted?

9. (a) What is Dining Philosophers problem? Discuss the solution to diving philosophers problem using monitors? 7½

(b) Define a semaphore? What is meant by counting semaphore and binary semaphore? Discuss mutual exclusion implementation using semaphore. 7½

C

(Printed Pages 4)

Roll No. _____

# 22/5065

# B.C.A. (Fourth Semester) Examination, 2022

## Second Paper

## (Operating System)

*Time : Three Hours ]* *[ Maximum Marks : 75*

**Note :** Attempt any **five** questions. **All** questions carry equal marks.

**Note :** The answers to short answer type questions should not exceed **200** words and the answers to long answer type questions should not exceed **500** words.

1. (a) Explain FCFS, LRU and optimal page replacement Algorithms. Which algorithm suffer's from Belady's anomaly? 7

   (b) Consider the page reference string : 1, 2, 3, 4, 2, 5, 3, 4, 2, 6, 7, 8, 7, 9, 7, 8, 2, 5, 4 and 9. Calculate how many page faults would occur for LRU and FIFO page replacement algorithms? 8







2. (a) What is a deadlock? Explain the necessary and sufficient conditions for deadlock occurrence. Also explain how deadlock can be prevented? 5

   (b) Consider the following snapshot of a system : 10

| | Allocation | | | Maximum | | | Available | | |
|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | A | B | C | A | B | C |
| $P_0$ | 0 | 1 | 0 | 7 | 5 | 3 | 3 | 3 | 2 |
| $P_1$ | 2 | 0 | 0 | 3 | 2 | 2 | | | |
| $P_2$ | 3 | 0 | 2 | 9 | 0 | 2 | | | |
| $P_3$ | 2 | 1 | 1 | 2 | 2 | 2 | | | |
| $P_4$ | 0 | 0 | 2 | 4 | 3 | 3 | | | |

Answer the following questions using Banker's algorithm :

(i) Is the system in a safe state?

(ii) If a request from $P_1$ arrives for (1,0,2), Can the request be granted immediately? Show it.

3. (a) What do you understand by disk scheduling? Discuss disk scheduling algorithm. List the advantages of SCAN over C-SCAN Algorithm. 5

   (b) Calculate the total head movement with FCFS, SSTF and SCAN disk sched-

uling Algorithms for the given block sequence :

40, 66, 73, 146, 34, 59, 76, 123, 39, 83, 91, 14 initially the head is at block number 1. Draw the diagram for all the algorithms. 10

4 (a) Explain the concept of thrashing with the help of diagram. How can we prevent it? 5

(b) Discuss any **two** of the following in brief : 10

(i) File attributes and types

(ii) Sequential file access

(iii) Direct file access

(iv) Tree structured directories

5. (a) What is the critical section problem? Discuss any one solution of critical section problem. 5

(b) Differentiate between any **two** of the following : 10

(i) Internal and External Fragmentation



(ii) Demand paging and Demand Segmentation

(iii) Fixed and variable partition

(iv) First fit, Best fit and Worst fit

6. (a) Explain with a diagram, how paging supports the virtual memory. Also ex-





plain how a logical address is translated into a physical address in paging. 5

(b) Draw the Gantt chart for the Round Robin (RR) scheduling policy and calculate the average turnaround time, average waiting time, throughput and processor utilization for the following set of processes : 10

(Quantum in 3)

| Process | CPU Burst Time |
|---|---|
| $P_1$ | 04 |
| $P_2$ | 14 |
| $P_3$ | 06 |
| $P_4$ | 07 |

7. (a) Define a process. Explain various states of a process. How does a process differ from a thread? 5

(b) Differentiate amongst multiprogrammed, multiuser and multitasking operating systems. Also discuss the advantages and limitations of each operating system. 10

8. (a) List the content's of process control Block (PCB). Also explain the step's involved in "Context switch" between two process with an illustration. 7

(b) What are system calls? How are system calls categorized? Explain the sequence of system calls for copying one file to another (new) file. 8

C

(Printed Pages 4)

Roll No. _____

# 19/1566

# B.C.A. Examination, 2019

## Fourth Semester

## Fourth Paper

## (Optimization Techniques)

***Time : Three Hours*** ***Maximum Marks : 75***

**Note**: Answer any **five** questions. **All** questions carry equal marks.

**Note** : The answers to short questions should not exceed 200 words and the answers to long questions should not exceed 500 words.

