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Examinations Summer 2022

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Examinations Summer 2022

Program: Electronics and Telecommunication Engineering

Curriculum Scheme: Rev2019

Examination: Third Year Semester VI

Course Code: ECC 601 and Course Name: E and A

QUESTION BANK

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	Coulomb law is employed in
Option A:	Electrostatics
Option B:	Magnetostatics
Option C:	Electromagnetics
Option D:	Maxwell theory
2.	The electric field intensity is defined as
Option A:	Product of force and work done
Option B:	Force on a test charge
Option C:	Force per unit charge on a test charge
Option D:	Product of force and charge
3.	The Poynting vector is the power component that is calculated by the
Option A:	Product of E and H
Option B:	Ratio of E and H
Option C:	Dot product of E and H
Option D:	Cross product of E and H
4.	In the conversion of line integral of H into surface integral, which theorem is used?
Option A:	Green theorem
Option B:	Gauss theorem
Option C:	Stokes theorem
Option D:	It cannot be converted
5.	A charge Q is enclosed by a Gaussian spherical surface of radius R. If R is doubled then the outward flux is
Option A:	Doubled
Option B:	Increased four times
Option C:	Reduces to quarter
Option D:	Remains unaltered
6.	The ratio of the transverse electric field to the transverse magnetic field is called as
Option A:	waveguide impedance
Option B:	waveguide wavelength
Option C:	phase velocity
Option D:	Poynting vector

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7.	The tangential component of electric field intensity at the boundary of separation of the medium for a dielectric- dielectric interface will be
Option A:	Same
Option B:	Different
Option C:	Negative
Option D:	Inverse
8.	Ampere law states that,
Option A:	Divergence of H is same as the flux
Option B:	Curl of D is same as the current
Option C:	Divergence of E is zero
Option D:	Curl of H is same as the current density
Q9.	Continuity equation is also called as the law of conservation of
Option A:	Mass
Option B:	Energy
Option C:	Charge
Option D:	Power
10.	An electromagnetic field can exist if it satisfies
Option A:	Gauss's law
Option B:	Faraday's law
Option C:	Coulomb's law
Option D:	All Maxwell's equations
11.	The value of $\int H \cdot dL$ will be
Option A:	J
Option B:	I
Option C:	B
Option D:	H
12.	The electric flux density is the
Option A:	Product of permittivity and electric field intensity
Option B:	Product of number of flux lines and permittivity
Option C:	Product of permeability and electric field intensity
Option D:	Product of number of flux lines and permeability
13.	Biot Savart law in magnetic field is analogous to which law in electric field?
Option A:	Gauss law
Option B:	Faraday law
Option C:	Coulomb's law
Option D:	Ampere law
14.	Electromagnetic waves are transverse in nature due to
Option A:	Reflection
Option B:	Diffraction
Option C:	Interference

Option D:	Polarization
15.	In free space, the Poisson equation becomes
Option A:	Maxwell equation
Option B:	Ampere equation
Option C:	Laplace equation
Option D:	Steady state equation
16.	Antenna is a _____ element
Option A:	Active
Option B:	Passive
Option C:	Resistive
Option D:	Capacitive
17.	For a monopole antenna over an infinite ground plane, the directivity is _____ and input impedance is _____, as compared to a $\lambda/2$ -dipole antenna.
Option A:	Twice, Twice
Option B:	Twice, Half
Option C:	Half, Half
Option D:	Half, Twice
18.	Steradian is a measurement unit of-----
Option A:	Point angle
Option B:	Linear angle
Option C:	Plane angle
Option D:	Solid angle
19.	An antenna has a field pattern $E(\theta) = \cos \theta \cos 2\theta$. The first null beam width of the antenna is:
Option A:	45°
Option B:	90°
Option C:	180°
Option D:	120°
20.	For end-fire array, the progressive phase shift should be
Option A:	zero
Option B:	infinite
Option C:	finite
Option D:	$-\beta d$
21.	If the length of elements of an array is greater than $\lambda/2$, which will be the operating region of an array?
Option A:	transmission line region
Option B:	active region
Option C:	reflective region
Option D:	reactive region
22.	What does the beam width of an antenna tell us?

