K. J. Somaiya Institute of Engineering and Information Technology
Sion, Mumbai - 400022
NAAC Accredited Institute with 'A' Grade
NBA Accredited 3 Programs
(Computer Engineering, Electronics & Telecommunication Engineering and Electronics Engineering)
Permanently Affiliated to University of Mumbai

EXAMINATION TIME TABLE (JANUARY 2021)
PROGRAMME - B.E. (Computer) (REV-2016) (Choice Based)
SEMESTER - VII

Days and Dates	Time	Course Code	Paper
Friday, January 08, 2021	03:30 p.m. to 05:30 p.m.	CSC701	Digital Signal & Image Processing
Monday, January 11, 2021	03:30 p.m. to 05:30 p.m.	CSC702	Mobile Communication & Computing
Wedneday, January 13, 2021	03:30 p.m. to 05:30 p.m.	CSC703	Artificial Intelligence & Soft Computing
Friday, January 15, 2021	03:30 p.m. to 05:30 p.m.	CSDLO7031	Department Level Optional Course – III: Advance System Security & Digital Forensics
Friday, January 15, 2021	03:30 p.m. to 05:30 p.m.	CSDLO7032	Big Data & Analytics
Friday, January 15, 2021	03:30 p.m. to 05:30 p.m.	CSDLO7033	Robotics
Wednesday, January 20, 2021	03:30 p.m. to 05:30 p.m.	IL07011	Institute Level Optional Course-I :- Product Life Cycle Management
Wednesday, January 20, 2021	03:30 p.m. to 05:30 p.m.	IL07012	Reliability Engineering
Wednesday, January 20, 2021	03:30 p.m. to 05:30 p.m.	IL07013	Management Information Systems
Wednesday, January 20, 2021	03:30 p.m. to 05:30 p.m.	IL07014	Design of Experiments
Wednesday, January 20, 2021	03:30 p.m. to 05:30 p.m.	IL07015	Operations Research
Wednesday, January 20, 2021	03:30 p.m. to 05:30 p.m.	IL07016	Cyber Security & Laws
Wednesday, January 20, 2021	03:30 p.m. to 05:30 p.m.	IL07017	Disaster Management & Mitigation Measure
Wednesday, January 20, 2021	03:30 p.m. to 05:30 p.m.	IL07018	Energy Audit & Management
Wednesday, January 20, 2021	03:30 p.m. to 05:30 p.m.	IL07019	Development Engineering

Important Note: ● Change if any, in the time table shall be communicated on the college web site.

Mumbai
20th December, 2020.

Principal

University of Mumbai

Examination 2020 under cluster 4 (Lead College:Pillai College of Engineering)

Examinations Commencing from 23rd December 2020 to 6th January 2021 and from 7th January 2021 to 20th January 2021

Program: B.E. Computer

Curriculum Scheme: Rev 2016

Examination: BE Semester: VII

Course Code:CSC701 and Course Name: Digital Signal & Image Processing

Time: 2 hour Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Determine the given system is $\mathbf{y(n) = n * x(-n)}$
Option A:	Time Variant
Option B:	Time Invariant
Option C:	Shift Invariant
Option D:	Depends on n
2.	Determine the given signal is $y(n) = \frac{x(n)}{cos(n)}$
Option A:	Can't predict
Option B:	BIBO stable
Option C:	BIBO unstable
Option D:	Depends on past inputs
3.	Determine the given signal is $y(n) = 7a^n$
Option A:	Stable
Option B:	Can't predict
Option C:	Unstable
Option D:	Depends on space & time
4.	Plot even components for discrete ramp function for the range -3 to 3.
Option A:	1.5 1 0.5 0 0.5 1 1.5

Option B:	1 1.5 0.5 0 0.5 1.5 1 ↑
Option C:	–1.5 –1 –0.5 0 0.5 1 1.5 ↑
Option D:	–1 –1.5 0.5 0 0.5 1.5 1 ↑
5.	For a given analog signal $x(t) = 2\sin(480\pi t) + 3\sin(120\pi t)$ What is the minimum sampling rate to avoid aliasing
Option A:	240Hz
Option B:	60Hz
Option C:	300Hz
Option D:	480Hz
6.	Determine the given signal is $\mathbf{x(n) = \left(\frac{1}{3}\right)^{n} u(-n)}$
Option A:	Periodic
Option B:	Aperiodic
Option C:	Periodic with Fundamental period=1/3
Option D:	Periodic with Fundamental period=-1/3
7.	In W_4, twiddle matrix, how many sign changes are there for every row?
Option A:	Row 1:0, Row 2:2, Row 3:3,Row 4: 1
Option B:	Row 1:0, Row 2:1, Row 3:2,Row 4: 3
Option C:	Row 1:3, Row 2:2, Row 3:0,Row 4: 2
Option D:	Row 1:3, Row 2:2, Row 3:1,Row 4: 0
8.	How many complex multiplications are required to convert given signal from time domain to frequency domain and again from frequency domain to time domain in FFT?
Option A:	$N/2 \log_2 N$
Option B:	$2N \log_2 N$

Option C:	$\log_2 N$
Option D:	$N \log_2 N$
9.	Let x(n)={ 1, 2, 3, 4, -1, -2, -3, -4} With 8 Point DFT, evaluate X[0] & X[4] without computing DFT.
Option A:	X[0]=0, X[4]=4
Option B:	X[0]=0, X[4]=0
Option C:	X[0]=4, X[4]=4
Option D:	X[0]=4, X[4]=4
10.	Find energy of the given signal $x(n) = \begin{cases} (1/2)^n & n \geq 0 \\ 3^n & n < 0 \end{cases}$
Option A:	0
Option B:	∞
Option C:	4/3
Option D:	Neither energy nor power signal
11.	For 3 point DFT, X[k]={?, -4+3.46j, ?} Determine X[0] & X[2]
Option A:	**X[0]=cant' predict, X[2]=-4-3.46j**
Option B:	X[0]=X[3]= -4+3.46j
Option C:	X[0]=X[3]= -4-3.46j
Option D:	X[0]= 0, X[3]= -4+3.46j
12.	In Human Eye System, Cones respond to illumination levels vision called as:
Option A:	Scotopic
Option B:	Photopic
Option C:	Fovea
Option D:	Choroid
13.	For e.g. in screen, no of rows are 3200, no. of columns 2400, approximate resolution of screen in Megapixel is
Option A:	10MP
Option B:	12MP
Option C:	8MP
Option D:	4MP

14.	In bit plane slicing, for 4 BPP image how many planes can be possible
Option A:	Depends on application
Option B:	Infinite
Option C:	Image having 256 gray levels
Option D:	Image having 16 gray levels
15.	Image -> Histogram is which type of operation
Option A:	Reversible
Option B:	Irreversible
Option C:	Depends on density
Option D:	Depends on Gray level
16.	The response of the filter based on ranking of pixel is called as:
Option A:	Stochastic Filter
Option B:	Order-Statistic Filter
Option C:	Linear Filter
Option D:	High pass Filter
17.	In which file format we can store multiple images per file
Option A:	BMP
Option B:	TIFF
Option C:	JPEG
Option D:	PDF
18.	The range of values spanned by the gray scale is informally referred as
Option A:	Dynamic Range
Option B:	Sampling
Option C:	Pixel Distribution
Option D:	Pixel Density
19.	Distance Measure for image pixels cannot be done using?
Option A:	Euclidean distance
Option B:	Chessboard distance
Option C:	City Block distance
Option D:	Levenshtein distance
20.	Following mentioned edge detection operators can be used as compass operator
Option A:	Robert
Option B:	Prewitt

Option C:	Laplacian
Option D:	Median filter mask

Subjective:

Q2.	**Solve any Four out of Six. (5 marks each)**
A	Define: 1) Deterministic and nondeterministic signals 2) Periodic and Aperiodic signals With the help of examples.
B	Compute linear convolution of the causal sequence x(n)={1,2,0,1,2,3}, h(n)={2,2,1} using Overlap Add Method.
C	For a given discrete time signal x(n) $x(n) = \underset{\uparrow}{2}\ \ 5\ \ 4\ \ 6\ \ -1\ \ 1\ \ -2$ Plot i) x(n+4) ii) x(n-1)u(n) iii) x(-n)u(-n+1)
D	Obtain the linear convolution of two sequences defined as $x(n)=u(n)-u(n-3)$ $h(n)=u(n-1)+u(n-2)-u(n-4)-u(n-5)$
E	x(n) is given. x(n)={1, 2, 3, 1} Perform FFT to convert signal from time domain to frequency domain X[k]. Draw butterfly flow graph.
F	Explain any three properties of DFT.

Q3.	**Solve any Four out of Six. (5 marks each)**
A	Explain Sampling & Quantization process during image acquisition.
B	Explain image with respect to no. of gray levels. No of gray levels are 2, 8, 64, 256. How it affects on storage as number of gray levels are change.
C	Which is better option High Boost filter or High Pass filter? Derive expression for High Boost Filter.
D	Justify median filter is the best filter to remove salt & pepper noise in an image.
E	Explain Log & Power law transformation with suitable diagrams.
F	Write derivation for Sobel Edge detection operator. What is the advantage of Sobel operator?

University of Mumbai

Examination 2020 under cluster 04(Lead College:Pillai College of Engineering)

Examinations Commencing from 23rd December 2020 to 6th January 2021 and from 7th January 2021 to 20th January 2021

Program: B.E. Computer

Curriculum Scheme: Rev 2016

Examination: BE Semester: VII

Course Code: CSC701 and Course Name: Digital Signal & Image Processing

Time: 2 hour Max. Marks: 80

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Q1. Choose the correct option for following questions. All the Questions are compulsory and carry equal marks

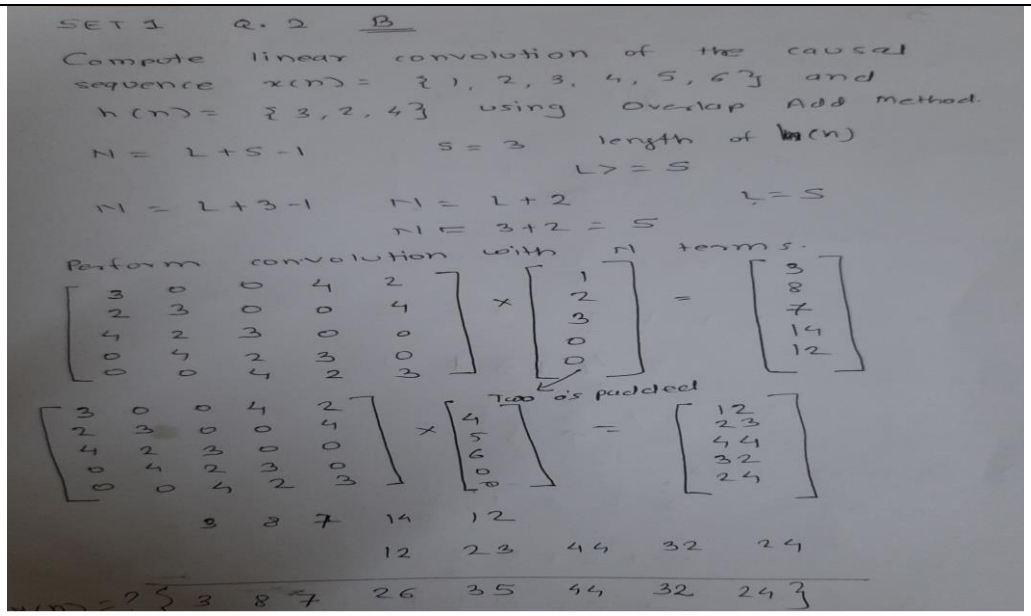
Question Number	Correct Option (Enter either 'A' or 'B' or 'C' or 'D')
Q1.	A
Q2.	C
Q3.	B
Q4	A
Q5	D
Q6	B
Q7	A
Q8.	D
Q9.	B
Q10.	C

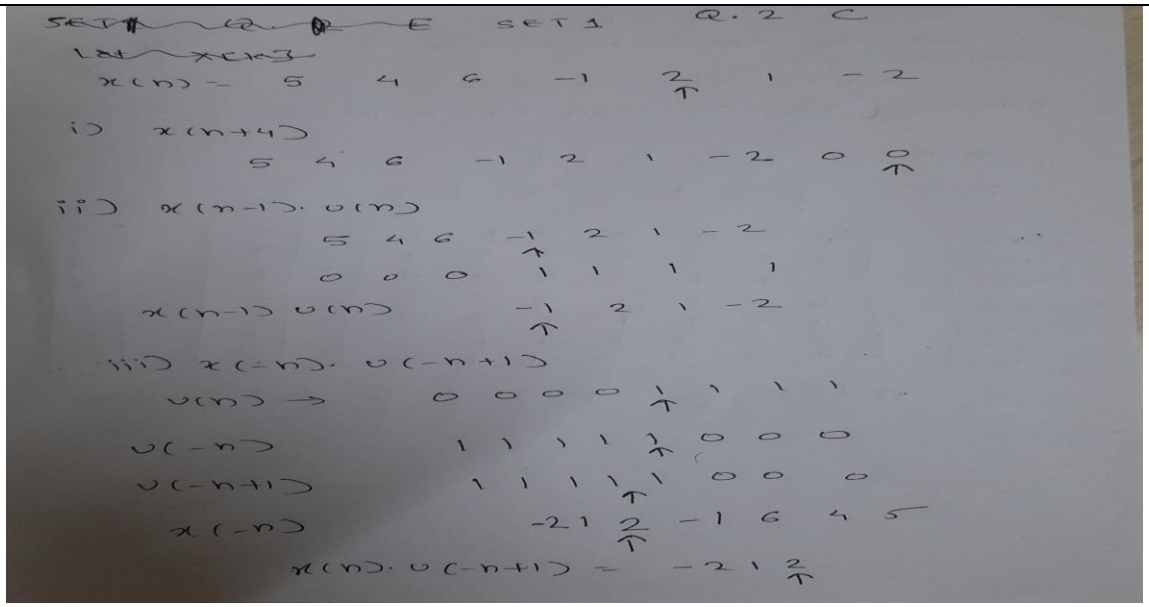
Q11.	A
Q12.	B
Q13.	C
Q14.	D
Q15.	B
Q16.	B
Q17.	B
Q18.	A
Q19.	D
Q20.	B

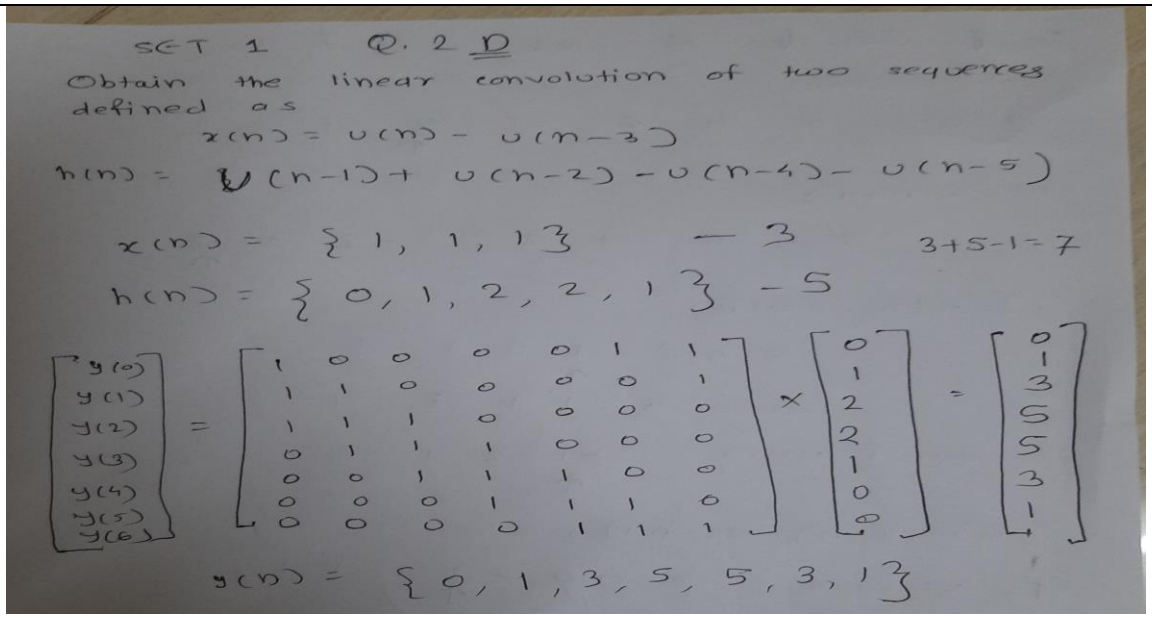
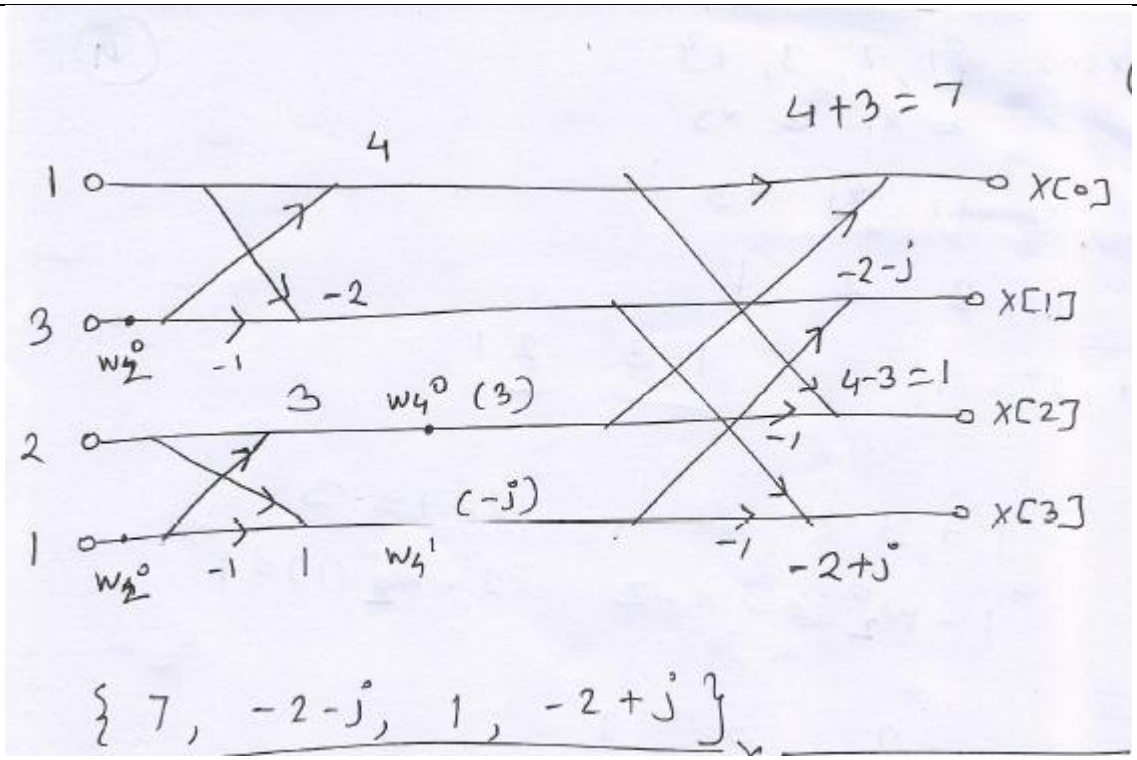
Q2.