1. (a) Write the advantages and limitations of LPP. 5

   (b) Define Basic solution and Optimum solution. 5

**P.T.O.**







   (c) Discuss Primal and Dual Problem. 5

2. What do you understand by Simplex method to solve a LPP. Solve the following LPP 10

   Maximize

   $$z = 3x_1 + 2x_2$$

   S.to.c.

   $$-2x_1 + x_2 \leq 1$$

   $$x_1 \leq 2$$

   $$x_1 + x_2 \leq 3$$

   and $x_1, x_2 \geq 0$

3. Obtain the steady state equation for the Model M/M/1 : FIFO and derive the formula for

   (i) Average number of units in the queue.

   (ii) Average waiting time of an arrival in the queue. 15

4. Define a Queue and explain the various queue disciplines.

   A self-service store employs one cashier at its counter. Nine customers arrive on an av-

erage every 5 minutes while the cashier can serve 10 customers in 5 minutes. Assuming Poisson distribution for arrival rate and exponential distribution for service time, find-

(i) Average number of customers in the system

(ii) Average number of customers in the queue.

(iii) Average time a customer spends in the queue. 8+7=15

5. Explain how the theory of replacement is used in the replacement of items whose maintenance cost varies with time. 15

6. Find the cost per period of individual replacement policy of an installation of 300 light bulbs, given the following: 15

(i) Cost of replacing an individual bulb is Rs. 2/-





http://www.mgkvponline.com



(ii) Conditional probability of failure is given below :

| Week No. : | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| Conditional : Probability of failure | 0 | 0.1 | 0.3 | 0.7 | 1.0 |

Also calculate the number of light bulbs that would fail during each of the four weeks.

7. Derive EOQ formula for an inventory model with finite production rate and shortages permitted. 15

8. Give Johnson's procedure for determining an optimal sequence for processing n jobs on two machines. Give the justification of the rule used in the procedure. 15



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MGKVP University Question Paper
B.C.A. Examination, 2016
Fourth Semester
Fourth Paper
(Optimization Techniques)
MGKVPonline.com

Time Three Hours Maximum Marks : 75

Note : Attempt any five questions. All questions carry equal marks.

Note : The answers to short questions should not exceed 200 words and the answers to long question should not exceed 500 words.

1. (a) Old hens can be bought for Rs. 2.00 each but young ones cost Rs. 5.00 each. The old henslay 3 eggs per week and the young ones, 5 eggs per week, each being worth 30 paisa. A hen costs Rs. 1.00 per week to feed. If I have only Rs. 80.00 to spend for hens, how many of each kind should I by to give a profit of more than Rs. 6.00 per week, assuming that I cannot house more than 20 hens?
Write a mathematical model of the above problem. You need not solve the problem. (7)

(b) Solve graphically the following L.P.P. maximize. (8)
$z = 3x_1 + 2x_2$
Subject to the constraints :
$-2x_1 + x_2 \leq 1$
$x_1 \leq 2$
$x_1 + x_2 \leq 3$
$x_1, x_2 \geq 0$

2. Use Simplex method to solve the following L.P.P. : (15)
Maximize $z = x_1 + 2x_2$
Subject to : $-x_1 + 2x_2 \leq 8$, $x_1 + 2x_2 \leq 12$
$x_1 - 2x_2 \leq 3$; $x_1 \geq 0$ and $x_2 \geq 0$