Option A:	Signal strength
Option B:	Signal power
Option C:	Directivity
Option D:	Degradation
23.	In broadside array, all the elements in the array should have similar _____ excitation along with similar amplitude excitation for maximum radiation.
Option A:	Phase
Option B:	Frequency
Option C:	Current
Option D:	Voltage
24.	A helical antenna is used for satellite tracking because of its
Option A:	circular polarization
Option B:	high gain
Option C:	broad bandwidth
Option D:	good front-to-back ratio
25.	What is the half power beam width for a half wave dipole antenna?
Option A:	78°
Option B:	180°
Option C:	50°
Option D:	250°
26.	Design a dipole antenna at 0.7 GHz of diameter 4mm. The approximate length in cm is
Option A:	10
Option B:	20
Option C:	30
Option D:	40
27.	A circular loop antenna has a diameter of 1.5λ has directivity of
Option A:	3.18
Option B:	6
Option C:	10
Option D:	1.5
28.	Horn is treated as a/an _____ antenna.
Option A:	linear
Option B:	planar
Option C:	aperture
Option D:	array
29.	Duct propagation is useful
Option A:	To create shadow zones
Option B:	To lower the frequency

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Option C:	To lower the distance of transmission
Option D:	To reduce the effect of curvature of the earth.
30.	The directivity for a paraboloid reflector whose aperture diameter is 6λ
Option A:	230
Option B:	400
Option C:	1.5
Option D:	6
31.	A log periodic antenna is a
Option A:	Frequency independent antenna
Option B:	Frequency dependent antenna
Option C:	Directional antenna
Option D:	Dipole Antenna
32.	The waves that travel within the substrates of microstrip antennas are called
Option A:	space waves
Option B:	surface waves
Option C:	transverse electric waves
Option D:	transverse magnetic waves
33.	If the maximum electron density for F-layer in ionosphere is 4×10^6 electrons/cm ³ , then what will be the critical frequency of EM wave for F-layer?
Option A:	4 MHz
Option B:	9 MHz
Option C:	18 MHz
Option D:	25 MHz
34.	Which antennas are renowned as patch antennas especially adopted for space craft applications?
Option A:	Aperture
Option B:	Microstrip
Option C:	Array
Option D:	Lens
35.	The half power beam width for a paraboloid reflector whose aperture diameter is 6λ
Option A:	0.11°
Option B:	60°
Option C:	23°
Option D:	11.66°
36.	Which antenna is used for direction finding
Option A:	Loop antenna
Option B:	Folded dipole
Option C:	Yagi- Uda antenna
Option D:	Horn Antenna

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37.	For square corner reflector the flaring angle is.....
Option A:	30 degrees
Option B:	60 degrees
Option C:	90 degrees
Option D:	180 degrees
38.	The far field is indicated by the presence of
Option A:	r term
Option B:	1/r term
Option C:	1/r ² term
Option D:	1/r ³ term
39.	For avoiding ground losses, better is the surface conductivity, less is the
Option A:	Attenuation
Option B:	Phase velocity
Option C:	Propagation constant
Option D:	Tilt angle
40.	Ground wave propagation is useful for
Option A:	Microwave
Option B:	Medium Wave
Option C:	Short wave
Option D:	Long distance