Model Answer: (with marks distribution)

Q2.	Solve any Four out of Six. (5 marks each)
A	Define: 1) Deterministic and nondeterministic signals 2) Periodic and Aperiodic signals With the help of examples Each signal carries 2.5 Marks
Ans	1) Deterministic & Non deterministic signals

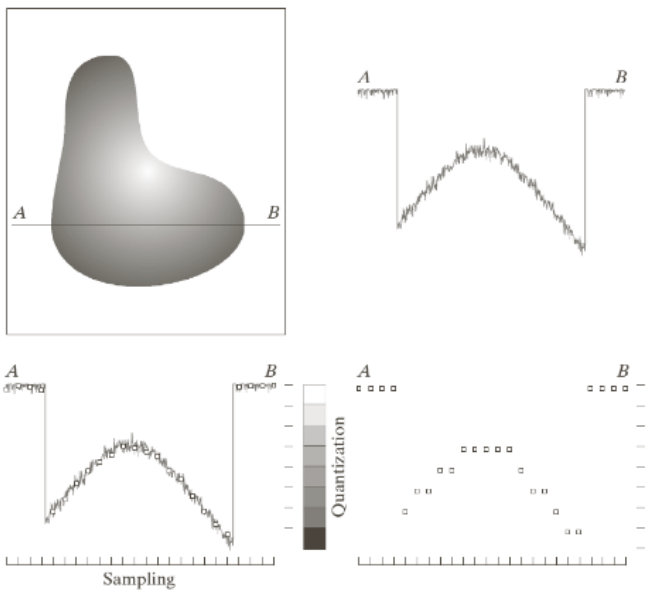
	1. Deterministic and Nondeterministic Signals : The signals that can be completely specified by mathematical equations are called deterministic signals. **e. g. Step, ramp, exponential and sinusoidal signals** The signals whose characteristics are random in nature are called nondeterministic signals. **e.g. noise signal** 2) Periodic and Aperiodic signals **2) Periodic and Aperiodic Signals** When a discrete time signal x(n). satisfies the condition **x(n + N)= x(n)** for integer values of N, then the discrete time signal x(n) is called periodic signal. Here N is the number of samples of a period. $\mathbf{x(n+N)=x(n)}$, for all n, then x(n) is periodic. The smallest value of N for which the above equation is true is called fundamental period. If there is no value of N that satisfies the above equation, then x(n) is called aperiodic or nonperiodic signal.
B	Compute linear convolution of the causal sequence x(n)={1,2,0,1,2,3}, h(n)={2,2,1} using Overlap Add Method.
Ans	

C	For a given discrete time signal x(n) $x(n) = 5 \quad 4 \quad 6 \quad -1 \quad \underset{\uparrow}{2} \quad 1 \quad -2$ Plot i) x(n+4) ii) x(n-1)u(n) iii) x(-n)u(-n+1)
Ans	
D	Obtain the linear convolution of two sequences defined as x(n)=u(n)-u(n-3) h(n)=u(n-1)+u(n-2)-u(n-4)-u(n-5)

Ans	
E	x(n) is given. x(n)={1, 2, 3, 1} Perform FFT to convert signal from time domain to frequency domain X[k]. Draw butterfly flow graph.
Ans	
F	Explain any three properties of DFT
Ans	Each property 1Mark

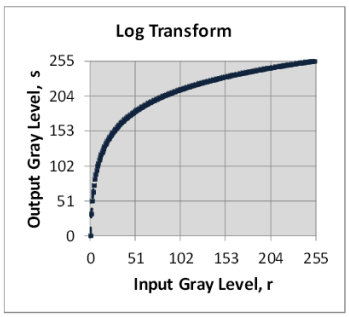
Q3.

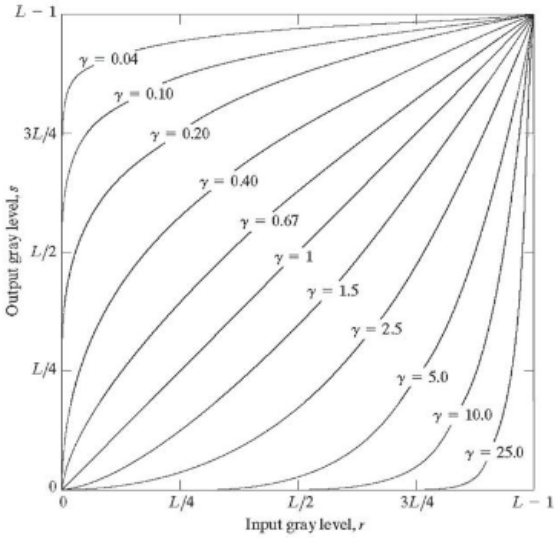
Model Answer: (with marks distribution)

Q3.	Solve any Four out of Six. (5 marks each)
A	Explain Sampling & Quantization process during image acquisition.
Ans	**Sampling:** Digitizing the coordinate values **Quantization:** Digitizing the amplitude values Image continuous with respect to x and y coordinates as well as amplitude. The one-dimensional function in Fig. 2.16(b) is a plot of amplitude (intensity level) values of the continuous image along the line segment AB in Fig. 2.16(a). To sample this function, we take equally spaced samples along line AB, as shown in Fig. 2.16(c). The samples are shown as small white squares. The set of these discrete locations gives the sampled function. However, the values of the samples still span (vertically) a continuous range of intensity values. In order to form a digital function, the intensity values also must be converted (quantized) into discrete quantities. The right side of Fig. 2.16(c) shows the intensity scale divided into eight discrete intervals, ranging from black to white. The assignment is made depending on the vertical proximity of a sample to a vertical tick mark. The digital samples resulting from both sampling and quantization are shown in Fig. 2.16(d). Starting at the top of the image and carrying out this procedure line by line produces a two-dimensional digital image.  a b c d **FIGURE 2.16** Generating a digital image. (a) Continuous image. (b) A scan line from *A* to *B* in the continuous image, used to illustrate the concepts of sampling and quantization. (c) Sampling and quantization. (d) Digital scan line.
B	Explain image with respect to no. of gray levels. No of gray levels are 2, 8, 64, 256. How it affects on storage as number of gray levels are change.
Ans	An image is normally approximated by equally spaced samples arranged in the form

	of an N x M array where each element of the array is a discrete quantity. Each element of the array is known as a pixel. Size of the image This digitization process requires that decisions be made regarding the values for M. N and for the number, L. of discrete intensity levels. There are no restrictions placed on M and N. other than they have to be positive integers. However, due to storage and quantizing hardware considerations, the number of intensity levels typically is an integer power of 2: $L = 2^k$ Size of the image is M*N*k For L=2, k=1, For L=8, k=3, For L=64, k=6, For L=256, k=8. This indicates as L increases, k is also increases. Therefore for as no of gray levels increases, more memory is required to store the image. But at the same time, more colors are used which results in good quality of the image as it reduces false contouring.
C	Which is better option High Boost filter or High Pass filter? Derive expression for High Boost Filter.
Ans	High pass filter allows high frequency components and removes low frequency components. As it removes low frequency component, image looks degraded. **High Boost Filter** In many practical cases where a high pass image is required, we also want to retain some of the low frequency components to aid in the interpretation of the image. Thus, if we multiply the original image by an amplification factor *A* before subtracting the low pass image, we will get a *high boost* or *high frequency emphasis* filter. **High pass = Original - Low pass.** $\begin{aligned} \text{High boost} &= A.\text{Original} - \text{Low pass} \\ &= (A-1).(\text{Original}) + \text{Original} - \text{Low pass} \\ &= (A-1).\text{Original} + \text{High pass}. \end{aligned}$ Now, if $A = 1$ we have a simple high pass filter. When $A > 1$ part of the original image is retained in the output. A simple filter for high boost filtering is given by -1/9 -1/9 -1/9 -1/9 ω/9 -1/9

	-1/9 -1/9 -1/9 where $\omega = 9A - 1$. - if A=1 → standard highpass result - when A>1 ✓ part of original is added back to the highpass result ✓ restore partially the low freq. components lost by HPF ✓ the result : the high-boost image looking more like the original image ✓ relative degree of edge enhancement : dependent on the value of A - implementation ; ✓ the center weight of mask w=9A-1 $\frac{1}{9} \times \begin{bmatrix} -1 & -1 & -1 \\ -1 & w & -1 \\ -1 & -1 & -1 \end{bmatrix}$
D	Justify median filter is the best filter to remove salt & pepper noise in an image.
Ans	Statement is true. Salt and pepper noise have extreme values. Salt noise close to highest gray level and Pepper noise close to lowest gray levels. Salt & pepper noise is called impulse noise. To remove salt and pepper noise, median filter is the best. In median filter, pixel in the consideration(whose noise to be removed) is at mid of sub region. Pixels in that sub region are arranged in either ascending/descending order. Pixel in consideration is replaced by median value pixel. **Because when pixels are arranged in ascending order, salt noise, if present goes to end. Pepper noise if present goes to start. Thus salt and pepper noise gets removed using median filter.** **12 17 16 12 17 16**

	12 251 16 12 16 16 **18 16 14 18 16 14** **Ascending order: 12, 12, 14, 16, 16, 16, 17, 18, 251** **12 17 16 12 17 16** **12 1 16 12 16 16** **18 16 14 18 16 14** **Ascending order: 1, 12, 12, 14, 16, 16, 16, 17, 18**
E	Explain Log & Power law transformation with suitable diagrams.
Ans	Non-linear piecewise Transformation **Log Transformation:** The general form of the log transformation is s=c*log(1+r) Where c is a constant and it is assumed that r>=0. This transformation is used to expand the values of dark pixels in an image while compressing the higher-level values as shown in the figure below:  Figure 4.8 Form of Log transform Log curve maps a narrow range of low gray level values in the input image into a wider range of the output levels. Used to expand the values of the dark pixels in an image while compressing the higher-level values. It compresses the dynamic range of images with large variations in pixel values. Example of image with dynamic range: Fourier spectrum image. It can have intensity range from 0 to 106 or higher. We can't see the significant degree of detail as it will be lost in the display. These are useful for enhancing the dynamic range of the darker regions of the image and subduing the dynamic range of the lighter (brighter) regions. Power Law Transformation

	Power-law transformation Power-law transformations have the basic form: $$s = c * r^{y}$$ where c and y are positive constants. The power y is known as *gamma*, hence this transform is also called *Gamma transformation*. The figure below shows the form of a power-law transform with different gamma (y) values.  Figure 4.10 Form of power-law transform with various gamma values (c = 1 in all cases) Power-law transformations are useful for contrast enhancement. The next figure shows the use of power-law transform with gamma values less than 1 to enhance a dark image. • **$\gamma < 1$ ➔ T plays as log transformation.** • **$\gamma > 1$ ➔ T plays as inverse log transformation.** • **c = γ = 1 ➔ Identity function** • **This transformation function is also called as *gamma* correction.**
F	Write derivation for Sobel Edge detection operator. What is the advantage of Sobel operator?
Ans	**Sobel Operator:** Higher weights are assigned to the pixel close to the candidate pixels. $$\nabla f = |(z_7+2z_8+z_9) - (z_1+2z_2+z_3)| + |(z_3+2z_6+z_9) - (z_1+2z_4+z_7)|$$ **x-gradient** **y-gradient**

−1	−2	−1	−1	0	1
0	0	0	−2	0	2
1	2	1	−1	0	1

x gradient finds horizontal edges and y gradient finds vertical edges

Advantages of Sobel filter

1) Sobel mask is an odd size mask (e.g. 3×3) which can be applied efficiently on the given image as all neighbours are available to process pixel into consideration.

2) Sobel mask can be rotated in eight ways to extract edges in all directions.

3) Sobel mask exhibits isotropic results for horizontal and vertical edges, and for edges oriented at $\pm 45^0$

4) It gives smoothing effect as well as edge enhancement operation.

5) This mask gives more importance to the pixels that are closer to the center of the mask that results in quality edge detection.

University of Mumbai

Examination 2020 under cluster 4 (Lead College: PCE, New Panvel)

Examinations Commencing from 23rd December 2020 to 6th January 2021 and from 7th January 2021 to 20th January 2021

Program: **_Computer Engineering**

Curriculum Scheme: Rev2016

Examination: BE Semester VII

Course Code: CSC702 and Course Name: Mobile Communication and Computing

Time: 2 hour Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Which one is not an advantage of using frequency reuse?
Option A:	Increased capacity
Option B:	Limited spectrum is required
Option C:	Same spectrum may be allocated to other network
Option D:	Number of base stations is reduced
2.	Direct Sequence Spread Spectrum technique uses
Option A:	Chipping Sequence
Option B:	Frequency Hopping
Option C:	WEP
Option D:	OFDM
3.	Which of the following multiple access techniques are used by second generation cellular systems?
Option A:	FDMA/FDD and TDMA/FDD
Option B:	TDMA/FDD and CDMA/FDD
Option C:	FDMA/FDD and CDMA/FDD
Option D:	FDMA/FDD only
4.	How many users or voice channels are supported for each 200 KHz channel in GSM?
Option A:	Eight
Option B:	Three
Option C:	Sixty four
Option D:	Twelve
5.	Which modulation technique is used by GSM?
Option A:	GMSK
Option B:	BPSK
Option C:	QPSK
Option D:	GFSK
6.	For GSM Security - Algorithms are ?
Option A:	SRES, SIM, RAND
Option B:	IMSI, KC, SRES

Option C:	A3, A5, A8
Option D:	RAND, SRES, Kc
7.	3G W-CDMA is also known as
Option A:	UMTS
Option B:	DECT
Option C:	Digital Cellular System (DCS) 1800
Option D:	Extended Total Access Communications System (ETACS)
8.	Which of the following WLAN standard has been named Wi-Fi?
Option A:	IEEE 802.6
Option B:	IEEE 802.15.4
Option C:	DSSS IEEE 802.11b
Option D:	IEEE 802.15
9.	MACA provide solution for
Option A:	Power Management Problem
Option B:	Multipath Propagation Problem
Option C:	Count to infinity Problem
Option D:	Hidden Terminal Problem
10.	Foreign Agents and Home Agents advertise their presence periodically using
Option A:	Agent solicitations
Option B:	Registration Request
Option C:	Agent Advertisement
Option D:	Registration Replay
11.	Short Interframe Spacing (SIFS) inCSMA algorithm in WLAN
Option A:	Medium Priority, for time bound services
Option B:	Highest Priority : Ack , CTS, Polling response
Option C:	Lowest Priority: for asynchronous data services
Option D:	No priority
12.	Destination-Sequenced Distance vector routing protocol(DSDV) can be viewed as which one of the following?
Option A:	Reactive Routing Protocol
Option B:	Proactive Routing Protocol
Option C:	Hybrid Routing Protocol
Option D:	Multicast routing protocol
13.	The interface between SGSN and GGSN in GPRS is ?
Option A:	G_b
Option B:	G_n

Option C:	G_i
Option D:	G_r
14.	WLAN MAC management functionality ?
Option A:	Synchronisation
Option B:	Congestion Control
Option C:	CSMA/CA
Option D:	Modulation
15.	What is the range of asynchronous user data rates provided by HIPER-LAN?
Option A:	1-100 Mbps
Option B:	50-100 Mbps
Option C:	1-20 Mbps
Option D:	500 Mbps to 1 Gbps
16.	Revere Tunneling may be required in case of
Option A:	Firewall at Foriegn Agent
Option B:	Firewall at Corresponding Node
Option C:	Firewall at Home Agent
Option D:	Firewall at Default Routers
17.	Which of the following specifies a set of media access control (MAC) and physical layer specifications for implementing infrastructure based WLANs?
Option A:	IEEE 802.16
Option B:	IEEE 802.3
Option C:	IEEE 802.11
Option D:	IEEE 802.15
18.	The Mobile TCP enhancement, Using Persistent Mode
Option A:	M-TCP
Option B:	I-TCP
Option C:	Selective Retransmission
Option D:	Snooping TCP
19	UMTS FDD frame structure
Option A:	1920-1980 MHz uplink 2110-2170 MHz downlink
Option B:	1900-1920 MHz uplink 2010-2025 MHz downlink
Option C:	1920-1940 MHz uplink 2110-2125 MHz downlink
Option D:	1980-2020 MHz uplink 2040-2085 MHz downlink
20.	IP Multimedia Subsystem is component of _____
Option A:	LTE-VOLTE
Option B:	LTE
Option C:	HSPA
Option D:	LTE-Advanced

Q2 (20 Marks)	Solve any Four out of Six 5 marks each
A	What are different elements and interfaces used in GSM,
B	Explain Routing Optimization in Mobile IP.
C	Explain GPRS with its architecture.
D	Explain Power management in WLAN (infrastructure based)
E	Compare various Mobile TCP protocols
F	Explain the spread spectrum with its advantages and disadvantages.

Q3. (20 Marks)	Solve any Four out of Six 5 marks each
A	Explain call establishment process for Mobile Terminated call
B	What is Bluetooth? Describe some of its user scenarios.
C	What is the hidden terminal problem? And What is the possible solution?
D	Explain Cellular IP - Micromobilty protocol.
E	Explain functionality of elements of SAE-Enhanced Packet Core (EPC)
F	Compare 2G,3G,4G technologies.

University of Mumbai

Examination 2020 under cluster _4_ (Lead College: ____PCOE_____)

Examinations Commencing from 23rd December 2020 to 6th January 2021 and from 7th January 2021 to 20th January 2021

Program: **_Computer Engineering**

Curriculum Scheme: Rev2016

Examination: BE Semester VII

Course Code: CSC702 and Course Name: Mobile Communication and Computing

Time: 2 hour Max. Marks: 80

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Q1. Choose the correct option for following questions. All the Questions are compulsory and carry equal mark 40 marks (2 marks each)

Question Number	Correct Option
Q1.	D
Q2.	A
Q3.	B
Q4	A
Q5	A
Q6	C
Q7	A
Q8.	C
Q9.	D
Q10.	C

Q11.	B
Q12.	B
Q13.	B
Q14.	A
Q15.	C
Q16.	B
Q17.	C
Q18.	A
Q19.	A
Q20.	A

Q2 (20 Marks)	Solve any Four out of Six 5 marks each
A	What are different elements and interfaces used in GSM,
Ans	Diagram of 3 subsystem elements (1), interfaces (1) and Elements and their functionalities(3)
B	Explain Routing Optimization in Mobile IP.
Ans	Diagram (2 marks), with explanation of Binding Request, Binding Updates, Binding acknowledgement, Binding Warnings (3 marks)
C	Explain GPRS with its architecture.
Ans	Diagram of GPRS with its elements and architecture details
D	Explain Power management in WLAN (infrastructure based)

Ans	Diagram (2 marks) with infrastructure based power management (3 marks)
E	Compare various Mobile TCP protocols
Ans	Compare and contrast 7 mobile TCP
F	Explain the spread spectrum with its advantages and disadvantages.
Ans	Advantages of Spread Spectrum(detailed explanation)

Q3. (20 Marks)	**Solve any Four out of Six 5 marks each**
A	Explain call establishment process for Mobile Terminated call
Ans	Diagram (2 marks) with explanation of MSISDN MSRN nos and GMSC, HLR MSC and VLR functionality in rouling the call (3 marks).
B	What is Bluetooth? Describe some of its user scenarios.
Ans	Bluetooth general functionality in terms of adhoc network (2 marks) and its user scenarios at least 6 (3 marks).
C	What is the hidden terminal problem? And What is the possible solution?
Ans	Hidden Terminal problem (2)and solution (2) with diagram (1 mark)
D	Explain Cellular IP - Micromobilty protocol.
Ans	Cellular IP diagram (2 marks) , Paging Route (2 marks), Cache (1 mark) etc.
E	Explain functionality of elements of SAE-Enhanced Packet Core (EPC)
Ans	Diagram (1 mark) MME, S-GW, P-GW, HSS PCRF (3marks) and interfaces (1 mark)of SAE-EPC
F	Compare 2G,3G,4G technologies.
Ans	At Least 4/5comparison of technologies, Following table is to be used just for reference not as absolute necessary content.