3. (a) Use Vogel's Approximation method to obtain an initial basic feasible solution of the transportation problem : (8)

| | D | E | F | G | Availability |
|---|---|---|---|---|---|
| A | 11 | 13 | 17 | 14 | 250 |
| B | 16 | 18 | 14 | 10 | 300 |
| C | 21 | 24 | 13 | 10 | 400 |

Demand 200 225 275 250

(b) Explain the difference between transportation problem and an assignment problem. Give a mathematical formulation of the assignment problem. (7)

4. At a railway station, only one train is handled at a time. The railway yard is sufficient only for two trains to wait while, the other is given the Signal to leave the station. Trains arrive at the station at an average rate of 6 per hour and the railway station can handle them on an average of 12 per hour. Assuming Poisson arrivals and exponential service distribution, find the steady-state probabilities for the various number of trains in the system.
Also find the average waiting time of a new train corning into the yard. (15)

5. What is meant by replacement problem? Enumerate various types of solutions to the replacement problem. Discuss in brief : group replacement and individual replacement policies. (15)

6. What are the motives for carrying inventory? Find the E.O.Q. problem with known shortages. (15)

7. In a factory, there are Six jobs to perform, each of which should go through two machines A and B, in the order A, B. The processing timing (in hours) for the jobs are given here. You are required to determine the sequence for performing the jobs that Would minimize the total elapsed time, T. What is the value of T.? 15

| Job : | $J_1$ | $J_2$ | $J_3$ | $J_4$ | $J_5$ | $J_6$ |
|---|---|---|---|---|---|---|
| Machine A | 1 | 3 | 8 | 5 | 6 | 3 |
| Machine B | 5 | 6 | 3 | 2 | 2 | 10 |

C

(Printed Pages 4)

Roll No. _____

# 18/2666

## B.C.A. Examination, 2018

### Fourth Semester

### Fourth Paper

### (Optimization Techniques)

*Time : Three Hours* *Maximum Marks : 75*

**Note**: Attempt any **five** questions . **All** questions carry equal marks.

**Note**: The answers to short questions should not exceed **200** words and the answers to long questions should not exceed **500** words.

1. (a) Explain the general formulation of linear programming. 4

   (b) Describe the characteristics of the standard form of LPP. 7

   (c) Discuss the basic assumptions of linear programming problems. 4

**P.T.O.**

2. Solve by using two phase simplex method: 15

Maximize: $Z = 5x_1+8x_2$

Subject to the constraints:

$$3x_1+2x_2 \geq 3$$

$$x_1+4x_2 \geq 4$$

$$x_1+x_2 \leq 0$$

$$x_1,x_2 \geq 0$$

3. In a single server, Poisson anival and exponential service time queing system, show that the probability $P_n$ of n customers in steady state satisfies the following equations: 15

$\lambda P_0 = \mu P_1$ $\quad n = 0$

$(\lambda+\mu)P_1 = \mu P_2$ $\quad n = 1$

$(\lambda+\mu)P_n = \mu P_{n+1}+\lambda P_{n-1}$ $\quad n \geq 2$

4. (a) Define queue with example. Discuss the characteristics of queuing models. 10

(b) Draw a diagram showing the physical layout of a queuing system with multi server multi channel service facility. 5

5. Describe the replacement procedure of an item when value of money changes with constant rate during the period.

6. (a) A vehicle has been purchased at a cost of Rs. 1,60,000/. The value of the vehicle is depreciated in the first three years by Rs.15000/ each year and Rs. 12,000/ per year there after Its maintainance and operating costs for the first three years are Rs. 14,000/ Rs.17,000/ and Rs 20,000/ respectively and inerease by Rs 4000/ every year. Assuming an interest rate of Rs. 10% find the economic life on the vehicle.

7. Discuss inventory system, its types and baisc characterestics. 15



P.T.O.