Questions	
A	5 marks each
1	State and explain Gauss's Law.
2	Derive continuity equation.
3	Derive Faraday's law with suitable application
4	Explain Coulomb's law.
5	Explain the concept of potential gradient and the relation between electric field and potential.
6	$\vec{E} = E_m \sin(\omega t - \beta z) \vec{a}_y$ in free space. Find \vec{D} , \vec{B} , \vec{H} , displacement current density.
7	$\vec{D} = z r \cos^2 \varphi \vec{a}_z$. Calculate the charge density at $(1, \pi/4, 3)$. Also find the total charge enclosed by the cylinder of radius 1m with $-2 \leq z \leq 2$ m.
8	A circular loop located on $x^2 + y^2 = 9$, $z=0$ carries a direct current of 10 A along \vec{a}_φ . Determine \vec{H} at $(0,0,4)$ and $(0,0,-4)$
9	Describe five controls of array antenna.
10	Explain Loop antenna. Write its applications.
11	Write short note on near field and far field radiation.
12	Explain the cassegrain feed of reflector antenna.
13	A parabolic antenna with a circular aperture is to have a power gain of 1000 at $\lambda =$

	10 cm. find the diameter of the mouth and the half power beamwidth of the antenna.
14	Define Radiation pattern, radiation intensity, Beamwidth, Radiation resistance
15	Define Directivity and Gain. And relation between directivity and Gain.
16	Explain different reflector antennas
17	Write short note on sky wave propagation.
18	Define Critical frequency, Virtual height, Maximum usable frequency.
19	Write short note on ground wave propagation.
20	Write short note on duct propagation.
B	10 marks each
21	Derive Maxwell's equation for time varying fields in point and integral form and explain its significance.
22	State Poynting theorem. Derive mathematical expression for Poynting theorem and explain the meaning of each term.
23	Derive boundary conditions for electrostatics and magnetostatics.
24	In free space, $V = 6xy^2z + 8$. Find electric field intensity \mathbf{E} and volume charge density ρ_v at point P (1, 2, -5).
25	In nonmagnetic medium $\vec{E} = 4 \sin(2\pi * 10^7 t - 0.8x) \vec{a}_z$ v/m. Find ϵ_r , η , time average power carried by the wave, total power crossing 100 cm^2 of plane $2x+y = 5$.
26	Derive an expression for E-field and H-field and radiation resistance of infinitesimal dipole.
27	Derive Friss transmission formula. State its significance in wireless communication. A radio link has 15 W transmitter connected to an antenna of 2.5 m^2 effective aperture at 5 GHz. The receiving antenna has an effective aperture of 0.5 m^2 and is located at a 15 km line of sight distance from the transmitting antenna. Assuming lossless, matched antennas, find the power delivered to the receiver.
28	Design a rectangular microstrip antenna at 2.4 GHz on a substrate with dielectric constant 4.4 and substrate thickness 1.6 mm.
29	Explain how antenna radiates and also explain near field and far field of antenna.
30	Draw current distribution and radiation pattern of 0.1λ , 0.5λ , λ , 3λ of simple dipole antenna.
31	Compare Half wave dipole, short dipole and infinitesimal dipole. Compare Half wave dipole and folded dipole and monopole antenna.
32	Explain Dipole and monopole antenna and design Dipole and monopole at 700MHz.
33	Explain pattern multiplication and differentiate between broadside and endfire array.
34	Find the radiation pattern of an array of 2 isotropic point sources fed with same amplitude and phase and placed $\lambda/2$ apart.
35	What are the characteristics, advantages and disadvantages and applications of microstrip antennas. Discuss feeding mechanism of microstrip antennas.
36	Explain Horn antenna in detail. The pyramidal horn antenna is designed at 1GHz with the dimensions $A=50\text{cm}$, $B=40\text{cm}$. Efficiency=70%, calculate the gain of the horn.
37	Explain the Cassegrain feed of reflector antenna. A parabolic antenna with a

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	circular aperture is to have a power gain of 1000 at $\lambda = 10$ cm. find the diameter of the mouth and the half power beamwidth of the antenna.
38	Explain Yagi -Uda antenna and log periodic in detail.
39	Explain Helical antenna in detail.
40	Describe formation of ionised layer in the ionosphere and describe their importance in the radio communication.