Generation→ Features↓	2G	3G	4G
Deployment	1990 - 2001	2001-2010	2011
Data Rates	14.4-64kbps	2Mbps	200 Mbps to 1 Gbps
Technology	Digital Cellular Technology: Digital narrow band circuit data Packet data	Digital Broadband Packet data: CDMA 2000 EVDO UMTS EDGE	Digital Broadband Packet data: WiMax LTE Wi-Fi
Service	Digital voice with higher clarity SMS, MMS Higher capacity packetized data	Enhanced audio video streaming video conferencing support Web browsing at higher speeds IPTV support	Enhanced audio, video streaming IP telephony HD mobile TV
Multiplexing Switching	TDMA, CDMA	CDMA	CDMA
Core Network	PSTN	Packet N/W	Internet
Standards	2G:GSM 2.5:GPRS 2.75:EDGE	IMT-2000 3.5G-HSDPA 3.75G:HSUPA	Single unified standard LTE, WiMAX
WEB Standard	www	www(IPv4)	www (IPv4)
Handoff	Horizontal only	Horizontal & Vertical	Horizontal & Vertical
Shortfalls	Digital signals were reliant on location & proximity, required strong digital signals to help mobile phones	Need to accommodate higher network capacity	Being deployed

University of Mumbai

Examination 2020 under cluster 4 (Lead College: Pillai College of Engineering)

Examinations Commencing from 23rd December 2020 to 6th January 2021 and from 7th January 2021 to 20th January 2021

Program: Computer Engineering : SEM VII R2016 scheme CBCGS

Curriculum Scheme: Rev2016
Examination: BE Semester VII
Course Code: CSC703 and Course Name: Artificial Intelligence and Soft Computing

Time: 2 hour Max. Marks: 80

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1301_R16_BE_VII_CSC703_QP3

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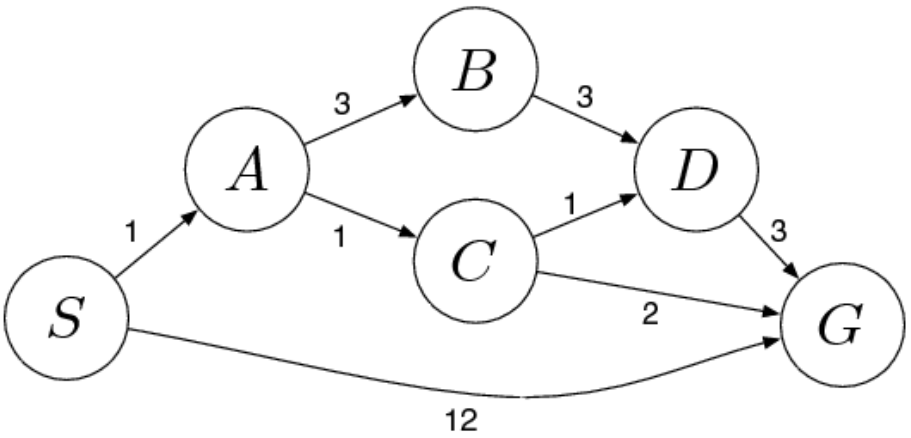
Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	In intelligent agent the mapping from percept to action is done by
Option A:	Sensors
Option B:	actuators
Option C:	agent function
Option D:	percept sequence
2.	A vacuum Cleaner world with two location, two sensors - location and dirt , three actions - left, right and suck will have a state space with how many possible states ?
Option A:	6
Option B:	8
Option C:	10
Option D:	12
3.	 Apply uniform cost search. Initial state is S, Goal state is G.
Option A:	12
Option B:	4

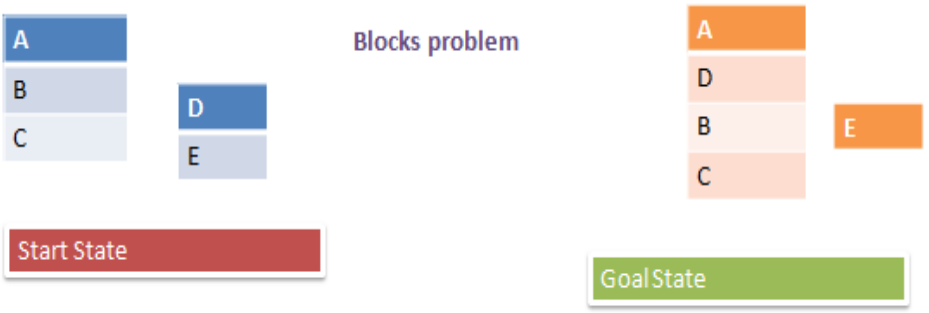
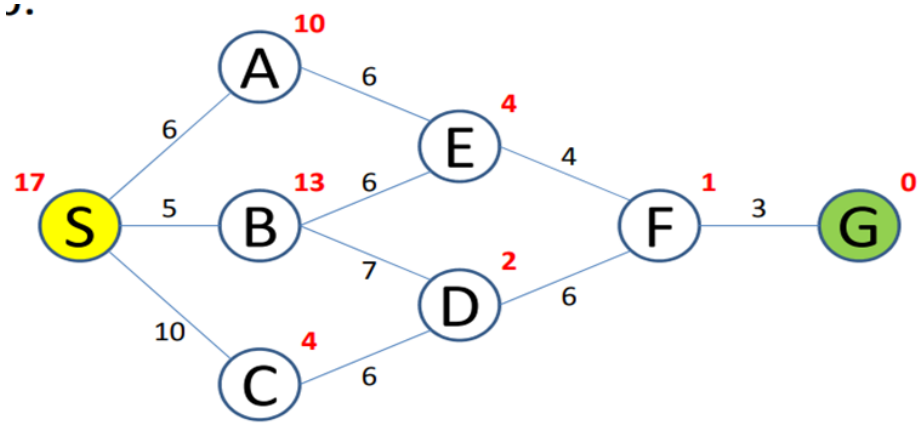
Option C:	6
Option D:	10
4.	Identify the rule : “If premise P(c) is true for any arbitrary element c in the universe of discourse, then we can have a conclusion as (for all) x P(x)"
Option A:	Universal Generalization
Option B:	Universal Instantiation
Option C:	Existential Instantiation
Option D:	Existential Introduction
5.	If a fuzzy set A is defined on an interval X = [0, 10] of integers by the membership function Membership A(x) = x / (x+2) Then the Alpha cut with Alpha = 0.5 will be given as?
Option A:	{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10}
Option B:	{1, 2, 3, 4, 5, 6, 7, 8, 9, 10}
Option C:	{1, 2, 3, 4, 5, 6, 7, 8, 9, 10,11}
Option D:	{2, 3, 4, 5, 6, 7, 8, 9, 10}
6.	Consider A and B are two fuzzy sets with membership functions Membership A(x) = {0.6, 0.7, 0.1, 0.7, 0.4} Membership(x) = {0.8, 0.2, 0.6, 0.9, 0.5} Then the value of Membership Complement AUB(x) will be
Option A:	{0.2,0.3,0.4,0.1,0.5}
Option B:	{0.8,0.7,0.6,0.9,0.5}
Option C:	{0.5,0.7,0.6,0.8,0.4}
Option D:	{0.2,0.7,0.4,0.1,0.5}
7.	Which function is a continuous function that varies gradually between the values 0 and 1 or -1 and +1?
Option A:	Linear function
Option B:	Sigmoidal function
Option C:	Thresholding function
Option D:	Activation function
8.	A* search is optimal for graph search if it has which property ?
Option A:	Admissible
Option B:	Monotonicity
Option C:	Dominance
Option D:	Dominance
9.	A simple perceptron is
Option A:	auto-associative neural network
Option B:	Competitive network
Option C:	Multilayer feed-back network
Option D:	a single layer feed-forward neural network
10.	Write FOL You can fool some of the people all of the time.

Option A:	(∃x) (∀t) can-fool(x,t)
Option B:	(∃t) (∀x) can-fool(x,t)
Option C:	(∀t) (∃x) can-fool(x,t)
Option D:	(∀x) (∃t) can-fool(x,t)
11.	Back propagation algorithm is based on
Option A:	Evolutionary algorithms
Option B:	Particle swarm optimization
Option C:	Genetic algorithms
Option D:	Gradient descent method
12.	Planning problem combines the following aspects of AI
Option A:	Knowledge Based Systems
Option B:	Logic & Knowledge Based Systems
Option C:	FOL & Logic
Option D:	Search & Logic
13.	Select the correct sequence of operation for generic knowledge-based agent program i. ASK the knowledge-base what action it should perform ii. TELLs the knowledge-base which action is chosen iii. TELLs the knowledge-base what it perceives
Option A:	i, ii, iii
Option B:	ii, i, iii
Option C:	iii, i, ii
Option D:	iii, ii, i
14.	The ---------- determines how fast the weights of NN change.
Option A:	Learning rate
Option B:	Bias
Option C:	Activation function
Option D:	Momentum
15.	A good knowledge representation system must NOT possess the following properties?
Option A:	Representational Accuracy
Option B:	Inferential Adequacy
Option C:	Acquisitional Efficiency
Option D:	Universal Efficiency
16.	A Clause containing at most one positive literal is called _____
Option A:	Definite Clause
Option B:	Horn Clause
Option C:	Unification
Option D:	Resolution
17.	What are the following sequence of steps taken in designing a fuzzy logic machine?
Option A:	Fuzzification -Rule evaluation -Defuzzification
Option B:	Fuzzification -Defuzzification - Rule evaluation

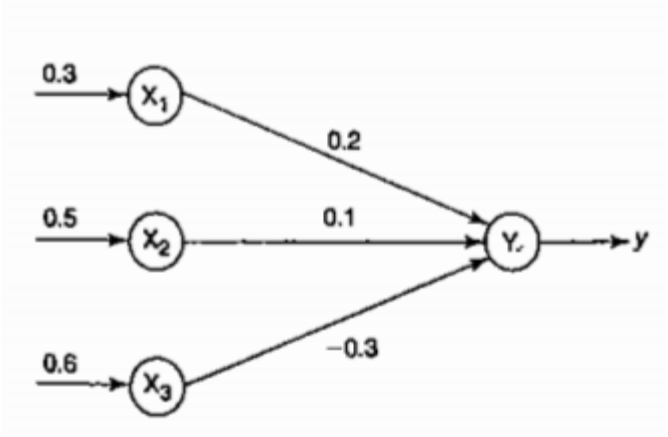
Option C:	Rule evaluation -Defuzzification -Fuzzification
Option D:	Rule evaluation - Fuzzification -Defuzzification
18.	Which of the following is only an unsupervised learning problem?
Option A:	Digit recognition
Option B:	Image segmentation
Option C:	Image compression
Option D:	Image recognition
19.	What is the feature of ANNs due to which they can deal with noisy, fuzzy, inconsistent data?
Option A:	associative nature of networks
Option B:	distributive nature of networks
Option C:	both associative & distributive
Option D:	commutative
20.	Which one is not the characteristics of Expert Systems
Option A:	High performance and responsive
Option B:	User dependent
Option C:	Understandable
Option D:	Reliable

Descriptive questions

Q2	
A	**Solve any Two** **5 marks each**
i.	Give PEAS Description of Online Teaching. Explain which type of agent is required for the same.
ii.	Consider the following initial state and the goal state for a block world problem. Solve the problem using Hill Climbing algorithm, so as to reach from initial state to the goal state. Consider h1(n) – Add 1 if block is on correct block/ goal pattern, Subtract 1 if on wrong block and h2(n) - Add 1 for every block in a correct structure that the block is sitting on, subtract 1 for every block Note down your observations after solving for h1 and h2

	
iii.	Solve the below graph by using A* search algorithm. Consider S to be the start node and G is the goal node. The heuristics values and the distance between the nodes are given in the graph. 
B	**Solve any One** **10 marks each**
i.	Consider the following axioms: 1. Every child loves Santa. 2. Everyone who loves Santa loves any reindeer. 3. Rudolph is a reindeer, and Rudolph has a red nose. 4. Anything which has a red nose is weird or is a clown. 5. No reindeer is a clown. 6. Scrooge does not love anything which is weird. 7. (Conclusion) Scrooge is not a child. Solve by resolution.
ii.	What is perceptron? Give a perceptron model for XOR and AND gate.

Q3	
A	**Solve any Two** **5 marks each**
i.	For the following network calculate the net input given to the output neuron.

	
ii.	Explain Genetic algorithm steps.
iii.	Write a note on ANFIS system.
B	**Solve any One** **10 marks each**
i.	Consider two inputs I1 and I2. These two inputs have the following linguistic states: I1 : L(low), M(Medium), H(High) I2 : NR(Near), FR (Far), VF(Very Far) The output of any i-th rule can be expressed by the following: yi = f (I1, I2) = aji I1 + bki I2 ; where, j,k = 1,2,3. Suppose: a1i = 1, a2i = 2, a3i = 3 if I1 = L, M and H, respectively. b1i = 1, b2i = 2, b3i = 3 if I2 = NR, FR, and VF, respectively. Calculate the output of FLC for I1 = 6.0 and I2 = 2.2 using Takagi and Sugeno approach.
ii.	Explain Spare tire problem using conditional planning.

University of Mumbai

Examination 2020 under cluster 4 (Lead College: Pillai College of Engineering)

Examinations Commencing from 23rd December 2020 to 6th January 2021 and from 7th January 2021 to 20th January 2021

Program: Computer Engineering : SEM VII R2016 scheme CBCGS

Curriculum Scheme: Rev2016
Examination: BE Semester VII
Course Code: CSC703 and Course Name: Artificial Intelligence and Soft Computing

Time: 2 hour Max. Marks: 80

1301_R16_BE_VII_CSC703_AK3

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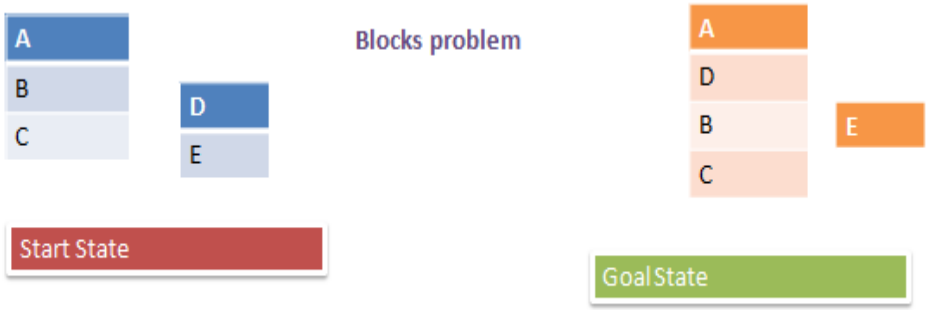
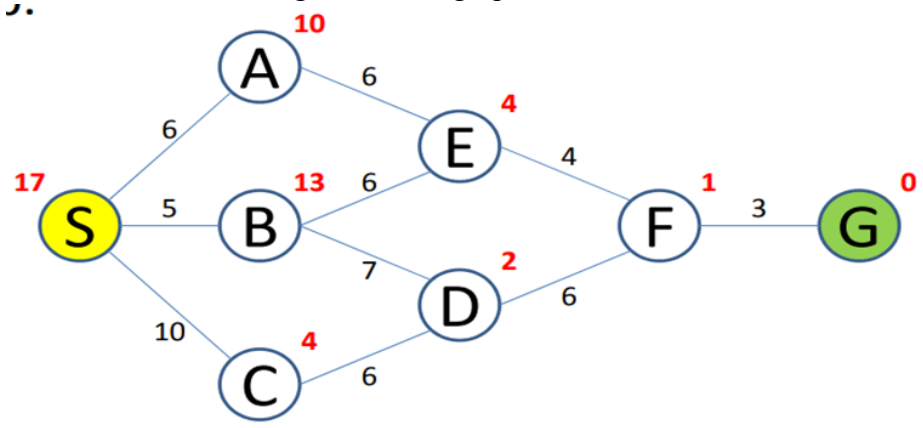
Q1. Choose the correct option for following questions. All the Questions are compulsory and carry equal marks

Question Number	Correct Option (Enter either 'A' or 'B' or 'C' or 'D')
Q1.	C
Q2.	B
Q3.	B
Q4	A
Q5	D
Q6	A
Q7	B
Q8.	A
Q9.	D
Q10.	A

Q11.	D
Q12.	D
Q13.	C
Q14.	A
Q15.	D
Q16.	B
Q17.	A
Q18.	C
Q19.	C
Q20.	B

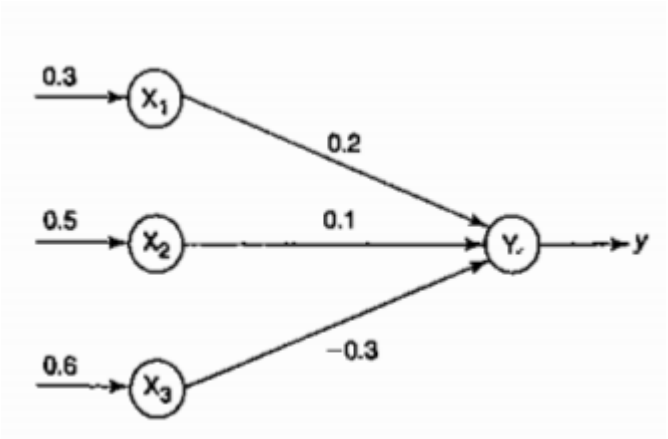
MODEL ANSWERS

Q2	
A	**Solve any Two** **5 marks each**
i.	Give PEAS Description of Online Teaching. Explain which type of agent is required for the same.

	Solution: PEAS Discription similar to online tutor- 4 marks. And Learning agent is the requirement- 1 Mark
ii.	Consider the following initial state and the goal state for a block world problem. Solve the problem using Hill Climbing algorithm, so as to reach from initial state to the goal state. Consider h1(n) – Add 1 if block is on correct block/ goal pattern, Subtract 1 if on wrong block and h2(n) - Add 1 for every block in a correct structure that the block is sitting on, subtract 1 for every block Note down your observations after solving for h1 and h2  Solution: Initialization values and initial heuristic-1 mark Various levels and states heuristic values- 3 marks Final state with heuristic- 1 mark
iii.	Solve the below graph by using A* search algorithm. Consider S to be the start node and G is the goal node. The heuristics values and the distance between the nodes are given in the graph.  Solution: S-B-E-F-G: 18
B	**Solve any One** **10 marks each**

i.	Consider the following axioms: 1. Every child loves Santa. 2. Everyone who loves Santa loves any reindeer. 3. Rudolph is a reindeer, and Rudolph has a red nose. 4. Anything which has a red nose is weird or is a clown. 5. No reindeer is a clown. 6. Scrooge does not love anything which is weird. 7. (Conclusion) Scrooge is not a child. Solve by resolution. Solution: Converting into CNF and prove it by negating the conclusion. a) Every child loves Santa. $\forall x (CHILD(x) \rightarrow LOVES(x,Santa))$ b) Everyone who loves Santa loves any reindeer. $\forall x (LOVES(x,Santa) \rightarrow \forall y (REINDEER(y) \rightarrow LOVES(x,y)))$ c) Rudolph is a reindeer, and Rudolph has a red nose. $REINDEER(Rudolph) \wedge REDNOSE(Rudolph)$ d) Anything which has a red nose is weird or is a clown. $\forall x (REDNOSE(x) \rightarrow WEIRD(x) \vee CLOWN(x))$ e) No reindeer is a clown. $\neg \exists x (REINDEER(x) \wedge CLOWN(x))$ f) Scrooge does not love anything which is weird. $\forall x (WEIRD(x) \rightarrow \neg LOVES(Scrooge,x))$ g) (Conclusion) Scrooge is not a child. $\neg CHILD(Scrooge)$ For conversion to FOL: 2 marks Converting to CNF: 2 Marks Proof: 6 marks.
ii.	What is perceptron? Give a perceptron model for XOR and AND gate. Solution: Percepton definition and architecture: 4 marks AND gate truth table and architecture with threshold: 3 marks XOR gate truth table and architecture with threshold: 3 marks

Q3	
A	**Solve any Two** **5 marks each**
i.	For the following network calculate the net input given to the output neuron.

<table>
<tr><td></td><td> 

Solution:
$$[x_1, x_2, x_3] = [0.3, 0.5, 0.6]$$
$$[w_1, w_2, w_3] = [0.2, 0.1, -0.3]$$
The net input can be calculated as
$$y_{in} = x_1 w_1 + x_2 w_2 + x_3 w_3$$
$$= 0.3 \times 0.2 + 0.5 \times 0.1 + 0.6 \times (-0.3)$$
$$= 0.06 + 0.05 - 0.18 = -0.07$$</td></tr>
<tr><td>ii.</td><td>Explain Genetic algorithm steps.
Solution: All the steps to be explained with example:5 marks.</td></tr>
<tr><td>iii.</td><td>Write a note on ANFIS system.
Solution:
Architecture with application is expected.</td></tr>
<tr><td>B</td><td>Solve any One 10 marks each</td></tr>
<tr><td>i.</td><td>Consider two inputs I1 and I2. These two inputs have the following linguistic states:
I1 : L(low), M(Medium), H(High)
I2 : NR(Near), FR (Far), VF(Very Far)
The output of any i-th rule can be expressed by the following:
yi = f (I1, I2) = aji I1 + bki I2 ; where, j,k = 1,2,3.
Suppose: a1i = 1, a2i = 2, a3i = 3 if I1 = L, M and H, respectively.
b1i = 1, b2i = 2, b3i = 3 if I2 = NR, FR, and VF, respectively.
Calculate the output of FLC for I1 = 6.0 and I2 = 2.2 using Takagi and Sugeno approach.