8. (a) Discuss job sequencing, terminology used in, its assumptions and solution of a sequencing problem. 10

(b) Explain the term lead time. reorder point, stock out cost and set-up cost. 5

C (Printed Pages 4)

Roll No.

# 23/3201

## B.C.A. (Fourth Semester) Examination, 2023

## Fourth Paper

## (Optimization Techniques)

*Time : 3:00 Hours ]* *[ Maximum Marks : 75*

**Note :** Attempt any **five** questions. **All** question carry equal marks.

**Note :** The answers to short answer type questions should not exceed **200** words and the answers to long answer type questions should not exceed **500** words.

1. Discuss transportation problem. Describe the steps used in North-west corner method alongwith its advantages and disadvantages. Determine an initial basic feasible solution to the following transportation problem using this method. 1+3+3+3+5=15

| | | TO I | II | III | IV | Supply |
|---|---|---|---|---|---|---|
| From | A | 13 | 11 | 15 | 20 | 2 |
| | B | 17 | 14 | 12 | 13 | 6 |
| | C | 18 | 18 | 15 | 12 | 7 |
| Demand | | 3 | 3 | 4 | 5 | |

**P.T.O.**





2. Differentiate between a transportation and an assignment problem. Discuss the steps used in reduced matrix method and solve the following minimal assignment problem. 3+4+8=15

| | | Men 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| Job | I | 12 | 30 | 21 | 15 |
| | II | 18 | 33 | 9 | 31 |
| | III | 44 | 25 | 24 | 21 |
| | IV | 23 | 30 | 28 | 14 |

3. Explain characteristics of a queueing system. Also discuss the customers behaviour in a queue and definition of various terms used in queueing. 3+6+6=15

4. Describe Poisson process and its postulates . Also prove that if arrival pattern in a queueing problem follows a poisson process, then the random variable T representing the inter arrival time follows the exponential distribution and vice-versa. 4+11=15

5. Prove the policy of a machine is continued upto the time the average cost per year of it decrease and is replaced at the time when this cost begins to increase. A machine owner finds from his post records that the cost per year maintaining a machine A whose purchase price is Rs. 6000.00 are as given below: 15

| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Maintenance Cost (in Rs.) | 1000 | 1200 | 1400 | 1800 | 2300 | 2800 | 3400 | 4000 |
| Resale price (in Rs.) | 3000 | 1500 | 750 | 375 | 200 | 200 | 200 | 200 |

Find at what age is the replacement due?

6. To derive an economic lot size formula and the minimum average costs under the following assumptions: 15
   (i) Demand is uniform
   (ii) Production is instantaneous
   (iii) lead time is zero
   (iv) $C_1$=holding cost per unit per unit time
   (V) $C_3$=set up cost per production run time and
   (vi) Shortages are not allowed.

7. Discuss the concept of job sequencing and its assumptions. Discuss Johnson method for n jobs on 2 machines. We have five jobs, each of which must go through two machines A and B in the order AB. Processing times in hours are given in the table below:  4+4+7=15

| Jobs | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Machine A (Ai) | 5 | 1 | 9 | 3 | 10 |
| Machine B (Bi) | 2 | 6 | 7 | 8 | 4 |

Determine the sequence for the five jobs that will minimize the elapsed time T.







8. (a) XYZ manufacturing company is using a machine whose purchase price is Rs. 65,000=00 The installation charges amount to Rs. 18,000=00 and the machine has a scrap value of only Rs. 8,000=00 because of firm has a monopoly of this type of work. The maintenance cost in various years is given in the following table: 8

| Years | Maintenance Cost (in Rs) |
|---|---|
| 1 | 1250 |
| 2 | 3750 |
| 3 | 5000 |
| 4 | 7500 |
| 5 | 10500 |
| 6 | 14500 |
| 7 | 20000 |
| 8 | 24000 |
| 9 | 30000 |

Determine after how many years should the machine be replaced, assuming that the machine replacement can be done only at the year end.

(b) Discuss basic requirements and basic assumptions of a linear programming problem. 3+4=7

C

(Printed Pages 4)

Roll No. _____

# 22/5067

## B.C.A. (Fourth Semester)

## Examination, 2022

### Fourth Paper

### (Optimization Techniques)

*Time : Three Hours ]* *[ Maximum Marks : 75*

**Note :** Attempt any **five** questions. **All** questions carry equal marks.

**Note :** The answers to short answer type questions should not exceed **200** words and the answers to long answer type questions should not exceed **500** words.

1. (a) Define linear programming problem and discuss statements and properties of basic theorem. 8

   (b) Solve by graphical method, the linear programming problem : 7

   Minimize $z=20x_1+10x_2$

   subject to the constraints,







$x_1+2x_2 \leq 40$

$3x_1+x_2 \geq 30$

$4x_1+3x_2 \geq 60$

and non-negative restrictions $x_1, x_2 \geq 0$

2. Describe the advantages of simplex method over graphical method to solve a LPP.

   Consider the set of equations : 3+12=15

$5x_1-4x_2+3x_3+x_4=3$

$2x_1+x_2-5x_3-3x_4=0$

$x_1+6x_2-4x_3+2x_4=15$

$x_1, x_2, x_3, x_4 \geq 0$

   If $x_1=1$, $x_2=2$, $x_3=1$, $x_4=3$, is a feasible soultion, then find a basic feasible solution.

3. Find out the system of steady state equations for the model II in Queueing Theory, and derive the formula for : 5+5+5=15

   (a) average number of customers in the system.

   (b) average length of waiting time.

   (c) expected waiting time in the queue (excluded service time) ie average waiting time if an arrival in the queue.

4. Discuss the classification of queuing models. Arrivals at a telephone booth are considered to be Poisson, with an average time of 10

minutes between one arrival and the next. The length of a phone call assumed to be distributed exponentially with mean 3 minutes. Find the following: 3+4+4+4=15

(a) Find the average number of units in the system.

(b) Find the probability that it will take, an arrival, more than 10 minutes altogether to wait for the phone and complete his call?

(c) Find the probability that an arrival will have to wait more than 10 minutes before the phone is free.

5. Find the best replacement time of a machine, taking time as discrete and continuous. 15

6. Given demand D=450 items per year, ordering cost s=Rs 45 and carrying cost c=Rs 15 per unit. Find EOQ and F. 15

7. (a) Define inventory problem and categorize its variables. 3

(b) Discuss advantages and disadvantages of inventory. 2

(c) Derive an economic lot size formula and minimum average costs under the following assumptions : 10







(i) demand is uniform at a rate of r units per unit time

(ii) production is instantaneous (ie production rate is infinite.)

(iii) lead time is zero

(iv) $C_1$=holding cost per unit per unit time

(v) $C_3$=set up cost per production run, and

(vi) shortages are not allowed

8. What is sequencing problem? Discuss its applications at least in two areas. The costs of 5 different jobs to two machines are given as follows : 15

| | | Jobs | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| Machines | 1 | 4 | 7 | 3 | 9 | 6 |
| | 2 | 6 | 9 | 5 | 10 | 6 |

Solve the problem assuming that the objective is to minimize the total cost.

# 6639

## B.C.A. Examination, 2014

### Fourth Semester

### Fourth Paper

### *(Optimization Techniques)*

***Time : Three Hours***

***Maximum Marks : 75***

Note: Attempt any **five** questions. All questions carry equal marks.