Solution:
(2 marks each)
a) The input $I_1 = 6.0$ can be called either L or M. Similarly, the input $I_2 = 2.2$ can be declared either FR or VF.
b) Using the principle of similarity of triangles, we have the following.
$\mu_L(I_1) = 0.8$</td></tr>
</table>

	$\mu_M(I_1) = 0.2$ $\mu_{FR}(I_2) = 0.8$ $\mu_{VF}(I_2) = 0.2$ c) For the input set, following four rules can be fired out of all 9 rules. R1: I_1 is L and I_2 is FR R2: I_1 is L and I_2 is VF R3: I_1 is M and I_2 is FR R4: I_1 is M and I_2 is VF d) Now, the weights for each of the above rules can be determined as follows. R1: $w^1 = \mu_L \times \mu_{FR} = 0.8 \times 0.8 = 0.6$ R2: $w^2 = \mu_L \times \mu_{VF} = 0.8 \times 0.2 = 0.16$ R3: $w^3 = \mu_M \times \mu_{FR} = 0.2 \times 0.8 = 0.16$ R4: $w^4 = \mu_M \times \mu_{VF} = 0.2 \times 0.2 = 0.6$ e) The functional consequent values for each rules can be calculated as below. $y^1 = I_1 + 2I_2 = 6.0 + 2 \times 2.2 = 10.4$ $y^2 = I_1 + 3I_2 = 6.0 + 3 \times 2.2 = 12.6$ $y^3 = 2I_1 + 2I_2 = 2 \times 6.0 + 2 \times 2.2 = 16.4$
ii.	Explain Spare tire problem using conditional planning.

University of Mumbai

Examination 2020 under cluster 04 (Lead College: PCE, Panvel)

Examinations Commencing from 23rd December 2020 to 6th January 2021 and from 7th January 2021 to 20th January 2021

Program: **Computer Engineering**

Curriculum Scheme: Rev2016

Examination: BE Semester VII

Course Code: CSDLO7031 and Course Name: Advanced System Security and Digital Forensics

Time: 2 hour Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal (02) marks**
1.	User works in a company and the company decides how data should be shared is __ type of access control mechanism
Option A:	MACs (Mandatory Access Control)
Option B:	RBACs (Role Based Access Control)
Option C:	LBACs (List Based Access Control)
Option D:	DACs (Discretionary Access Control)
2.	What is the Strong Star Property Rule in Bell-La –Padula (BLP) model?
Option A:	The subject with the same clearance as the object can read and write to the object.
Option B:	The object with the same clearance level as the subject can write to the subject.
Option C:	The subject cannot read to the object.
Option D:	The object cannot read or write to the subject
3.	This is not level in classification in BIBA/ BLP model
Option A:	Top Secret
Option B:	Secret
Option C:	Confidential
Option D:	Classified
4.	A type of the attack where state or condition is changed between the time the security was checked and the access of the resource is known as
Option A:	Linearization attack
Option B:	Covert Channel
Option C:	Race Conditions
Option D:	Salami Attack
5.	A type of the virus which changes its type and signature.
Option A:	Non-resident virus
Option B:	Boot Sector Virus
Option C:	Polymorphic Virus
Option D:	Memory Virus
6.	What is a covert channel?
Option A:	Using a communications channel in a way that was not intended
Option B:	Tunneling software

Option C:	A Trojan removal tool
Option D:	Using a communications channel in the original, intended way
7.	Which of the following is not the type of the Cookies used for authentication?
Option A:	Session Cookies
Option B:	Persistent Cookies
Option C:	Temporary Cookies
Option D:	Zombie Cookies
8.	Which of the following is not example of a web service security (WS-Sec) token
Option A:	A Kerberos ticket
Option B:	A signature algorithm
Option C:	A username and password
Option D:	An X.509 certificate
9.	A Web site that allows users to enter text, such as a comment or a name, and then stores it and later displays it to other users, is potentially vulnerable to a kind of attack what attack is it __
Option A:	Cross-site scoring scripting
Option B:	Cross-site scripting
Option C:	SQL injection
Option D:	Two-factor authentication
10.	This is not the type of the file permission in Unix/ Linux system.
Option A:	Owner Permission
Option B:	Group Permission
Option C:	Other permissions
Option D:	User
11.	This is not the one of the type of phishing attack
Option A:	Email phishing
Option B:	Spear phishing
Option C:	Vishing
Option D:	Web bug
12.	The Key Confirmation Key (KCK) is used to
Option A:	Integrity-protect data between station and the AP
Option B:	Integrity-protect messages between in the four way handshake
Option C:	Encrypt data between the station and the AP
Option D:	Encrypt the message containing the Group Key
13.	Which types of VPNs are used for creating a virtual tunnel between an employee's device and the company's network?
Option A:	Remote access VPNs
Option B:	Site-to-site VPNs
Option C:	Peer-to-Peer VPNs
Option D:	Country-to-country VPNs
14.	The MAC computed in UMTS is used to
Option A:	Authenticate the base station to the SIM card

Option B:	Authenticate the SIM card to the base station
Option C:	Authenticate the MSC/HLR to the SIM card
Option D:	Authenticate the SIM card to the MSC/HLR
15.	It gives its owner the legal right to exclude others from making, using, or selling an invention for a limited period of years.
Option A:	Patent
Option B:	Copyright
Option C:	Trade Secret
Option D:	Trademark
16.	Which of the following is not computer crime
Option A:	Plagiarism
Option B:	Hacking
Option C:	Using Internet to transfer
Option D:	Virus Transferring
17.	Utility or tool used to determining Who Is Logged in to the System during windows investigation is
Option A:	log
Option B:	dir
Option C:	PsLoggedOn
Option D:	dd
18.	What is called as the process of creation of a duplicate of digital media for purpose of examining it?
Option A:	Acquisition.
Option B:	Steganography.
Option C:	Live analysis
Option D:	Hashing.
19.	What is the most significant legal issue in computer forensics?
Option A:	Preserving Evidence
Option B:	Seizing Evidence.
Option C:	Admissibility of Evidence.
Option D:	Discovery of Evidence
20.	Utility/ command used to create a forensic duplicate of a hard drive
Option A:	dd
Option B:	grep
Option C:	ls
Option D:	dir

Q2	**Solve any Four out of Six** **(5 marks each)**
A	Explain in brief Single sign on and Federated Identity management.

B	What are different types of Virus? Explain how virus propagates.
C	Explain multi factor authentication.
D	Write short note on Privacy and Authentication in GSM.
E	Explain rights of employee.
F	Explain qualified forensics duplicate, restored image and mirror image.

Q3	**Solve any Four out of Six** **(5 marks each)**
A	Explain BIBA model.
B	Explain file protection mechanism.
C	Write short note on Account harvesting.
D	Explain types of phishing.
E	Compare WEP and WPA.
F	What are the different ways to recover deleted files from Unix System?

University of Mumbai

Examination 2020 under cluster 04 (Lead College: PCE, Panvel)

Examinations Commencing from 23rd December 2020 to 6th January 2021 and from 7th January 2021 to 20th January 2021

Program: **Computer Engineering**

Curriculum Scheme: Rev2016

Examination: BE Semester VII

Course Code: CSDLO7031 and Course Name: Advanced System Security and Digital Forensics

Time: 2 hour Max. Marks: 80

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Question Number	Correct Option (Enter either 'A' or 'B' or 'C' or 'D')
Q1.	A
Q2.	A
Q3.	D
Q4	C
Q5	C
Q6	A
Q7	C
Q8.	B
Q9.	B
Q10.	D
Q11.	D
Q12.	B
Q13.	A
Q14.	C
Q15.	A
Q16.	C
Q17.	C
Q18.	A
Q19.	C
Q20.	A

Q. 2 Solve any Four out of Six

A) Explain in brief Single sign on and Federated Identity management.

Ans:-

1) SSO:- Single sign-on (SSO) is an authentication method that enables users to securely authenticate with multiple applications and websites by using just one set of credentials.

2)FIM: FIM is the set of agreements and standards enable the portability of identities across multiple enterprises and numerous applications to support large numbers of users.

Advantages: Economical and convenience, cost-savings and consolidation of resources.

Examples of FIM systems Include OpenID and OAuth

difference : **SSO** allows a single **authentication** credential to **access** different systems within a single organization, a **FIM** system provides single **access** to multiple systems across different enterprises

B) What are different types of Virus. Explain how virus propagates.

Ans: A virus is a piece of software that can "infect" other programs by modifying them. The modification includes a copy of the virus program, which then can go to infect other programs.

Types: Parasitic Virus, Memory resident Virus, Boot-Sector Virus, Stealth Virus, Polymorphic Virus, Metamorphic Virus

The virus places an identical copy of itself into other programs or into certain system areas on the disk.

For a virus to do its malicious work and spread itself, it must be activated by being executed

Many ways to ensure that programs will be executed

E.g., the SETUP program call dozens or hundreds of other programs

If any one of these programs contains a virus, the virus code could be activated

Running an infected program obtained from distribution medium, such as a CD, or opening an e-mail attachment are common way for viruses to get activated.

Also, objects such as graphics or photo images can contain code to be executed by an editor/viewer. It is a bad idea for programs to perform potentially security-relevant actions without a user's consent.

C) Explain multi factor authentication.

Ans: Using more than one authentication techniques.

1.What you have :ATM ,smart Card

2. What you know: Password, PIN

3.What you are: Biometric authentication

D) Write short note on security in GSM.

In GSM, security is implemented in three entities:

1) Subscriber identity module (SIM) contains authentication key Ki (64-bit), ciphering key (Kc) generating algorithm, and authentication algorithm. SIM is a single chip computer containing the operating system (OS), the file system, and applications. SIM is protected by a PIN and owned by an operator. SIM applications can be written with a SIM tool kit.

2) GSM handset contains ciphering algorithm.

3) Network uses algorithms and IDs that are stored in the authentication center.

Degree of security in GSM is higher basic security mechanisms are:

a) Access control and authentication :It prevents access by unregistered users.

b) Encryption: It prevents unauthorized listening.

c) Confidentiality: It prevents subscriber's location discloser.

E) Explain rights of employee.

ANS:-

Ownership of Products: Ownership of a Patent, Ownership of a Copyright

Work for Hire

Licenses:

Trade Secret Protection

Employment Contracts

F) Explain qualified forensics duplicate, restored image and mirror image.

Ans: -

1) Forensics duplicate: A simple duplication consists of making a copy of specific data. The data may consist of a single file, a group of files, a partition on a hard drive, an entire hard drive, or other elements of data storage devices and the information stored on them.

A forensic duplication is an accurate copy of data that is created with the goal of being admissible as evidence in legal proceedings.

2) Restored image: A *restored image* is what we get when we restore a forensic duplicate or a qualified forensic duplicate to another storage medium. The restoration process is more complicated than it sounds

3) Mirror image:- A *mirror image* is created from hardware that does a bit-for-bit copy from one hard drive to another. Hardware solutions are very fast, pushing the theoretical maximum data rate of the IDE or SCSI interfaces

Q. 3. Solve any Four out of Six

A) Explain BIBA model.

BIBA model is for integrity

Let I(O) denote the integrity of object O and I(S) denote the integrity of subject S

Biba can be stated as

Write Access Rule: S can write O if and only if $I(O) \leq I(S)$

(if S writes O, the integrity of O ≤ that of S)

Biba's Model: S can read O if and only if $I(S) \leq I(O)$

(if S reads O, the integrity of S ≤ that of O)

Often, replace Biba's Model with

Low Water Mark Policy: If S reads O, then $I(S) = \min(I(S), I(O))$

B) Explain file protection mechanism.

Ans:

1)Basic Forms of Protection:

i) All-None Protection: Any user could read, modify, or delete a file belonging to any other user

ii) Group Protection:- All authorized users are separated into groups

2)Single Permissions: Password or other token

assign a password to a file

Temporary Acquired Permission

Unix set userid permission.

If this protection is set for a file to be executed, the protection level is that of the file's *owner*, not the *executor*

C) Write short note on Account harvesting.

- The process of collecting all the legitimate account names on a system can be done passively or actively.
- Often used to refer to computer spammers, individuals who try to sell others or get information through email advertising or solicitation.
- Credential Harvesting (or Account Harvesting) is the use of MITM attacks, DNS poisoning, phishing, and other vectors to a mass large numbers of credentials (username / password combinations) for reuse.

Attackers use a variety of these tools to aggregate vast quantitites of credentials and make them available for sale on the dark web and through other clandestine channels

D) Explain types of phishing.

Spear phishing, Email phishing, voice, sms,

E) Compare WEP and WPA.

	WEP	WPA
Purpose	Making WiFi networks as secure as wired networks	Implementation of IEEE802.1 li standards on WEP hardware
Data Privacy (Encryption)	Rivest Cipher 4 (RC4)	Temporal Key Integrity Protocol (TKIP)
Authentication	WEP-Open and WEP-Shared	WPA-PSK and WPA-Enterprise
Data Integrity	CRC-32	Message Integrity code
	40 bit key	128 bit key

F) What are the different ways to recover deleted files from Unix System?

Ans:- grep word search provides enough “hits”

Debugfs:- It is an interactive file debugger used to examine and to change the state of the ext2 file systems.

we recover an 82 byte file called “goner”. We recover this small file by accessing the inode for the file directly, and changing the link count from zero (marked for deletion) to 1.

After we relink the file, we have to run the file system check tool (e2fsck or fsck) to mapthe relinked file to “lost+found

First, we view the file we are going to remove with the “rm” command, using the “-i” extension to view its inode number

We then invoke the debugfs command, accessing the device /dev/hdb2 in read-only mode

Lsdel: command to list the inodes that have a link count of zero

University of Mumbai

Examination 2020 under cluster 4 (Lead College: Pillai College of Engineering)

Examinations Commencing from 23rd December 2020 to 6th January 2021 and from 7th January 2021 to 20th January 2021

Program: **Computer Engineering**

Curriculum Scheme: Rev 2016

Examination: BE Semester VII

Course Code: CSDLO7032 and Course Name: Big Data & Analytics

Time: 2 hour Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Which software tool allows real time data processing in big data?
Option A:	Hive
Option B:	Sqoop
Option C:	Flume
Option D:	PIG
2.	Which one of the following statement is false about Hadoop?
Option A:	It is a distributed framework
Option B:	Processing in hadoop is Map Reduce
Option C:	Name node can communicate with Task tracker
Option D:	It runs with commodity hardware
3.	_____ is used to check the status of all daemons running in the Hadoop
Option A:	Fsck
Option B:	Jps
Option C:	Hadoop fs
Option D:	Distcp
4.	Big data analysis does perform all the tasks mentioned below except
Option A:	Collects data
Option B:	Analyzes data
Option C:	Spreads data
Option D:	Organizes data
5.	In which mode each daemon runs on a single node but there is separate java process for each daemon
Option A:	Local (Standalone) mode
Option B:	Pseudo-distributed mode
Option C:	Fully distributed mode
Option D:	Dual distributed mode
6.	The term _____ is often used to describe Hadoop hardware requirements.
Option A:	Commodity hardware
Option B:	Commodity software

Option C:	Commodity firmware
Option D:	Cluster hardware
7.	There is a need for storing transactional data generated by a Bank's ATM. The data is to be stored in a tabular format. According to CAP theorem, which type of data store is to be used for this?
Option A:	CP
Option B:	AP
Option C:	CA
Option D:	CAP
8.	In NoSQL databases, which term is used to indicate high availability and disaster recovery?
Option A:	Processing
Option B:	Replication
Option C:	Scalability
Option D:	Recovery
9.	Which of the following options are examples of streaming data?
Option A:	Offline processing of credit card transactions stored in the HDFS
Option B:	Analysing a company's performance, based on its annual report
Option C:	Sensors continuously monitoring luggage on a conveyor belt
Option D:	Data of a retail shop
10.	A _____ query P is a query that is issued once over a database D, and then logically runs continuously over the data in E until P is terminated.
Option A:	One-time Query
Option B:	Adhoc Query
Option C:	General Query
Option D:	Continuous Query
11.	Which of the following is not the component of Data Stream Management System?
Option A:	Stream Data Regulator
Option B:	Working Storage
Option C:	Inference
Option D:	Query Processor
12.	A Bloom filter guarantees no
Option A:	False negatives
Option B:	False positives
Option C:	False positives and false negatives
Option D:	False positives or false negatives, depending on the Bloom filter type
13.	What are DGIM's maximum error boundaries?
Option A:	DGIM always underestimates the true count; at most by 25%
Option B:	DGIM either underestimates or overestimates the true count; at most by 50%
Option C:	DGIM always overestimates the count; at most by 50%
Option D:	DGIM either underestimates or overestimates the true count; at most by 25%

14.	What is the Manhattan distance (L1-norm) for the points X=(0, 3, 4, 5) and Y=(7, 6, 3, 1) ?
Option A:	15
Option B:	16
Option C:	14
Option D:	17
15.	Find Hamming Distance for vectors A=10010101111 B=10001001011
Option A:	1
Option B:	2
Option C:	3
Option D:	4
16.	Flajolet-Martin(FM) algorithm is used to_____
Option A:	Count distinct elements in the stream
Option B:	Count frequent items in the stream
Option C:	Count ones in the streams
Option D:	Check item in the stream
17.	_____ system recommend items based on similarity measures between users and/or items.
Option A:	Content-based filtering
Option B:	General filtering
Option C:	Collaborative Filtering
Option D:	User-based filtering
18.	Which of the following term can be used to describe nodes that contain the maximum amount of information about a network?
Option A:	Social Networks
Option B:	Degree Centrality
Option C:	Betweeness Centrality
Option D:	Broadcasters
19.	Pages that are relevant and are linked by many other pages are called as _____
Option A:	Hub
Option B:	Dead end
Option C:	Spider Trap
Option D:	Authority
20.	The First step of Girvan-Newman algorithm is
Option A:	Performing depth-first search
Option B:	Performing breath-first search
Option C:	Applying hashing
Option D:	Applying hashing on betweenness

Q2	Solve any Four out of Six 5 marks each
A	Define Hadoop. What is the limitation in Hadoop 1.X and how this limitation is resolved in Hadoop 2.x?
B	Explain working of different phases of Map Reduce with one common example?
C	Explain how to use join operation in mapreduce?
D	What do you mean by NoSQL databases? What is the alternative to ACID property in Nosql databases?
E	Determine the distinct element in the following stream using appropriate algorithm. Input stream of integers S = {4, 7, 5, 1, 2, 7, 6} Hash function, h(x) = (3 x + 1) mod 7
F	What is page rank? How to calculate the page rank of a web graph?

Q3	Solve any Four out of Six 5 marks each
A	Define HDFS. Discuss the HDFS Architecture and HDFS Commands in brief.
B	Explain with the example the types of queries fired on stream data
C	Why Cosine Distance is a Distance Measure? Find the Cosine Similarity between two documents DOC_1: ABC cares me more than XYZ cares me DOC_2: RMM helps me more than ABC cares me
D	Write a short note on Bloom Filter.
E	What is a recommendation system? Explain the design of a recommendation system used to recommend movies to users.
F	What is a community in a Social Network Graph? Explain how the Girvan Newman algorithm finds the different Communities in the graph.