1. (a) Discuss L.P.P. How it can be used in different fields. 7

   (b) Find the convex region from the graph of
   $z = 3x_1 + x_2$
   subject to constrains 8
   $-2x_1 + x_2 \le 1,\ x_1 \le 2,\ x_1 + x_2 \le 3,\ x_1, x_2 \ge 0$

2. (a) In matrix form $Ax = b$, we have







4. (a) Explain : 5
   (i) FCFS
   (ii) FIFO
   (iii) LIFO
   (iv) SIRO
   (v) FSR

   (b) Discuss transient state. In a railway, good trains arrive at a rate of 30 trains per day. Assuming that the inter-arrival time follows an exponential distribution and the service time distribution is also exponential with an average 36 minutes. Calculate the mean line length. 10

5. (a) Explain inventory problem. What are the costs involved in single item deterministic model. 8

   (b) Discuss
   (i) Long size model without shortage.
   (ii) tic-tac problem. 7

6. (a) Explain Johnsons algorithm for n jobs through 2 machine. 8

$$A=\begin{pmatrix}1 & 2 & 1\\ 2 & 1 & 5\end{pmatrix},\ x=\begin{bmatrix}x_1\\ x_2\\ x_3\end{bmatrix} \text{ and } b=\begin{bmatrix}4\\ 5\end{bmatrix}.$$

Write basic matrix and show that basic solutions are non-degerate solution. 6

(b) Discuss primal and dual simplex method. Write relationship between feasible dual and primal solution. 9

3. (a) Explain replacement technique. Where it is useful? Discuss replacement of items whose maintenance costs increases with time (value of money remains same during the period). 8

(b) Explain : Group replacement and individual replacement. A group replacement policy at the end of each month is most profitable if

$\frac{NC_2+N_pC1}{2} > NC_2$ and

$\frac{NCI}{1+q} > NC_2$, prove it. 7













(b) Explain Generalization of steady state M/M/1 model. 7

7. Write short notes on any three of the following : 15

(a) Basic theorem and their properties

(b) Classification of Queuing Model

(c) Simplex method

(d) Solution of sequencing problem

(e) Assignment problem and its solution

# 17/1565

## B.C.A. (Fourth Semester)

## Examination, 2017

### Third Paper

### *(Software Engineering)*

***Time : Three Hours*** ***Maximum Marks : 75***

**Note**: Attempt any **five** questions. **All** questions carry equal marks.

**Note**: The answers to short questions should not exceed 200 words and the answers to long questions should not exceed 500 words.

1. How can we review the SRS document for correctness, consistency and completeness? Explain with the help of a block diagram. 15

**P.T.O.**







2. Discuss the parameters that are to be considered for the following : 5+5+5

   (a) Data Design

   (b) Procedure Design

   (c) Design of files and databases

3. Write short notes on : 5+5+5

   (a) Data Dictionary

   (b) Data Flow Diagram

   (c) Formal Design Document

4. Why is comprehensive documentation required at each phase of the Software development process? With the help of a diagram, enumerate the different documentation reports that are produced at the end of each phase of software development. Also describe the importance of each such report. 15

5. (a) What are the issues that need to be considered in the development of code? 5+5+5

(b) Discuss the importance of structuredness as well as modularity of code produced.

(c) How can you ensure readability in the code developed by you?

6. (a) What are the different issues during implementation phase? 5+5+5

(b) Write the detailed discussion about End-user Training and the importance of User Manual as well as Operations Manual.



(c) Explain the need for changeover Instructions.

7. Differentiate between : 5+5+5

(a) Maintenance of software and long-Term Evolution of Software.











(b) Perceptive Maintenance and Corrective Maintenance.

(c) Module strength and Module coupling.

8. Throw light on the Object Oriented Design Approach. What are its advantages? Compare it with the traditional function-oriented Design approach. 15

9. Explain with examples : 5+5+5

(a) CASE Tools

(b) Entities and Attributes

(c) Physical system and logical system

# 19/1565
# B.C.A. (Fourth Semester) Examination, 2019
## Third Paper
## (Software Engineering)

***Time : Three Hours*** ***Maximum Marks : 75***

**Note**: Attempt any **five** questions. **All** questions carry equal marks.

**Note**: The answers to short questions should not exceed 200 words and the answers to long questions should not exceed 500 words.