University of Mumbai

Examination 2020 under cluster 4 (Lead College: Pillai College of Engineering)

Examinations Commencing from 23rd December 2020 to 6th January 2021 and from 7th January 2021 to 20th January 2021

Program: **Computer Engineering**

Curriculum Scheme: Rev 2016

Examination: BE Semester VII

Course Code: CSDLO7032 and Course Name: Big Data & Analytics

Time: 2 hour Max. Marks: 80

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Question Number	Correct Option (Enter either 'A' or 'B' or 'C' or 'D')
Q1.	C
Q2.	C
Q3.	B
Q4	C
Q5	B
Q6	A
Q7	C
Q8.	B
Q9.	C
Q10.	D
Q11.	C
Q12.	A
Q13.	B
Q14.	A
Q15.	D
Q16.	A
Q17.	C
Q18.	B
Q19.	D
Q20.	B

Q 2

A. Define Hadoop. What is the limitation in Hadoop 1.X and how this limitation is resolved in Hadoop 2.x?

Ans: Define Hadoop and its limitations ……..2 marks

Detail explanation about YARN …… 3 marks

B. Explain working of different phases of Map Reduce with one common example?

Ans: Map Phase, Reduce Phase, Shuffle Phase, Sort Phase and Combiner/Partition

……..5 marks

C. Explain how to use join operation in mapreduce?

Ans: Explanation about join ……..1 marks

Map and Reduce algorithm with explanation ……4 marks

D. What do you mean by NoSQL databases? What is the alternative to ACID property in Nosql databases?

Ans: Definition of Nosql databases ……1 marks

BASE and CAP theorem …… 4 marks

E. Determine the distinct element in the following stream using appropriate algorithm. Input stream of integers S = {4, 7, 5, 1, 2, 7, 6}
Hash function, h(x) = (3 x + 1) mod 7

Ans: …

Use Flajolet-Martin Algorithm for counting the distinct elements

Given : $S = \{4, 7, 5, 1, 2, 7, 6\}$

$h(x) = (3x+1) \bmod 7.$

Calculate hash value for every element of stream

$h(4) = (3 \cdot 4+1) \bmod 7 = 6 = 110 = 1$
$h(7) = (3 \cdot 7+1) \bmod 7 = 1 = 001 = 0$
$h(5) = (3 \cdot 5)+1) \bmod 7 = 2 = 010 = 1$
$h(1) = (3 \cdot 1+1) \bmod 7 = 4 = 100 = 2$
$h(2) = (3 \cdot 2+1) \bmod 7 = 0 = 000 = 0$
$h(7) = (3 \cdot 7+1) \bmod 7 = 1 = 001 = 0$
$h(6) = (3 \cdot 6+1) \bmod 7 = 5 = 101 = 0$

For every hash value write the binary equivalent value

Now write the trailing zero's in each hash function bit

From the binary equivalent trailing zero's values, Calculate the value of maximum number of trailing 0's.

Let the value $r = 2$

The distinct values $R = 2^r$

$R = 2^2 = 4$

Estimated value of distinct elements $R = 4$

F. What is page rank? How to calculate the page rank of a web graph?

Definition of page rank …… ½ mark

Explanation of page rank algorithm ……. 4 ½ marks

Q3

A. Define HDFS. Discuss the HDFS Architecture and HDFS Commands in brief.

Ans: HDFS Definition and Architecture Diagram includes Name node and data node ……4 marks

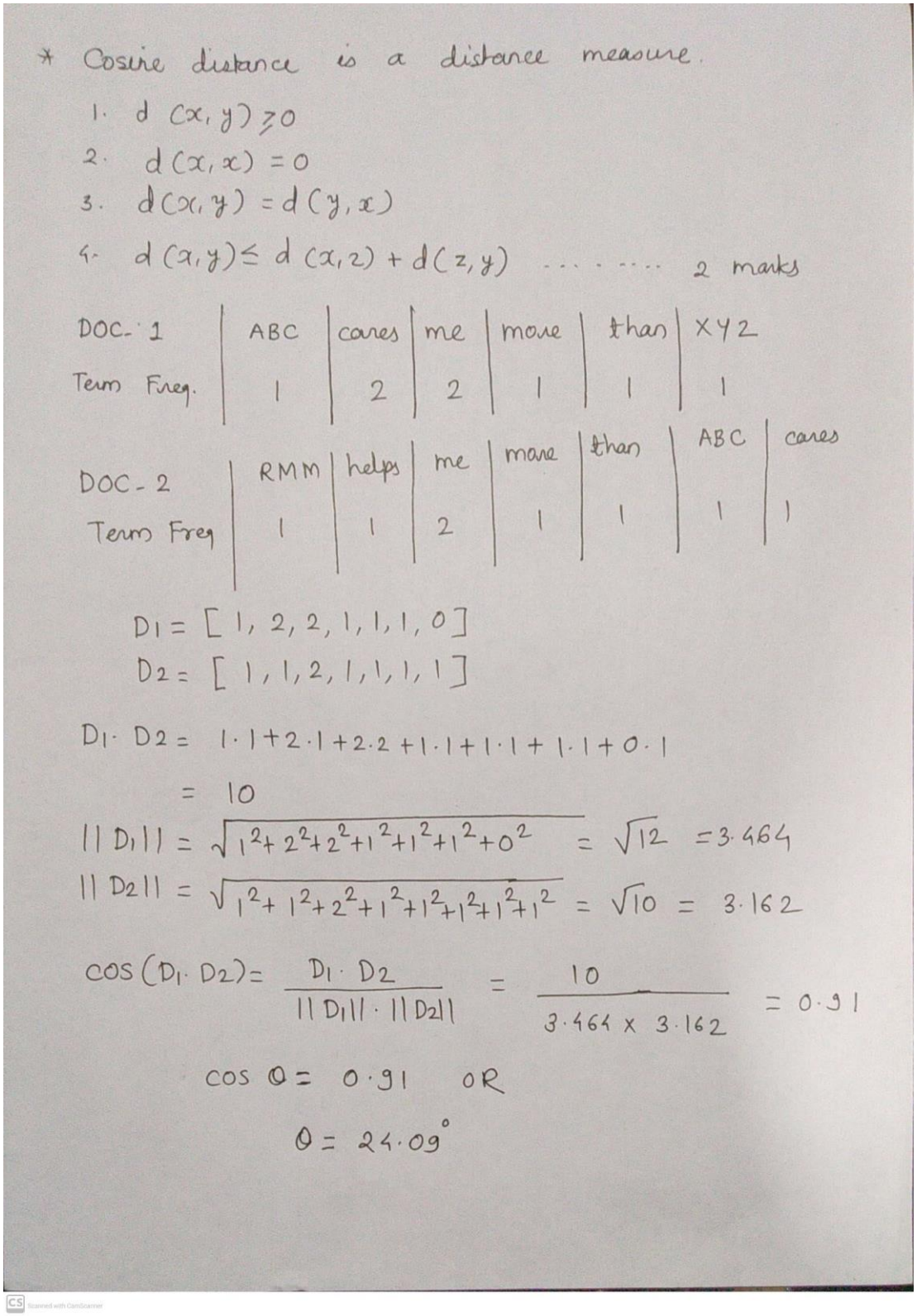
Commandy like Hadoop fs –ls, copyFromLocal, put, copytoLocal …… (2 commands 1 mark)

B. Explain with the example the types of queries fired on stream data

Ans: Standing Queries, Continuous queries and the Ad-hoc queries with example of each ……..5 marks

C. Why Cosine Distance is a Distance Measure?
Find the Cosine Similarity between two documents
DOC_1: ABC cares me more than XYZ cares me
DOC_2: RMM helps me more than ABC cares me

Ans:



D. Write a short note on Bloom Filter.

Ans: Expalnation about bloom filter with steps 3 marks

Analysis of bloom filter ……2 mark

E. What is a recommendation system? Explain the design of a recommendation system used to recommend movies to users.
Ans: Recommendation system definition and types Collaborative filtering and Content Based Filtering …… 2 marks
Movie recommendation design ……3 marks

F. What is a community in a Social Network Graph? Explain how the Girvan Newman algorithm finds the different Communities in the graph.

Ans: Community definition …….. ½ marks

Algorithms steps and explanation ……..4 ½ marks

University of Mumbai

Examination 2020 under cluster no. 04 (Lead College: Pillai College of Engineering, New Panvel)

Examinations Commencing from 23rd December 2020 to 6th January 2021 and from 7th January 2021 to 20th January 2021

Program: **Computer Engineering**

Curriculum Scheme: Rev2016

Examination: BE Semester VII

Course Code: CSDLO7033 and Course Name: Robotics

Time: 2 hour Max. Marks: 80

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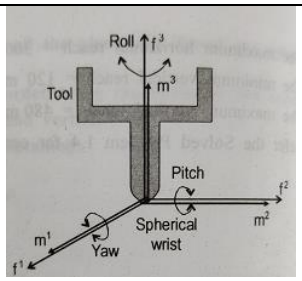
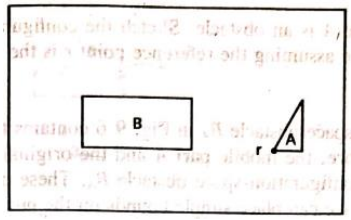
Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	For a functional industrial robot, typically, how many degrees of freedom would the robot have?
Option A:	4
Option B:	5
Option C:	6
Option D:	7
2.	Which of the following terms refers to the use of compressed gasses to drive (power) the robot device?
Option A:	pneumatic
Option B:	piezoelectric
Option C:	hydraulic
Option D:	photosensitive
3.	A work envelope of a Robot is
Option A:	the area space where robot is working
Option B:	the shape created when a manipulator reaches forward, backward, up and down.
Option C:	the cabinet use to keep the robot.
Option D:	not useful to define the application of robot.
4.	The fixed coordinate frame is attached to
Option A:	The shoulder joint of the robot.
Option B:	The elbow joint of the robot.
Option C:	The base joint of the robot.
Option D:	The end effector.
5.	Homogeneous transformation matrix is a
Option A:	3X3 matrix
Option B:	3X4 matrix
Option C:	4X3 matrix
Option D:	4X4 matrix
6.	Input to Direct kinematics is…
Option A:	multiple set of joint parameters

Option B:	one set of joint parameters.
Option C:	multiple set of link parameters.
Option D:	one set of link parameters.
7.	Screw transformation is defined as..
Option A:	rotation about X axis followed by translation about Y axis
Option B:	rotation about Y axis followed by translation about Z axis
Option C:	rotation about Z axis followed by translation about X axis
Option D:	rotation and translation about the same axis
8.	Tool Configuration Space is ….
Option A:	N dimensional.
Option B:	4 dimensional.
Option C:	3 dimensional.
Option D:	6 dimensional.
9.	Input to a Inverse Kinematic problem is
Option A:	a pair of {R, p}
Option B:	set of Joint variables q = {q1, q2, ….., qn}
Option C:	set of link parameters
Option D:	kinematic parameter table
10.	A relay is a type of:
Option A:	sensor.
Option B:	actuator.
Option C:	end effector.
Option D:	controller.
11.	What is the name for information sent from robot sensors to robot controllers?
Option A:	Temperature
Option B:	Pressure
Option C:	Feedback
Option D:	Signal
12.	Each joint of Robot is driven or powered by …
Option A:	Sensors
Option B:	Actuators
Option C:	Drive systems
Option D:	Friction.
13.	There are _____ general approaches to robot programming.
Option A:	3
Option B:	2
Option C:	4
Option D:	5
14.	The uncertainty in task planning is represented as
Option A:	nominal value plus error term
Option B:	nominal value plus exact value
Option C:	exact value plus error term

Option D:	nominal value minus error term
15.	Path planning problem requires a search in
Option A:	two-dimensional space
Option B:	three-dimensional space
Option C:	four-dimensional space
Option D:	six-dimensional space
16.	Robot vision system is used for
Option A:	to automate the manipulation of objects.
Option B:	to control the robot movement.
Option C:	to control the movement of camera
Option D:	to decide the precision of a robot.
17.	Robot vision does not include
Option A:	Image representation.
Option B:	Motion planning.
Option C:	Edge detection.
Option D:	Template matching.
18.	In edge detection algorithm which technique is used to extract vertex pixels directly
Option A:	corner point decoding
Option B:	vertex point decoding.
Option C:	corner point encoding
Option D:	vertex point encoding.
19.	What is the form of Fuzzy logic?
Option A:	Two-valued logic
Option B:	Crisp set logic
Option C:	Many-valued logic
Option D:	Binary set logic
20.	Which of the following is not a Capabilities of Expert Systems?
Option A:	Advising
Option B:	Demonstrating
Option C:	Explaining
Option D:	Expanding

Q2	**(Total 20 Marks)**
A	**Solve any Two** **5 marks each**
i.	Give the difference between Hard and Soft Automation.
ii.	Explain a 4 axis articulated ROBOT.
iii.	Describe principle function of robot vision system.
B	**Solve any One** **10 marks each**
i.	Consider the robotic tool shown in figure. Sketch the tool position after each position of the following YPR operation. Yaw of 90 degree, Pitch of -90 degree and Roll of 90 degree. Rotations are performed about fixed axes of F frame.

	
ii.	Explain the classification of Robots based on drive technology, work space and motion control with example.

Q3.	**(Total 20 Marks)**
A	**Solve any Two** **5 marks each**
i.	Compare and contrast Direct Kinematics and Inverse Kinematics.
ii.	Explain Shrink operators and swell operators.
iii.	What is the role of sensors in robots? Explain any one sensor in detail.
B	**Solve any One** **10 marks each**
i.	Define the following terms with neat diagram showing all the relevant parameters: Joint angle $\boldsymbol{\theta_k}$, Joint distance $\mathbf{d_k}$, Link length $\mathbf{a_k}$ and Link twist angle $\boldsymbol{\alpha_k}$.
ii.	Consider a scene with two polygonal parts shown in the figure, Triangle A is a mobile part and rectangle B is an obstacle. Generate a configuration space induced by A. 

University of Mumbai

Examination 2020 under cluster no. 04 (Lead College: Pillai College of Engineering, New Panvel)

Examinations Commencing from 23rd December 2020 to 6th January 2021 and from 7th January 2021 to 20th January 2021

Program: **Computer Engineering**

Curriculum Scheme: Rev2016

Examination: BE Semester VII

Course Code: CSDLO7033 and Course Name: Robotics

Time: 2 hour Max. Marks: 80

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Q1. Choose the correct option for following questions. All the Questions are compulsory and carry equal marks

Question Number	Correct Option (Enter either 'A' or 'B' or 'C' or 'D')
Q1.	B
Q2.	A
Q3.	B
Q4	C
Q5	D
Q6	B
Q7	D
Q8.	D
Q9.	A
Q10.	A
Q11.	C
Q12.	B
Q13.	A
Q14.	A
Q15.	D
Q16.	A
Q17.	B
Q18.	B
Q19.	B
Q20.	D

Q2.

A-i) Minimum 5 Points of differences and example of Hard and Soft Automation. 1 mark for each point.

A-ii) A 4 axis articulated ROBOT has got 4 DOF or 4 axes. They are Base, Shoulder, Elbow, Tool Roll. All the joints are rotary nature hence the name articulated. 2 Marks for the diagram and 3 marks for description.

A-iii) Principal functions of Robot vision systems are Image representation and Template matching. 1 mark for defining Robot vision, 2 marks for explaining Image representation and 2 marks for explaining Template matching.

B-i) Initially, F and M are coincident as shown in fig. a

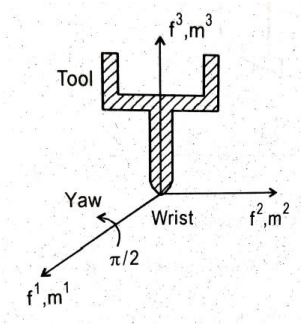


Fig a.

Perform YAW motion of 90^0 about f^1 axis. This is shown in fig. b

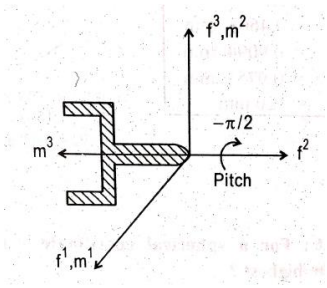


Fig. b

Then perform Pitch motion of -90^0 about f^2 axis and finally perform Roll motion of 90^0 about f^3 axis which is shown in fig. c

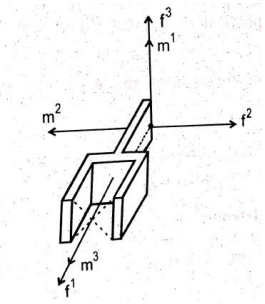


Fig. c

B-ii) Classification based on drive technologies: Electric, Pneumatic and Hydraulic. (3 marks)
Classification based on work space: Cartesian, Cylindrical, Spherical, SCARA and Articulated. (4 marks)
Classification based on motion control: Point to point and Continues path. (3 marks)

Q3.

A-i) Minimum 5 Points of differences.1 mark for each point.

A-ii) Shrink and swell operators are applied iteratively in the processing of digital image.

Shrink operators are iterative operators which converts 1(foreground) in to 0(background) i.e. converts a foreground pixel which is present in the background in to background pixel.

Swell operators are iterative operators which converts 0(background) in to 1(foreground) i.e. converts a background pixel which is present in the foreground in to foreground.

When all the noisy pixels are removed, shrink and swell operators converges in to a finite no of iterations.

One can shrink an image until it converges and then swell the shrunken image. This tends to remove small holes, small regions, narrow inlets and narrow appendages. (3 marks for Shrink operator and 2 marks for Swell operators)

A-iii) Robotic sensors are used to estimate a robot's condition and environment. These signals are passed to a controller to enable appropriate behavior. Sensors in robots are based on the functions of human sensory organs. Robots require extensive information about their environment in order to function effectively.

Sensors provide analogs to human senses and can monitor other phenomena for which humans lack explicit sensors.

- Simple Touch: Sensing an object's presence or absence.
- Complex Touch: Sensing an object's size, shape and/or hardness.
- Simple Force: Measuring force along a single axis.
- Complex Force: Measuring force along multiple axes.
- Simple Vision: Detecting edges, holes and corners.
- Complex Vision: Recognizing objects.
- Proximity: Non-contact detection of an object.

Sensors can measure physical properties, such as the distance between objects, the presence of light and the frequency of sound. They can measure:

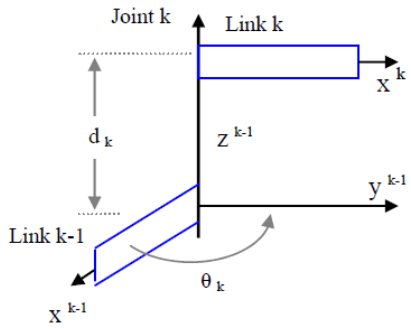
- Object Proximity: The presence/absence of an object, bearing, color, distance between objects.
- Physical orientation. The co-ordinates of object in space.
- Heat: The wavelength of infrared or ultra violet rays, temperature, magnitude, direction.
- Chemicals: The presence, identity, and concentration of chemicals or reactants.
- Light: The presence, color, and intensity of light.
- Sound: The presence, frequency, and intensity of sound.

Motion controllers, potentiometers, tacho-generators and encoder are used as joint sensors, whereas strain-gauge based sensing is used at the end-effector location for contact force control.

Examples of sensors: Position sensors, Velocity sensors. (3 marks for role of sensors and 2 marks for explaining any one sensor)

B-i) Each of the joints connecting two links have two joint parameters associated with them. They specify the relative position and the orientation of the two successive links. The two joint parameters are as follows:

• Joint angle θ_k (Fixed for prismatic joints)
• Joint distance d_k (Fixed for revolute joints)

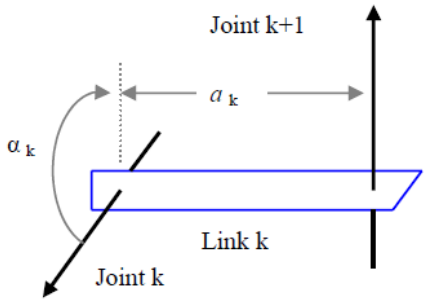


Each link is placed between two successive joints. This results in two link parameters specifying the position and orientation of the axes contained in the joints. They are as follows:

• Link length $\mathbf{a_k}$

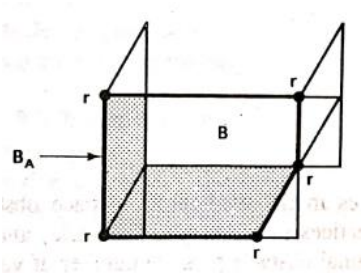
• Link twist angle $\boldsymbol{\alpha k}$

Unlike the joint parameters, these are always constant and are specified as part of the mechanical design of the robotic manipulator. The link parameters associated with link k, situated between joints k and k+1

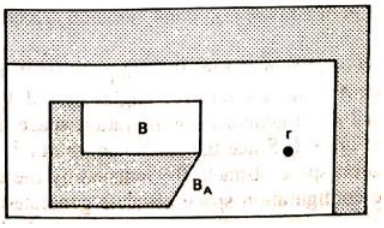


(5 marks for Joint parameters with definition and diagram, 5 marks for Link parameters with definition and diagram)

B-ii)



Generating the configuration space obstacle B_A (5 marks)



Configuration space induced by part A (5 marks)

University of Mumbai

Examination 2020 under cluster ALL(Lead College: VCET)

Examinations Commencing from 7th January 2021 to 20th January 2021

Program: **ALL_Institute Level Optional Course 1**

Curriculum Scheme: Rev2016

Examination: BE Semester VII

Course Code: ILO 7011 and Course Name: Product Life Cycle Management

Time: 2 hour Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	_____ is not a phase under product life cycle management
Option A:	Introduction
Option B:	Growth
Option C:	Maturity
Option D:	Rotation
2.	In _____ phase extensive advertisement is needed for product promotion
Option A:	Introduction
Option B:	Growth
Option C:	Maturity
Option D:	Decline
3.	In _____ phase profit level reaches to its maximum peak
Option A:	Introduction
Option B:	Growth
Option C:	Maturity
Option D:	Decline
4.	In_____ phase product sales reaches to minimum and profit is also lowest
Option A:	Introduction
Option B:	Growth
Option C:	Maturity
Option D:	Decline
5.	_____ is not a benefit of PLM
Option A:	Product life cycle analysis
Option B:	Profit maximization
Option C:	Decision making
Option D:	Large investment
6.	In _____ design model approach simultaneous and interlinked design activities are carried out
Option A:	Integrated
Option B:	Individual
Option C:	Isolated
Option D:	Dual

7.	_____ engineering is also called as simultaneous engineering.
Option A:	Concurrent
Option B:	Combine
Option C:	Linear
Option D:	Parallel
8.	_____ emphasizes the multidisciplinary approach in the product development process
Option A:	Concurrent engineering
Option B:	Dual engineering
Option C:	Rotational Engineering
Option D:	Realistic engineering
9.	_____ is not a step under new product development.
Option A:	Idea generation
Option B:	Concept development
Option C:	Idea screening
Option D:	Sensitivity analysis
10.	In ____ product is customized according to the customer wishes and product prepared as per specific requirement of customer.
Option A:	Product configuration
Option B:	Product rotation
Option C:	Product division
Option D:	Product linearization
11.	PDM stands for ____
Option A:	Product Data Management
Option B:	Product Development Management
Option C:	Product Dispatch Management
Option D:	Product Distinct Manament
12.	_____ is not the benefit of PDM
Option A:	It centralizes and control data
Option B:	It removes unnecessary data
Option C:	It improves data management
Option D:	It increases cost and time
13.	_____ is not the feature of PDM
Option A:	It facilitates better use of resources
Option B:	Engineering changes can be controlled easily
Option C:	Lead time gets reduced
Option D:	Consumes more time and resources
14.	_____ is not the component of virtual product development
Option A:	Virtual product design
Option B:	Virtual simulation
Option C:	Digital manufacturing
Option D:	Supply chain management

15.	DMU stands for _____
Option A:	Digital Mock up Unit
Option B:	Digital Manufacturing Unit
Option C:	Digital Maintenance Unit
Option D:	Differential Manufacturing Unit
16.	_____ is a realistic rendering technique of creating an image by tracing the path of light
Option A:	Ray tracing
Option B:	Ray casting
Option C:	Radiosity
Option D:	Radiography
17.	DFE stands for ____
Option A:	Design for excellence
Option B:	Design for efficiency
Option C:	Design for environment
Option D:	Design for economy
18.	DFE focuses on _____ factor
Option A:	Economy
Option B:	Energy
Option C:	Efficiency
Option D:	Environment
19.	LCA stands for _____
Option A:	Life Cycle Assessment
Option B:	Life Cycle Analysis
Option C:	Life Cycle Assembly
Option D:	Life Cycle Achievement
20.	LCCA stands for
Option A:	Life Cycle Class Achievement
Option B:	Life Cycle Creative Assessment
Option C:	Life Cycle Combine Assessment
Option D:	Life Cycle Cost Analysis

Q2 **(20 Marks)**	**Solve any Four out of Six 5 marks each**
A	*Explain product data management in detail.*
B	*Explain virtual product development tools in detail.*
C	*Explain the concept of sustainable development.*
D	Explain virtual manufacturing in detail.
E	*Explain product data management along with its advantages.*
F	*Explain the framework of life cycle assessment.*

Q3. **(20 Marks)**	**Solve any Two Questions out of Three 10 marks each**
A	*Explain life cycle phases in detail.*

B	*Explain product life cycle strategies in brief.*
C	*Explain various product development tools in detail.*

University of Mumbai

Examination 2020 under clusterALL(Lead College: VCET)

Examinations Commencing from 7th January 2021 to 20th January 2021

Program: **ALL_Institute Level Optional Course 1**

Curriculum Scheme: Rev2016

Examination: BE Semester VII

Course Code: ILO 7011 and Course Name: Product Life Cycle Management

Time: 2 hour Max. Marks: 80

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Question Number	Correct Option (Enter either 'A' or 'B' or 'C' or 'D')
Q1.	D
Q2.	A
Q3.	C
Q4	D
Q5	D
Q6	A
Q7	A
Q8.	A
Q9.	D
Q10.	A
Q11.	A
Q12.	D
Q13.	D
Q14.	D
Q15.	A
Q16.	A
Q17.	C
Q18.	D
Q19.	A
Q20.	D

University of Mumbai

Examination 2020 under cluster ALL(Lead College: VCET)

Examinations Commencing from 7th January 2021 to 20th January 2021

Program: **ALL_Institute Level Optional Course 1**

Curriculum Scheme: Rev2016

Examination: BE Semester VII

Course Code: ILO 7012 and Course Name: Reliability Engineering

Time: 2 hour Max. Marks: 80

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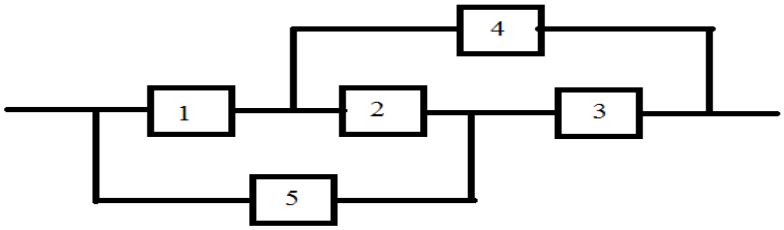
Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	The Bathtub curve indicates failure probability, Which stage is NOT normally associated with the bathtub curve?_____
Option A:	Pulling the plug where production is halted due to unacceptable level of failures
Option B:	Infant-mortality where failures occur early
Option C:	Wear-out where failure increases due to age
Option D:	Normal-life where few failures occur
2.	Three components each with a reliability of 0.9 are placed in series. What is the reliability of the system ?
Option A:	0.729
Option B:	0.125
Option C:	0.00258
Option D:	0.989
3.	. If A is a perfect subset of B and P(a) < P(b), then P(B - A) is equal to _____
Option A:	P(a) / P(b)
Option B:	P(a) P(b)
Option C:	P(a) + P(b)
Option D:	P(b) - P(a)
4.	In order to maintain maintainability in the system, repair time must _____
Option A:	be increased
Option B:	be reduced
Option C:	kept constant
Option D:	keeps on changing
5.	What refers to wear out failure_____.
Option A:	Depends upon the subject
Option B:	Depends upon type of the experiment
Option C:	Increasing failure rate
Option D:	Decreasing failure rate
6.	Find median and mode of the messages received on 9 consecutive days 15,11,9, 5,18,4,15,13,17.
Option A:	13,6
Option B:	13,18

Option C:	18,15
Option D:	15, 16
7.	The reliability of a device comprised of various parts functioning in series is the :
Option A:	Product of the reliabilities
Option B:	Sum of the probabilities of the unreliabilities
Option C:	Product of the unreliabilities
Option D:	Sum of the reliabilities
8.	Which among the following exhibits inversely proportional relationship with the reliability?
Option A:	Production cost
Option B:	Maintenance and repair cost
Option C:	Design and development cost
Option D:	Availability
9.	If 'm' is the mean of a Poisson Distribution, then variance is given by _____
Option A:	m^2
Option B:	$m^{1/2}$
Option C:	m
Option D:	$\frac{m}{2}$
10.	Which of the following is not considered a reliability design method_____.
Option A:	Parts selection
Option B:	Choice of technology
Option C:	Accessibility
Option D:	Derating
11.	Markov analysis is a technique that deals with the probabilities of future occurrences by_____.
Option A:	Using Bayes' theorem
Option B:	Analyzing presently known probabilities
Option C:	Time series forecasting
Option D:	The maximal flow technique
12.	Skewness of Normal distribution is _____
Option A:	Negative
Option B:	Positive
Option C:	0
Option D:	Undefined
13.	The design function which assigns probability of failures between components or subsystems is called:
Option A:	Significance
Option B:	Prediction
Option C:	Qualification
Option D:	Apportionment
14.	What is MTTR

Option A:	Mean Time To Restore
Option B:	Mean Time To Repair
Option C:	Mean Time To Recovery
Option D:	Mean Time to Restoration
15.	The inherent availability can be calculated for repairable system as:
Option A:	$A_I = \frac{MTBF}{MTTF + MTTR}$
Option B:	$A_I = \frac{MTTF}{MTTF + MTTR}$
Option C:	$A_I = \frac{MTTF}{MTBF + MTTR}$
Option D:	$A_I = \frac{MTTR}{MTTF + MTTR}$
16.	Three companies A, B and C supply 25%, 35% and 40% of the notebooks to a school. Past experience shows that 5%, 4% and 2% of the notebooks produced by these companies are defective. If a notebook was found to be defective, what is the probability that the notebook was supplied by A?
Option A:	44⁄69
Option B:	25⁄69
Option C:	13⁄24
Option D:	11⁄24
17.	What would happen, if an equipment possesses reliability and maintainability to the maximum extent in accordance to MTTR?
Option A:	Failure rate is higher & downtime is longer
Option B:	Failure rate is lower & downtime is longer
Option C:	Failure rate is higher & downtime is shorter
Option D:	Failure rate is lower & downtime is shorter
18.	All fault-tolerant techniques rely on
Option A:	Integrity
Option B:	Dependability
Option C:	Redundancy
Option D:	Reliability
19.	What is the Major Key parameter of maintainability?
Option A:	Accessibility
Option B:	Vulnerability
Option C:	RCS
Option D:	Survival
20.	Which of the following is the biggest impact of availability
Option A:	mean time
Option B:	median time
Option C:	downtime
Option D:	maximum time of repair

Q2	**Solve any Four out of Six** **5 marks each**
A	Tests performed on a self-diagnostic module for a complex electronic system resulted in correct diagnostics of a known fault 98% of time with only a 1% false reading when it was known there were no faults present. The Probability of a failure (fault) occurring over the test period is 0.005. How reliable is the self-diagnostic module?
B	Consider the system below. Do the following a) Assume that all componentsare identical and independent, and have a reliability R(t). Find the expression for the system reliability. b) Assume the components have exponentially distributed failure times with parameter λ. Develop an expression for the failure rate of the system $\lambda_s(t)$. 
C	Explain measures of Availability.
D	Obtain reliability of Parallel system containing of n components, when the reliability of each component is known. Assume that the units are non-repairable.
E	Explain the Failure Mode Effects analysis
F	Explain Reliability Block Diagram with example

Q3	**Solve any Two out of Three** **10 marks each**
A	ExplainBath Tub Curve, Hazard rate, failure density and Failure Rate with help of suitable example
B	It is known that 5% of the book bound at a certain bindery have defective bindings. Find the probability that 2 of 100 books bound by this bindery will defective binding using the Poisson approximation to the binomial distribution.
C	Explain Reliability Improvement methods with suitable example

University of Mumbai

Examination 2020 under cluster ALL (Lead College: VCET)

Examinations Commencing from 7th January 2021 to 20th January 2021

Program: **ALL_Institute Level Optional Course 1**

Curriculum Scheme: Rev2016

Examination: BE Semester VII

Course Code: ILO 7012 and Course Name: Reliability Engineering

Time: 2 hour Max. Marks: 80

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Question Number	Correct Option (Enter either 'A' or 'B' or 'C' or 'D')
Q1.	A
Q2.	A
Q3.	D
Q4	B
Q5	C
Q6	B
Q7	A
Q8.	B
Q9.	C
Q10.	D
Q11.	B
Q12.	C
Q13.	D
Q14.	B
Q15.	B
Q16.	B
Q17.	D
Q18.	C
Q19.	A
Q20.	C

University of Mumbai

Examination 2020 under cluster 6 (Lead College: VCET)

Examinations Commencing from 23rd December 2020 to 6th January 2021 and from 7th January 2021 to 20th January 2021

Program: **ALL**

Curriculum Scheme: Rev 2016

Examination: BE Semester VII

Course Code: ILO 7013 and Course Name: Management Information System

Time: 2 hour Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	For any information to be useful, it must be _____
Option A:	Efficient
Option B:	Safe
Option C:	Complete
Option D:	Optimized
2.	Types of information systems include _____
Option A:	Management support system
Option B:	Hardware processing system
Option C:	Output handling systems
Option D:	Storage processing systems
3.	The term **Field** in a data represents ____
Option A:	Integrated collection of logically related data
Option B:	A group of related records
Option C:	Logical structure
Option D:	Data attribute
4.	Functions of a DBMS includes ____
Option A:	Database
Option B:	Datamart
Option C:	Data Warehouse
Option D:	Manipulation of records in a table

5.	Data Mart is a subset of _____
Option A:	Data
Option B:	Data mining
Option C:	Data Warehouse
Option D:	Database
6.	Data mining is not used for _____
Option A:	Day to Day operations
Option B:	Market analysis
Option C:	Customer retention
Option D:	Discover new correlations
7.	Data scrubbing is which of the following?
Option A:	A process to reject data from the data warehouse and to create the necessary indexes
Option B:	A process to load the data in the data warehouse and to create the necessary indexes
Option C:	A process to upgrade the quality of data after it is moved into a data warehouse
Option D:	A process to upgrade the quality of data before it is moved into a data warehouse
8.	The purpose of a copyright is_____
Option A:	closely safeguarded as a secret, or legal protections are lost
Option B:	Information that gives one company a competitive advantage over others
Option C:	Designed to protect the expression of ideas
Option D:	Designed to protect inventions, tangible objects, or ways to make them
9.	_____ is the method of translating an original message into a type that, except for the intended recipient, cannot be interpreted by anyone.

Option A:	Virtual Private Network (VPN)
Option B:	Firewall
Option C:	Secure Socket Layer (SSL)
Option D:	Encryption
10.	The identity of the person who needs access is verified by a process called as ___
Option A:	Authentication
Option B:	Authorization
Option C:	Biometrics
Option D:	Password
11.	Electronic commerce systems generally include all of the following except:
Option A:	Internet websites for online sales
Option B:	Intranets that allow sales reps to access customer records
Option C:	Extranet access of inventory databases
Option D:	Direct links to credit reporting services
12.	Which of the following is incorrect about social computing
Option A:	Combines social behaviour and Information system
Option B:	Encourages and promotes machine-generated information
Option C:	Improves collaboration and interaction among people
Option D:	Produces social information

13.	What allows users to position data in multiple associations that overlap?
Option A:	Tagging
Option B:	Really Simple Syndication
Option C:	AJAX
Option D:	Wikis
14.	Traveling sales people and those at regional sales offices can use the Internet, extranets, and other networks to transmit customer orders from their laptop or desktop PCs, thus breaking barriers.
Option A:	Physical
Option B:	Competition
Option C:	Structural
Option D:	Geographic
15.	Most companies are building e-business and e-commerce websites to achieve all of the following goals except:
Option A:	Generate new revenue from online sales
Option B:	Increase foot traffic at brick and mortar locations
Option C:	Reduce transaction costs
Option D:	Increase the loyalty of existing customers via Web customer service and support
16.	All of the following would typically be supported by an organization's intranet information portal *except*:
Option A:	Communication and collaboration
Option B:	Business operations and management
Option C:	Web publishing
Option D:	Recruitment
17.	The most fundamental information systems in an organization are_____
Option A:	Office automation systems
Option B:	Decision support systems

Option C:	Functional area information systems
Option D:	Transaction processing systems
18.	Which of the following is not an advantage of the buy option for acquiring IS applications?
Option A:	Few types of off-the-shelf software are available, thus limiting confusion.
Option B:	The software can be tried out.
Option C:	The buy option saves time.
Option D:	The company will know what it is getting.
19.	Which of the following systems acquisition methods saves the company's time, enables the company to select software that has been used for similar problems in other organizations, and allows the company to try out the software?
Option A:	Systems development life cycle
Option B:	Prototyping
Option C:	End-user development
Option D:	Buy option
20.	_____ is a method of delivering software in which a vendor hosts the applications and customers access these applications over the Internet.
Option A:	Software-as-a-Service
Option B:	Prototyping
Option C:	Leasing the application
Option D:	Service-oriented architecture

Q2 (20 Marks)	**Solve any Four out of Six 5 marks each**
A	Describe what is meant by knowledge management. What factors have led to its development
B	Explain the importance of data in today's environment with an example
C	With a neat diagram explain the various types of Information systems
D	What is the impact of information system on organization and society
E	Describe the categories of ethical issues related to information technology.
F	Identify the three major types of controls that organizations can use to protect their information resources, and provide an example of each one?

Q3 **(20 Marks)**	**Solve any Four out of Six 5 marks each**
A	Discuss why social computing is so important in customer relationship management?
B	Describe the benefits of social commerce to customers.
C	Describe the most common types of wireless devices.
D	Describe technologies that underline pervasive computing, providing examples of how businesses can utilize them?
E	Compare and contrast the three basic types of reports which are closely associated with FAIS and ERP systems.
F	Describe the four fundamental business decisions that organizations must make when acquiring information systems.