1. (a) What do you understand by the term: legacy software? How does Software Engineering play a role in the development of quality software? 5+10

**P.T.O.**





(b) What are the different software development models? Explain any one of them in detail along with its advantage over other models.

2. (a) What do you understand by the terms: 'Process' and 'Entity'. What is a software process model? Explain with diagram. 5+5+5

(b) What is meant by software components? What are the uses of software components?

(c) Distinguish between the functional and non-functional requirements of a system.



3. Write short notes on: 15

(a) Requirements gathering

(b) Requirements validation

(c) SRS document

4. (a) Explain the utility and structure of the data dictionary in software documentation. 5+5+5

(b) What do you understand by Data flow model? Discuss its merits and demerits.

(c) Draw the DFD for any practical, real life system and explain it.

5. (a) Why is design important in Software engineering? Explain the use of software blue print methodology. 7+8

(b) Discuss :

(i) Analysis and design steps

(ii) Quality attributes and their guidelines

6. (a) Explain the process of factoring and integration in modular software design. 5+5+5

(b) What do you understand by : Top Down design, bottom-up design?

(c) Explain the different issues involved in user interface design.









7. (a) Compare the processes of software verification and validation. 7+8

(b) Write explanatory notes on :

(i) Integration Testing

(ii) Unit Testing

8. (i) Define the following terms with examples: 12+3

(a) Software Metrics

(b) Regression Testing

(c) CASE Tools

(ii) What are the desirable qualities of a 'good' coding style? Explain.

9. (a) Describe the Maintenance strategies for professionally developed software. Which strategy should be used under which preconditions? Discuss. 10+5

(b) What do you understand by Software Configuration Management?

MGKVP University Question Paper
B.C.A. Examination, 2016
Fourth Semester
Third Paper
(Software Engineering)
MGKVPonline.com

Time : Three Hours Maximum Marks : 75

Note: Attempt any five Questions. All questions carry equal marks.

Note The answers to short questions should not exceed 200 words and the answers to long question should not exceed 500 words.

1. Discuss clearly, the different phases in the software development process. Explain how the total effort is distributed over the different phases. (15)
2. What is the need for formulating a quality SRS? Discuss in detail. What are the basic issues that a SRS must address? (15)
3. Draw the labelled DFD and specify the data dictionary for any practical system, Explain the working of the system in detail, on the basis of the Data Flow Diagram. (15)
4. What do you mean by function oriented Design? Discuss the Top- down and Bottom-up modular design approach. (15)
5. Write short notes on : (5+5+5)
   (a) Structured Design approach
   (b) Coupling and cohesion
   (c) Object Oriented Design
6. State the relationship between Design and Implementation. What are the core activities and issues to be considered during the Implementation phase? (15)
7. What are CASE methodologies? Comment on their advantages and disadvantages. (15)
8. Explain with examples the process of software configuration management. (15)
9. What do you understand by the process of maintenance of software? State the reasons behind maintenance activity. State and discuss the different types of maintenance. (15)

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Roll No. _____

# 18/2665

## B.C.A. (Fourth Semester)

## Examination, 2018

### Third Paper

### (Software Engineering)





***Time : Three Hours*** ***Maximum Marks : 75***

**Note:** Attempt any **five** questions. **All** questions carry equal marks.

**Note:** The answer to short questions should not exceed 200 words and the answers to long questions should not exceed 500 words.

1. Define the term "Software Engineering". What are the phases in the development of properly engineered software? Discuss it from the generic point of view. 15

**P.T.O.**

2. (a) Explain how the development of System Scope is carried out in the Software Engineering Requirements Analysis phase. 8

(b) How can we allocate top level processes and entities to their physical elements? Explain with an example. 7

3. Write an explanatory note on : 7½×2

(a) Creating the SRS document

(b) Object Oriented Design Paradigm

4. Discuss with examples the different issues concerned with the following: 7+8

(a) Design Principle for Input and Output document.