University of Mumbai

Examination 2020 under cluster 6 (Lead College: VCET)

Examinations Commencing from 23rd December 2020 to 6th January 2021 and from 7th January 2021 to 20th January 2021

Program: **ALL**

Curriculum Scheme: Rev 2016

Examination: BE Semester VII

Course Code: ILO 7013 and Course Name: Management Information System

Time: 2 hour Max. Marks: 80

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Question Number	Correct Option (Enter either 'A' or 'B' or 'C' or 'D')
Q1.	C
Q2.	A
Q3.	D
Q4	D
Q5	C
Q6	A
Q7	C
Q8.	C
Q9.	D
Q10.	A
Q11.	D
Q12.	B
Q13.	A
Q14.	D
Q15.	B
Q16.	D
Q17.	D
Q18.	A
Q19.	D
Q20.	A

University of Mumbai

Examination 2020 under cluster ALL(Lead College: VCET)

Examinations Commencing from 7th January 2021 to 20th January 2021

Program: **ALL_Institute Level Optional Course 1**

Curriculum Scheme: Rev2016

Examination: BE Semester VII

Course Code: ILO 7014 and Course Name: Design of Experiments

Time: 2 hour Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	The principle used in dealing with controllable nuisance factor is
Option A:	Analysis of covariance
Option B:	Process robustness
Option C:	Blocking
Option D:	Analysis of variance
2.	An independent repeat run of each factor combinations is called
Option A:	Randomization
Option B:	Replication
Option C:	Blocking
Option D:	Repeated measurements
3.	The study which helps one to understand the conditions under which response variables of interest change seriously is _____.
Option A:	Robustness
Option B:	Optimization
Option C:	Randomization
Option D:	replication
4.	Production design and manufacturing personnel being brought together early in the design process is called
Option A:	Robust Design
Option B:	Concurrent Engineering
Option C:	Delayed Diferentiation
Option D:	Forward Engineering
5.	Imagine we conducted a three-way independent ANOVA. How many sources of variance would we have?
Option A:	3
Option B:	7
Option C:	4
Option D:	8
6.	First the main plot treatment and sub plot treatment are usually decided based on the needed _____.
Option A:	Precision
Option B:	Accuracy
Option C:	Results

Option D:	Conclusion
7.	Which of the following statements is true?
Option A:	No more than four factors can be included in a factorial design.
Option B:	The number of factors has no bearing on the interpretation of results.
Option C:	Any number of factors can be included, but interpretation of interactions is more difficult as the number of factors increases.
Option D:	Interactions with up to ten factors can be readily interpreted.
8.	Factorial experiments_____.
Option A:	include two or more dependent variables.
Option B:	include two or more independent variables.
Option C:	focus on unmeasured factors.
Option D:	focus on organismic factors.
9.	The different treatments are allotted at random to their respective plots. Such arrangement is called _____.
Option A:	Unique design
Option B:	Random design
Option C:	Split plot design
Option D:	Parallel design
10.	The factor for which greater _____ is required is assigned to the sub plots.
Option A:	Accuracy
Option B:	Testing
Option C:	Dependance
Option D:	Precision
11.	What information is given in the factorial design notation, 2 X 3 X 2?
Option A:	The design has two independent variables, three dependent variables, and two organismic variables.
Option B:	Interactions will be found.
Option C:	The design has three independent variables, two levels of A, three levels of B, and two levels of C.
Option D:	The design has 12 independent variables.
12.	The design in which no main effects are aliased with any other main effect, or two-factor interactions but two-factor interactions are aliased with three factor interactions are called _____.
Option A:	Resolution IV design
Option B:	Resolution V design
Option C:	Resolution III design
Option D:	Resolution VI design
13.	There are 30 students in each experimental condition in a 5x4 between-groups design, how many participants would be needed in total?
Option A:	600

Option B:	20
Option C:	400
Option D:	30
14.	Designs in which more than one variable are studied simultaneously are called _____ designs.
Option A:	factorial
Option B:	sum of squares
Option C:	two tailed
Option D:	replicate
15.	Which of the following typically generate negative information about which factors do not make a difference in the quality characteristic of interest?
Option A:	sample data sets
Option B:	attribute data sets
Option C:	bad data sets
Option D:	good data sets
16.	A continuous form of data is called as-
Option A:	attribute data
Option B:	variable data
Option C:	discontinuous data
Option D:	sample data
17.	Which name is most closely associated with robust design?
Option A:	Taguchi
Option B:	Ford
Option C:	Smith
Option D:	McGinnis
18.	Which of the following is an example of Taguchi's three level design?
Option A:	L4
Option B:	L8
Option C:	L12
Option D:	L27
19.	The main difference between traditional Design of Experiments and Taguchi's Design of Experiments is -
Option A:	Taguchi's DoE considers average to be more interesting to study than the variation
Option B:	Taguchi's DoE considers statistics to study variation
Option C:	Taguchi's DoE considers attribute data to study variation
Option D:	Taguchi's DoE considers variation to be more interesting to study than the average
20.	A factor with a range of settings, that is controlled by the user during use is called as -
Option A:	random factor
Option B:	robust factor
Option C:	nominal factor

Option D:	signal factor

Q2. **(20 Marks)**	**Solve any Four out of Six** **5 marks each**
A	Write a note on: Classification of Experimental Design
B	Explain factorial design.
C	Explain in short: Randomized Complete Block Design
D	What are the general guidelines for Designing Experiments?
E	Discuss hypothesis testing.
F	Write a note on: Split Plot design

Q3. **(20 Marks)**	**Solve any Two Questions out of Three** **10 marks each**
A	Explain Taguchi's design of experiments
B	Set up an analysis of variance table for the following per acre production data for three varieties of wheat, each grown on 4 plots and state if the variety differences are significant.
C	What are the features of a desirable design when selecting a response surface design?

Plot of land	*Per acre production data*		
	Variety of wheat		
	A	*B*	*C*
1	6	5	5
2	7	5	4
3	3	3	3
4	8	7	4

University of Mumbai

Examination 2020 under cluster ALL (Lead College: VCET)

Examinations Commencing from 7th January 2021 to 20th January 2021

Program: **ALL_Institute Level Optional Course 1**

Curriculum Scheme: Rev 2016

Examination: BE Semester VII

Course Code: ILO 7014 and Course Name: Design of Experiments

Time: 2 hour Max. Marks: 80

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Question Number	Correct Option (Enter either 'A' or 'B' or 'C' or 'D')
Q1.	C
Q2.	B
Q3.	A
Q4	B
Q5	D
Q6	A
Q7	C
Q8.	B
Q9.	C
Q10.	D
Q11.	C
Q12.	C
Q13.	A
Q14.	A
Q15.	C
Q16.	B
Q17.	A
Q18.	D
Q19.	D
Q20.	D

University of Mumbai

Examination 2020 under cluster ALL (Lead College: VCET)

Examinations Commencing from 7th January 2021 to 20th January 2021

Program: **ALL_Institute Level Optional Course 1**

Curriculum Scheme: Rev2016

Examination: BE Semester VII

Course Code: ILO 7015 and Course Name: Operations Research

Time: 2 hours Max. Marks: 80

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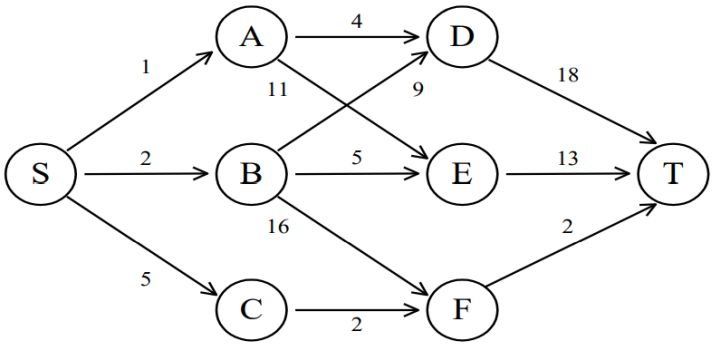
Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	At every iteration of Simplex method, for minimization problem, a Variable in the current basis is replaced with another variable that has ----
Option A:	A positive $c_j - z_j$ value
Option B:	A negative $c_j - z_j$ value
Option C:	$c_j - z_j = 0$
Option D:	Any value
2.	If there are more than one optimum solutions for the LPP then this is the case of
Option A:	Unbounded solution
Option B:	Infeasible solution
Option C:	Alternative optima
Option D:	No solution
3.	The solution of the LPP Max. $Z = 15x + 10y$ subject to the constraints $4x + 6y \leq 360$ $3x \leq 180$ $5y \leq 200$ where $x, y \geq 0$ is----------
Option A:	60, 0
Option B:	30, 40
Option C:	60, 20
Option D:	0, 40
4.	Dual of the Dual is
Option A:	Primal
Option B:	Dual
Option C:	Alternative
Option D:	Does not exist
5.	In sensitivity analysis of the coefficient of the non basic variables in cost minimization LP problem , the upper sensitivity limit is----------
Option A:	Original value + lowest positive value of improvement ratio
Option B:	Original value - lowest positive value of improvement ratio
Option C:	Positive infinity
Option D:	Negative infinity

<table>
<tr><td></td><td></td></tr>
<tr><td>6.</td><td>If the constraints of a LPP are not satisfied simultaneously then we conclude that----</td></tr>
<tr><td>Option A:</td><td>The LPP has infinitely many solutions</td></tr>
<tr><td>Option B:</td><td>The LPP has a unique solution</td></tr>
<tr><td>Option C:</td><td>The LPP has an unbounded solution</td></tr>
<tr><td>Option D:</td><td>The LPP has no solution</td></tr>
<tr><td></td><td></td></tr>
<tr><td>7.</td><td>For any Primal problem and its dual---</td></tr>
<tr><td>Option A:</td><td>Optimal value of primal is zero</td></tr>
<tr><td>Option B:</td><td>Primal will have an optimal solution if and only if dual does too</td></tr>
<tr><td>Option C:</td><td>Both primal and dual cannot be infeasible</td></tr>
<tr><td>Option D:</td><td>solution cannot be found from the same simplex table</td></tr>
<tr><td></td><td></td></tr>
<tr><td>8.</td><td>If the arrival and departure rates in a M/M/I queue are 1/2 per minute and 2/3 per minute respectively, find the average waiting time of a customer in the queue.</td></tr>
<tr><td>Option A:</td><td>5 minutes</td></tr>
<tr><td>Option B:</td><td>240 seconds</td></tr>
<tr><td>Option C:</td><td>5.5 minutes</td></tr>
<tr><td>Option D:</td><td>4.5 minutes</td></tr>
<tr><td></td><td></td></tr>
<tr><td>9.</td><td>Customers arrive at a service facility to get the required service. The inter-arrival and service time are constant and are 1.8 1nd 4 minutes respectively. Simulate the system for 14 minutes. The arrival time of customers within 14 minutes period will be:
<table>
<tr><td>Customer</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr>
<tr><td>Arrival Time (min)</td><td>0</td><td>1.8</td><td>3.6</td><td>5.4</td><td>7.2</td><td>9.0</td><td>10.8</td><td>12.6</td></tr>
</table>
Determine the average waiting time of a customer.</td></tr>
<tr><td>Option A:</td><td>3.7 mins</td></tr>
<tr><td>Option B:</td><td>3.4 mins</td></tr>
<tr><td>Option C:</td><td>4.0 mins</td></tr>
<tr><td>Option D:</td><td>3.0 mins</td></tr>
<tr><td></td><td></td></tr>
<tr><td>10.</td><td>A manual railway reservation system has 2 counters. Customers arrive to buy tickets at a mean rate of 40/hr. A person in each counter requires an average service rate of 15/hr. When both counters are busy, an arriving customer joins a single line to buy the tickets. Identify the type of queuing System.</td></tr>
<tr><td>Option A:</td><td>Single server, Infinite queue length, Finite population</td></tr>
<tr><td>Option B:</td><td>Single server, Infinite queue length, Infinite population</td></tr>
<tr><td>Option C:</td><td>Multiple server, finite queue length, Finite population</td></tr>
<tr><td>Option D:</td><td>Multiple server, Infinite queue length, Infinite population</td></tr>
<tr><td></td><td></td></tr>
<tr><td>11.</td><td>Which of the following is NOT correct?</td></tr>
<tr><td>Option A:</td><td>Basic steps in the use of simulation technique are more or less independent of the nature of the problem</td></tr>
<tr><td>Option B:</td><td>Probability simulation is like random sampling where the output is subject to statistical error</td></tr>
<tr><td>Option C:</td><td>Simulation involves developing a model of some real phenomenon and then experimenting on it</td></tr>
<tr><td>Option D:</td><td>Simulation cannot be used where mathematical techniques can be used</td></tr>
</table>

12.	When the ordering cost is increased to four times, the EOQ will be increased to
Option A:	2 times
Option B:	3 times
Option C:	8 times
Option D:	Remain same
13.	Which of the following is a property of a dynamic programming problem?
Option A:	Optimal substructure
Option B:	Non-Overlapping sub-problems
Option C:	Local Optimal choice
Option D:	The given problem can be reduced to the 3-SAT problem
14.	Which of the following problems is most suitable for a Probabilistic Dynamic problem solving method?
Option A:	Distributing medical teams to countries
Option B:	Scheduling employment levels
Option C:	Winning in Las Vegas
Option D:	Stagecoach problem
15.	What happens when Maximin and Minimax values are the same ?
Option A:	No solution exists
Option B:	Solution is mixed
Option C:	Saddle point exists
Option D:	Saddle point does not exist
16.	The size of the payoff matrix of a game can be reduced by using the principle of
Option A:	Game inversion
Option B:	Rotation reduction
Option C:	Dominance
Option D:	Game transpose
17.	The optimum strategies for each player in the case of strictly determinable games are--- Player B / Player A B1: A1 = 0, A2 = -1 B2: A1 = 2, A2 = 4
Option A:	(A1, B1)
Option B:	(A2, B1)
Option C:	(A1, B2)
Option D:	(A2, B2)
18.	An example of purchasing costs include---
Option A:	Incoming freight
Option B:	Storage costs
Option C:	Insurance
Option D:	Spoilage

19.	The order cost per order of an inventory is Rs. 400 with an annual carrying cost of Rs. 10 per unit. The Economic Order Quantity (EOQ) for an annual demand of 2000 units is-------
Option A:	440
Option B:	480
Option C:	500
Option D:	400
20.	The Economic Order Quantity (EOQ) is calculated as---- Note: D=Annual demand (units), S=Cost per order, h=Annual carrying cost per unit
Option A:	$\sqrt{\frac{(D*S)}{h}}$
Option B:	$\sqrt{\frac{(2D*S)}{h}}$
Option C:	$\sqrt{\frac{(D*S)}{3h}}$
Option D:	$\sqrt{\frac{(D*S)}{2h}}$

Q2. **(20 Marks)**	**Solve any Four out of Six** **5 marks each**
A	Find the saddle point and the best strategy for Player A and Player B. Also find the value of the game. **Player B** **Player A** B_1 B_2 B_3 A_1 15 2 3 A_2 6 5 7 A_3 -7 4 0
B	Write the dual of the following LPP Max Z $=2x_1+9x_2+11x_3$ subject to $x_1 - x_2 + x_3 \geq 3$ $-3x_1 + 2x_3 \leq 1$ $2x_1 + x_2 - 5x_3 = 1$ where $x_1, x_2, x_3 \geq 0$
C	A movie theater has two ticket counters. Customers arrive to buy tickets at a mean rate of 50/hr. A person in each counter requires an average service rate of 30/hr. When both counters are busy, an arriving customer joins a single line to buy the tickets. 1) What is the probability that there is no queue? 2) Determine the length of the queue

D	Neon lights on the ABC campus are replaced at the rate of 100 units per day. The physical plant orders the neon lights periodically. It costs $100 to initiate a purchase order. A neon light kept in storage is estimated to cost about $.02 per day. The lead time between placing and receiving an order is 12 days. Determine the Economic order Quantity (EOQ) of ordering the neon lights and associated cycle length.
E	The automobile Company manufactures around 130 cars. The daily car production varies from 126 to 134. **Production per day** | 126 | 127 | 128 | 129 | 130 | 131 | 132 | 133 | 134 **Probability** | 0.04 | 0.09 | 0.12 | 0.14 | 0.11 | 0.10 | 0.20 | 0.12 | 0.08 The finished cars transported in a lorry with an accommodating capacity of 150 cars using the following random numbers 80, 81, 76, 75, 64, 43, 18, 26, 10, 12, 65, 68, 69, 61, 57 Simulate the following 1)Average number of cars waiting in the factory 2)Average number of empty spaces in the lorry
F	Find an optimal path from S to T for the following stage coach problem using backward recursive approach 

Q3. **(20 Marks)**	**Solve (any Two) Questions out of Three** **10 marks each**
A	Solve the following L.P.P. by Simplex method Max $Z= 4x_1 + 10x_2$ subject to $2x_1+ x_2 \leq 50$ $2x_1 + 5x_2 \leq 100$ $2x_1 + 3x_2 \leq 90$ where $x_1, x_2 \geq 0$

B	A Salesman estimates that the following will be the cost on his route, visiting 5 cities as shown in the table below: **Destination** **Source** |	1	2	3	4	5
---	---	---	---	---	---
1	∞	2	5	7	1
2	6	∞	3	8	2
3	8	7	∞	4	7
4	12	4	6	∞	5
5	1	3	2	8	∞	 The salesman can visit each city only once. Determine the sequence he should follow to minimize the total distance travelled.
C	Find the optimal solution to the transportation problem using the stepping stone method. **Supply** **Demand** 					
---	---	---	---	---
4	6	8	8	**40**
6	8	6	7	**60**
5	7	6	8	**50**
20	**30**	**50**	**50**	

University of Mumbai

Examination 2020 under cluster ALL (Lead College: VCET)

Examinations Commencing from 7th January 2021 to 20th January 2021

Program: **ALL_Institute Level Optional Course 1**

Curriculum Scheme: Rev2016

Examination: BE Semester VII

Course Code: ILO 7015 and Course Name: Operations Research

Time: 2 hour Max. Marks: 40

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Question Number	Correct Option (Enter either 'A' or 'B' or 'C' or 'D')
Q1.	B
Q2.	C
Q3.	C
Q4	A
Q5	C
Q6	D
Q7	B
Q8.	D
Q9.	A
Q10.	D
Q11.	D
Q12.	A
Q13.	A
Q14.	C
Q15.	C
Q16.	C
Q17.	A
Q18.	C
Q19.	D
Q20.	B

University of Mumbai

Examination 2020 under cluster ALL (Lead College: VCET)

Examinations Commencing from 7th January 2021 to 20th January 2021

Program: **ALL_Institute Level Optional Course 1**

Curriculum Scheme: Rev2016

Examination: BE Semester VII

Course Code: ILO 7016 and Course Name: Cyber Security and Laws

Time: 2 hour Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Which of the following are wireless attacks?
Option A:	MAC Spoofing , Phishing
Option B:	Eavesdropping,, MAC Spoofing
Option C:	Phishing, Repudiation
Option D:	Eavesdropping , Non- Repudiation
2.	This attack can be deployed by infusing a malicious code in a website's comment section.
Option A:	Cross Site Request Forgery (XSRF)
Option B:	SQL injection
Option C:	HTML Scripting
Option D:	Cross Site Scripting (XSS)
3.	The Objective of Firewalls is to protect?
Option A:	Data Driven Attacks
Option B:	Unauthorized Access
Option C:	Confidentiality
Option D:	Integrity
4.	The user activities are sniff and forward this information as a background process to the attackers
Option A:	Adware
Option B:	Malware
Option C:	Spyware
Option D:	Warms
5.	It is a class of computer threat?
Option A:	Stalking
Option B:	Phishing

Option C:	DOS attacks
Option D:	Soliciting
6.	Someone posing as IT tech requests information about your computer configuration. What kind of attack is this?
Option A:	Whaling
Option B:	Social Engineering
Option C:	Insider Threat
Option D:	Phishing
7.	The Primary objective of worm is to Spread the infection from….
Option A:	computer to computer
Option B:	File to file on a computer
Option C:	Website to website
Option D:	Router to routers
8.	It is usually targeted by nature where the emails are exclusively designed to target any exact user.
Option A:	Algo-based phishing
Option B:	Vishing
Option C:	Domain Phishing
Option D:	Spear phishing
9.	In this attack, someone is repeatedly harassed to individuals or organizations using any electronics means.
Option A:	Identity theft
Option B:	Phishing
Option C:	Cyber stalking
Option D:	Bullying
10.	It is a kind of attempts by individuals to get confidential or sensitive information from a individuals to falsifying their identity?
Option A:	Identity theft scam
Option B:	Phishing scams
Option C:	Spyware scams
Option D:	Trojan horse Scam

11.	It cannot be exploited by assigning or by licensing the rights to others.
Option A:	Designs
Option B:	Patents
Option C:	Copy rights
Option D:	Trademark
12.	Which of following would not gain copyright protection?
Option A:	A DVD
Option B:	An unrecorded speech
Option C:	Written lyrics of a song
Option D:	A hand knitted jumper
13.	Which one of the following statements is true?
Option A:	The definition of an invention is set out in the Patents Act 1977.
Option B:	Copyright must be registered in order to gain protection.
Option C:	A patent must be registered in order to gain protection.
Option D:	The owner of a patent cannot sell it but can prevent others using his invention.
14.	Which one of the following is outside the scope of IT Act 2000
Option A:	Electronic message
Option B:	Electronic Evidence
Option C:	Power of Attorney with digital signature
Option D:	Electronic gift
15.	Which Act casts responsibility on body corporate to protect sensitive personal information and provide punishment for offences by companies.
Option A:	IT Act 2000
Option B:	Indian Evidence Act 1872
Option C:	Indian penal code
Option D:	IT (Amendment)Act 2008
16.	What is the proposed punishment for Cyber Terrorism in IT Act?
Option A:	10 year imprisonment
Option B:	Life Imprisonment

Option C:	5 year imprisonment
Option D:	1 Lac rupees penalty
17.	Which of the following NERC Standard provide cyber-security framework for identification and protection of critical cyber assets to support the reliable operation of BES
Option A:	CIP-001
Option B:	CIP-002
Option C:	CIP-002 through CIP-009
Option D:	CIP-003
18.	Standard CIP-002 is used for
Option A:	Critical cyber asset identification
Option B:	Electronic Security Perimeter
Option C:	Physical Security of Critical cyber assets
Option D:	Sabotage reporting
19.	Which of the following are part of key provisions of Sarbanes-Oxley Act ?
Option A:	Physical Security of Critical cyber assets
Option B:	Bulk Electric System (BES)
Option C:	Critical assets
Option D:	Corporate Responsibility for financial reports
20.	ISO 27000 was originally published in ____ as the BS 7799 by the British Standards Institute (BSI)
Option A:	1995
Option B:	1998
Option C:	2000
Option D:	2012

Q2 **(20 Marks)**	
A	**Solve any Two** **5 marks each**
i.	Explain Active and Passive Attacks with example
ii.	Explain how Appeal can be made under the IT Act 2000
iii.	Explain Key IT Requirement of GLBA/GLB
B	**Solve any One** **10 marks each**
i.	How Criminal Plan the Attack? Explain various steps

ii.	Explain E-Contracts. Discuss E-Contracts Act 1872.

Q3. **(20 Marks)**	
A	**Solve any Two** **5 marks each**
i.	Explain Bluetooth Hacking with various tools
ii.	Explain Vishing, Phishing and Smishing in Cyber Security
iii.	Explain Key IT Requirement of FISMA
B	**Solve any One** **10 marks each**
i.	Explain how Intellectual Property Laws protect the rights of the owner of the Intellectual Property
ii.	Explain Key features of Indian Information Technology Act 2000.

University of Mumbai

Examination 2020 under cluster ALL (Lead College: VCET)

Examinations Commencing from 7th January 2021 to 20th January 2021

Program: **ALL_Institute Level Optional Course 1**

Curriculum Scheme: Rev2016

Examination: BE Semester VII

Course Code: ILO 7016 and Course Name:Cyber Security and Laws

Time: 2 hour Max. Marks: 80

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Question Number	Correct Option (Enter either 'A' or 'B' or 'C' or 'D')
Q1.	B
Q2.	D
Q3.	B
Q4	C
Q5	A
Q6	B
Q7	A
Q8.	D
Q9.	C
Q10.	B
Q11.	D
Q12.	B
Q13.	C
Q14.	C
Q15.	D
Q16.	B
Q17.	C
Q18.	A
Q19.	D
Q20.	A

University of Mumbai
Examination 2020 under cluster ALL (Lead College: VCET)

Program: **ALL_Institute Level Optional Course 1**
Curriculum Scheme: Rev2016
Examination: BE Semester VII
Course Code: ILO 701**7**
Course Name: Disaster Management and Mitigation Measures
Time: 2 hour Max. Marks: 80

Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Which of the following is NOT occurred as a consequence of earthquake
Option A:	Tsunami
Option B:	Fire
Option C:	Damage to building
Option D:	Drought
2.	Which of the following is NOT the natural cause of flood .
Option A:	River bank erosion
Option B:	Poor natural drainage
Option C:	Heavy rain
Option D:	Deforestation
3.	Terrorism is a _____type of disaster
Option A:	Man made
Option B:	Natural
Option C:	Both natural and man made
Option D:	Neither natural nor man made
4.	World Health Organization (WHO) was established in
Option A:	1950
Option B:	1948
Option C:	1947
Option D:	1960
5.	Who heads NDMA, the apex body for Disaster management
Option A:	Home Minister
Option B:	Finance Minister
Option C:	Prime Minister
Option D:	Home Secretary
6.	Which of the following is a disaster mitigation strategy?
Option A:	Constructing cyclone shelters

Option B:	Giving loans from banks
Option C:	Providing cheap electricity
Option D:	Providing school uniforms to children
7.	Which of the following organization is the apex authority of disaster management in India?
Option A:	NDA
Option B:	NDMA
Option C:	CDMA
Option D:	INDR
8.	If the deficiency of a particular year's rainfall more than 50 % of normal it is termed as
Option A:	Onset of Drought
Option B:	Moderate Drought
Option C:	Severe Drought
Option D:	Simple Drought
9.	Magnitude of earthquake indicates amount of _____.
Option A:	vibrations per second
Option B:	vibrations per minute
Option C:	Oscillations
Option D:	energy released
10.	By which Act, N.I.D.M got the statutory organization status?
Option A:	National Disaster Policy Act 1999
Option B:	NDMP 2019
Option C:	Disaster Management Act 2005.
Option D:	National DM Policy 2009
11.	Amateur Radio is also known as?
Option A:	Ham radio
Option B:	Home radio
Option C:	Pocket radio
Option D:	Silent radio
12.	What are the three phases of disaster management planning?
Option A:	Preparation, Response and Recovery
Option B:	Preparation, Planning and Perception
Option C:	Evacuating, Rebuilding and Re-branding
Option D:	Planning, Evacuating and Recovery
13.	Cyclones, Heat wave , Climate change are part of _____disaster.
Option A:	The Geological Disaster
Option B:	The Hydrological Disasters
Option C:	The Meteorological Disasters
Option D:	The Chemical Disaster

14.	The Indian Tsunami Early Warning Centre (ITEWC) established at Indian National Centre for Ocean Information Sciences is located in
Option A:	Chennai
Option B:	Kochi
Option C:	Goa
Option D:	Hyderabad
15.	In _____ in 2013 cloudburst created the flash flood situation to cause heavy damage to lives and property.
Option A:	Uttarakhand
Option B:	Chennai
Option C:	Kashmir
Option D:	Karnataka
16.	When was the updated & revised National Disaster Management Plan was prepared?
Option A:	2016
Option B:	2019
Option C:	2018
Option D:	2017
17.	Which of the following is the best thing to do during heavy lightning?
Option A:	lie on the ground in an open place
Option B:	Go into a water body
Option C:	Stay indoors, away from metallic doors and windows
Option D:	Stand under a tall tree
18.	The given three actions are arranged for which step i) The planning ii) The training and iii) The supply
Option A:	The prevention step
Option B:	Recovery step
Option C:	The preparation step
Option D:	The recovery step
19.	The Vision of _____ is “To build a safer and disaster resilient India by a holistic proactive technology driven and sustainable development strategy that involves all stake holders and fasters a culture of Prevention, preparedness and Mitigation.
Option A:	N.D.R.F
Option B:	N.D.M.A
Option C:	S.D.R.F
Option D:	N.I.D.M
20.	S.D.R.F Stands for
Option A:	State Disaster Response Fund
Option B:	State Disaster Relief Fund
Option C:	State Dedicated Relief Fund
Option D:	State Dynamic Response Fund

Q2	**Solve any Four out of Six** **5 marks each**
A	State and describe the measures to prevent the global warming.
B	Define "Nuclear Disaster "and describe the effects of Nuclear disasters in India
C	What are the long term and short-term effects of disaster?
D	What are the main phases of Disaster Management?
E	Describe the importance and the methods to create public awareness in Disaster management?
F	Explain the role of Government Agencies in Relief fund raising for Disaster management.

Q3.	**Solve any Two Questions out of Three** **10 marks each**
A	Write detail note on occurrence, causes and measurement of earthquake. List out some of the major earthquakes occurred in India
B	Explain the role of NGO's in post disaster scenario and during rehabilitation.
C	State Do's and Don'ts in case of various disasters.

University of Mumbai

Examination 2020 under cluster ALL (Lead College: VCET)

Examinations Commencing from 7th January 2021 to 20th January 2021

Program: **ALL_Institute Level Optional Course 1**

Curriculum Scheme: Rev2016

Examination: BE Semester VII

Course Code: ILO 7017

Course Name: Disaster Management and Mitigation Measures

Time: 2 hour Max. Marks: 80

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Question	Correct Option (Enter either 'A' or 'B' or 'C' or 'D')
Q1.	D
Q2.	D
Q3.	A
Q4	B
Q5	C
Q6	A
Q7	B
Q8.	C
Q9.	D
Q10.	C
Q11.	A
Q12.	A
Q13.	C
Q14.	D
Q15.	A

Q16.	B
Q17.	A
Q18.	C
Q19.	B
Q20.	A

University of Mumbai

Examination 2020 under cluster ALL (Lead College:)

Examinations Commencing from 7th January 2021 to 20th January 2021

Program: **ALL_Institute Level Optional Course 1**

Curriculum Scheme: Rev2016

Examination: BE Semester VII

Course Code: ILO 7018 and Course Name: EAM

Time: 2 hour Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Energy that is available in market for definite price is known as
Option A:	Renewable energy
Option B:	Commercial energy
Option C:	Non-commercial energy
Option D:	Traditional energy
2.	As per the report "BP Statistical Review of World Energy-2014", for how many years the coal reserve in India available for energy production?
Option A:	500
Option B:	300
Option C:	100
Option D:	200
3.	Which source of energy dominates the energy production mix in India?
Option A:	Natural gas
Option B:	Coal
Option C:	Oil
Option D:	Nuclear
4.	Assisting and implementing ENCON recommendation measures and monitoring the performance are done in
Option A:	Pre Audit phase
Option B:	Audit phase
Option C:	Post Audit phase
Option D:	Pre and Audit phase
5.	The height of a column in a pump is called as
Option A:	Horizontal head
Option B:	Static head
Option C:	Multi head
Option D:	Vertical head
6.	What covers study of Variations occurring in energy costs, availability and reliability of supply of energy, energy mix, identify energy conservation technologies, retrofit for energy conservation equipment.
Option A:	Performance assessment

Option B:	Energy Audit
Option C:	Energy reliability
Option D:	Energy planning
7.	Which type of audit offers the most accurate estimate of energy savings and cost?
Option A:	Preliminary Audit
Option B:	Detailed Audit
Option C:	Overall Audit
Option D:	Secondary Audit
8.	Obtaining site drawings like building layout, steam, air distribution, electricity distribution are performed in which phase of audit?
Option A:	Post Audit phase
Option B:	Pre Audit phase
Option C:	Audit phase
Option D:	In between Pre and Post Audit phase
9.	Power factor can be improved by connecting which among these?
Option A:	Semiconductor device
Option B:	Resistors
Option C:	Inductor
Option D:	Static capacitors
10.	Fixed charge and Variable charge are dependent on what factor for HT consumer?
Option A:	Average load ,Energy consumption
Option B:	Energy consumption, Maximum Demand
Option C:	Maximum demand, Energy Consumption
Option D:	Maximum demand ,Peak load demand
11.	Energy savings potential of variable torque applications compared to constant torque application is:
Option A:	Higher
Option B:	Equal
Option C:	Lower
Option D:	Does not depend on Torque
12.	Electronic soft starters are used for motors to:
Option A:	improve the loading
Option B:	provide smooth start and stop
Option C:	achieve variable speed
Option D:	provide jerk during starting
13.	For large space lighting we prefer
Option A:	Time based control
Option B:	day light based controllers
Option C:	Localized Switching
Option D:	Photo sensors
14.	Formation of bubbles in an impeller is called
Option A:	Cavitation

Option B:	Defects
Option C:	Friction
Option D:	Heat burn
15.	If no instrument other than tachometer is available, what method you would suggest for measuring the motor load?
Option A:	Slip method
Option B:	Input power measurement method
Option C:	Line current measurement method
Option D:	Terminal voltage method
16.	In lighting performance assessment ILER stands for
Option A:	International Lighting Energy Regulation
Option B:	Indian Lighting Efficiency Regulation
Option C:	Installed Load Efficacy Ratio
Option D:	Interior Lighting Energy Ratio
17.	To have lighting performance assessment satisfactory to good, ILER value must be
Option A:	0.75 and above
Option B:	0.5 and less
Option C:	between 0.25 to 0.5
Option D:	below 0.25
18.	Which LEED rating system requires durability?
Option A:	LEED for Schools
Option B:	LEED for Commercial Interiors
Option C:	LEED for Homes
Option D:	LEED for Existing Buildings: Operation and Maintenance
19.	Photovoltaic cell converts solar energy into
Option A:	Heat energy
Option B:	Electric energy
Option C:	Mechanical energy
Option D:	Chemical energy
20.	Which insulation material is used for high temperatures
Option A:	Magnesia
Option B:	Polyurethane
Option C:	Expanded Polystyrene
Option D:	Calcium Silicate

Q2	
A	**Solve any Two** **5 marks each**
i.	Explain any FIVE special features of green building.
ii.	Explain advantages of power factor improvement.
iii.	A pump is filling water in to a rectangular overhead tank of 5 m x 4 m with a height of 8 m. The inlet pipe to the tank is located at height of 20 m above ground. Pump suction : 3 m below pump level Overhead tank overflow line : 7.5 m from the bottom of the tank Power drawn by motor : 5.5 kW Motor efficiency η : 92% Time taken by the pump to fill the overhead tank up to overflow level : 180 minutes. Find the pump efficiency.
B	**Solve any One** **10 marks each**
i.	What is the need of energy audit and explain types of energy audit.
ii.	Describe General fuel economy measures in furnaces

Q3	
A	**Solve any Two** **5 marks each**
i.	Explain Benchmarking and its types.
ii.	A 7.5 kW, 415 V, 15 A, 970 RPM, 3 phase rated induction motor with full load efficiency of 86 % draws 7.5 A and 3.23 kW of input power. Find the percentage loading of the motor.
iii.	Explain what is thermal insulations and its benefits.
B	**Solve any One** **10 marks each**
i.	Describe energy saving opportunities in water pumps.
ii.	Explain energy conservation opportunities in lighting controls.

University of Mumbai

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Examinations Commencing from 7th January 2021 to 20th January 2021

Program: **ALL_Institute Level Optional Course 1**

Curriculum Scheme: Rev2016

Examination: BE Semester VII

Course Code: ILO 7018 and Course Name: EAM_

Time: 2 hour Max. Marks: 80

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Question Number	Correct Option (Enter either 'A' or 'B' or 'C' or 'D')
Q1.	B
Q2.	C
Q3.	B
Q4	C
Q5	B
Q6	B
Q7	B
Q8.	B
Q9.	D
Q10.	C
Q11.	A
Q12.	B
Q13.	C
Q14.	A
Q15.	A
Q16.	C
Q17.	A
Q18.	C
Q19.	B
Q20.	D

University of Mumbai

Examination 2020 under cluster ALL(Lead College: VCET)

Examinations Commencing from 7th January 2021 to 20th January 2021

Program: **ALL_Institute Level Optional Course 1**

Curriculum Scheme: Rev2016

Examination: BE Semester VII

Course Code: ILO 7019 and Course Name: Development Engineering

Time: 2 hour Max. Marks: 80

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0701_R16_ALL_VII_ILO7019_QP1

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Which of the following was the first committee on Panchayati raj in India
Option A:	Balwant Rai Mehta
Option B:	Ashok Mehta
Option C:	L.M.Singhvi
Option D:	S. Mohinder Singh
2.	When is National Panchayati Day celebrated
Option A:	23rd December
Option B:	1st June
Option C:	24th April
Option D:	15th September
3.	73rd amendment gave practical shape to which article of the constitution
Option A:	Article 14
Option B:	Article 32
Option C:	Article 40
Option D:	Article 51
4.	The multi-dimensional poverty index is a measure developed by the
Option A:	UNCTAD
Option B:	World Bank
Option C:	International Monetary Fund IMF
Option D:	Oxford poverty and human development initiative , OPHDI , and the UNDP
5.	Which of the following system is established on the basis of direct election
Option A:	Gram Panchayat
Option B:	Block Committee
Option C:	Zila Parishad
Option D:	District
6.	Engagement of local people in development project refers to
Option A:	Economic development
Option B:	Socila development
Option C:	Participatory development
Option D:	Sustainable development

7.	Panchayats are constituted for
Option A:	four years
Option B:	five years
Option C:	six years
Option D:	three years
8.	Bread labour means
Option A:	To earn one's livelihood by engaging in manual labour
Option B:	Hard physical labour
Option C:	Labour for making bread
Option D:	Engaging in agriculture
9.	The Human Development Index ranks the countries based on their performance in the key areas of (1) health, (2) sex-ratio, (3)education (4) access to resources
Option A:	1,2,3
Option B:	2,3,4
Option C:	1,3,4
Option D:	1,2,4
10.	Which one of the following is not a correct statement ?
Option A:	Growth is quantitative and value neutral
Option B:	Development means a qualitative change which is always value positive
Option C:	Positive growth and development refer to changes over a period of time
Option D:	Both growth and development refer to changes over a period of time.
11.	Which of the following elements must always be in the mind of the engineer while performing his duties vis-à-vis Ethics (1)public safety, (2) economy, (3) health, (4) welfare
Option A:	1,2,3
Option B:	1,2,3,4
Option C:	1,4
Option D:	1,3,4
12.	According to Gandhi, ' Enjoy the wealth by renouncing it'is the essence of
Option A:	Trusteeship
Option B:	Sarvodaya
Option C:	Swaraj
Option D:	Ramarajya
13.	The term that refers to principles, values, beliefs that define right or wrong behaviour is
Option A:	Customer satisfaction
Option B:	Innovation
Option C:	Ethics
Option D:	Empowerment
14.	In which five year plan the Panchayat Raj System was introduced in India for the first time
Option A:	First

Option B:	Second
Option C:	Fifth
Option D:	Sixth
15.	Which of the following is an appropriate general principle with regard to engineering ethics
Option A:	The engineer shall regard his duty to the public welfare as paramount to all other obligations
Option B:	The engineer shall regard his duty to the objectives of the company as paramount to all other obligations
Option C:	The engineer shall regard his duty to the Profession of engineering as paramount to all other obligations
Option D:	The engineer shall regard his duty to his excellence as paramount to all other obligations
16.	Those individuals who raise ethical concerns to others inside or outside the organisation are called
Option A:	Entrepreneur
Option B:	Whistle blower
Option C:	Social entrepreneur
Option D:	Social impact management
17.	Which of the following is not a key intervention to improve governance
Option A:	Facilitating independent and inclusive journalism
Option B:	Capacity building of government officials
Option C:	Advocacy for policy design and implementation
Option D:	Employment for all
18.	Which of the following is not in the 11^{th} schedule of subjects
Option A:	Fisheries industry
Option B:	Safe drinking water
Option C:	Markets and fairs
Option D:	Large irrigation projects
19.	The following is not a stated objective of Self Help Groups
Option A:	Provide employment to the members
Option B:	Create awareness about rights
Option C:	Foster a sense of community
Option D:	Entrepreneurship development
20.	Those individuals who raise ethical concerns to others inside or outside the organisation are called
Option A:	Entrepreneur
Option B:	Whistle blower
Option C:	Social entrepreneur
Option D:	Social impact management

Q2	Solve any Four out of Six 5 marks each
A	Explain the provisions of the 74th amendment
B	What is the scope of information and communication technology in rural India
C	Define ethics and ethical dilemma
D	What are the important components of Green Revolution
E	What are the various steps taken for inclusion of women and the members of the reserved category in decision making
F	Why was there a need to set up rural co-operatives

Q3	Solve any Four out of Six 5 marks each
A	Briefly discuss the various rural development schemes in India
B	What is the importance of ethical conduct in business
C	Human Development Index is a barometer of a nation's progress- Comment on this while giving specific examples to prove your point
D	What are self help groups (SHG)? Explain their significance in rural development
E	Discuss any 2 initiatives of the Government of India towards urban development
F	What are the functions of Panchayat Samiti

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Curriculum Scheme: Rev2016

Examination: BE Semester VII

Course Code: ILO 7019 and Course Name: Development engineering

Time: 2 hour Max. Marks: 80

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0701_R16_ALL_VII_ILO7019_AK1

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Question Number	Correct Option (Enter either 'A' or 'B' or 'C' or 'D')
Q1.	A
Q2.	C
Q3.	C
Q4	D
Q5	A
Q6	C
Q7	B
Q8.	A
Q9.	C
Q10.	C
Q11.	D
Q12.	A
Q13.	C
Q14.	B
Q15.	A
Q16.	B
Q17.	D
Q18.	D
Q19.	A
Q20.	B