(b) Design of Modules and Interfaces.

5. (a) What are the qualities of a Well-designed code? Discuss. 7

(b) Differentiate between function oriented design and object oriented design. 8

6. Explain the need for maintenance of sofware? What are the different types of software maintenance? What are the points to be considered at the design phase in order to ensure maintainability? 15

7. Describe the steps in implementation of the new software system. How can the programming support environment be developed in order to ensure consistency in Implementation and changeover? 15

8. Write short notes on: 5+5+5
   (a) Data Flow Diagram
   (b) Waterfall Model
   (c) Software Quality

9. Explain with example: 5+5+5
   (a) Configuration Management
   (b) CASE Tools
   (c) Coupling and Cohesion

C

(Printed Pages 3)

Roll No. _____

# 23/3200

## B.C.A. (Fourth Semester)

## Examination, 2023

### Third Paper

### (Software Engineering)

*Time : Three Hours ]* *[ Maximum Marks : 75*

**Note :** Attempt any **five** questions. All questions carry equal marks.

**Note :** The answers to short answer type questions should not exceed 200 words and the answer to long answer type questions should not exceed 500 words.

1. (a) What is the objective behind adoption of software engineering principles? 7

   (b) Define and explain briefly, the meaning of software components. 8

**P.T.O.**





2. What are the attributes for a good quality software? Discuss. 15

3. Discuss the software development life cycle with the help of neat diagram. Enumerate the activities that take place during each phase. 15

4. Write a short note on: 7+8

   (a) Requirement Specification Document

   (b) Requirement Analysis Activities

5. What do you understand by a software process? What are the methods by means of which processes can be identified and allocated to physical elements? 15

6. What are the key elements to be taken care of in the Design phase? Elaborate on the different aspects of procedural design. 15

7. Describe the Object Oriented Design pardigm, briefly illustrating its advantages. 15

8. Differentiate between the following: 7+8=15

   (i) Design and Implementation

   (ii) Top Down and Bottom up approach in coding

9. Why is maintenance required for software? Distinguish between adaptive maintenance and corrective maintenance with examples. 15

(Printed Pages 3)

Roll No.

# 22/5066
# B.C.A. (Fourth Semester) Examination, 2022
## Third Paper
## (Software Engineering)

*Time : Three Hours ]* *[ Maximum Marks : 75*

**Note :** Attempt any **five** questions. **All** questions carry equal marks.

**Note :** The answers to short answer type questions should not exceed **200** words and the answers to long answer type questions should not exceed **500** words.

1. (a) Define the term "Software Engineering". Discuss the paradigm of Software Engineering with respect to its relevance and importance. 7+8







(b) What are the advantages to be gained from adopting the Software Engineering approach for Software product development?

2. (a) What are the steps involved in the Requirements Analysis phase of Software Engineering? 10+5

(b) What are the components and application of a Data Dictionary?

3. Explain the design considerations for (i) database and file design (ii) procedural design. 10+5

4. What do you understand by Object Oriented Design? How is it incorporated into Software design phase? 15

5. Explain how the following methodologies are useful in Code Design : $7\frac{1}{2} \times 2$

(i) Top down approach

(ii) Bottom-up Approach

6. Write short notes on 5+5+5

   (i) 'Good' Coding Style

   (ii) System documentation

   (iii) Implementation Activities

7. Why is maintenance necessarily required for software, after the implementation phase? Distinguish between perceptive and corrective maintenance with suitable example. 15

8. What is the utility and need for Software Configuration Management? What are the four main functions of Configuration Management? 15

9. Write short notes on any **two** : $7\frac{1}{2} \times 2 = 15$

   (i) Review of SRS

   (ii) Programming Support Environment for Implementation

   (iii) CASE Tools