Question Number	Correct Option (Enter either 'A' or 'B' or 'C' or 'D')
Q1.	A
Q2.	C
Q3.	D
Q4	C
Q5	D
Q6	A
Q7	A
Q8.	D
Q9.	C
Q10.	D
Q11.	B
Q12.	A
Q13.	C
Q14.	D
Q15.	C
Q16.	B
Q17.	B
Q18.	D
Q19.	B
Q20.	D
Q21.	C
Q22.	C
Q23.	A
Q24.	A
Q25.	A
Q26.	B

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Q27.	A
Q28.	C
Q29.	D
Q30.	A
Q31.	A
Q32.	B
Q33.	C
Q34.	B
Q35.	D
Q36.	A
Q37.	C
Q38.	B
Q39.	A
Q40.	B

Question Number	Correct Option (Enter either 'A' or 'B' or 'C' or 'D')
Q1.	A
Q2.	C
Q3.	D
Q4.	C
Q5.	D
Q6.	A
Q7.	A
Q8.	D
Q9.	C
Q10.	D
Q11.	B
Q12.	A
Q13.	C
Q14.	D
Q15.	C
Q16.	B
Q17.	B
Q18.	D
Q19.	B
Q20.	D
Q21.	C
Q22.	C
Q23.	A
Q24.	A
Q25.	A
Q26.	B

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Program: Electronics and Telecommunication Engineering

Curriculum Scheme: Rev2019

Examination: Third Year Semester VI

Course Code: ECC 602 and Course Name: Computer Communication Network

QUESTION BANK

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	RJ-45 UTP Cable has Cables.
Option A:	5 pair
Option B:	4 pair
Option C:	2 pair
Option D:	3 pair
2.	Which OSI layer allows the transmission and reception of data segments to a session layer in addition to the provision of flow control, sequence numbering and message acknowledgment?
Option A:	Network Layer
Option B:	Session Layer
Option C:	Transport Layer
Option D:	Application Layer
3.	A Link Control Protocol (LCP) is used for
Option A:	Establishing, configuring and testing the data-link connection
Option B:	Establishing and configuring different network-layer protocols
Option C:	Testing the different network-layer protocols
Option D:	Provides for multiplexing of different network-layer protocols
4.	Which transport layer protocol is used by DHCP?
Option A:	RSVP
Option B:	TCP
Option C:	DCCP
Option D:	UDP
5.	TCP groups a number of bytes together into a packet called
Option A:	Packet
Option B:	Buffer
Option C:	Segment
Option D:	Stack
6.	When 2 or more bits in a data unit has been changed during the transmission, the error is called.....
Option A:	random error
Option B:	burst error
Option C:	inverted error
Option D:	double error
7.	The computation of the shortest path in OSPF is usually done by.....
Option A:	Bellman-ford algorithm

Option B:	Routing information protocol
Option C:	Dijkstra's algorithm
Option D:	Distance vector routing
8.	Connection establishment in TCP is done by which mechanism?
Option A:	Flow control
Option B:	Three-Way Handshaking
Option C:	Forwarding
Option D:	Synchronization
9.	In IPv4 header format, the header size is?
Option A:	20 to 60 bytes
Option B:	20 bytes
Option C:	60 bytes
Option D:	Depends on the MTU
10.	If you wanted to have 12 subnets with a Class C network ID, which subnet mask would you use?
Option A:	255.255.255.252
Option B:	255.255.255.255
Option C:	255.255.255.240
Option D:	255.255.255.248
11.	Which transmission media are widely used in the backbone of networks?
Option A:	Unshielded Twisted Pair (UTP)
Option B:	Shielded Twisted Pair (STP)
Option C:	Optical Fiber
Option D:	Wireless
12.	In Go-Back-N ARQ, if 5 is the number of bits for the sequence number, then the maximum size of the receive window must be.....
Option A:	1
Option B:	16
Option C:	15
Option D:	31
13.	Protocols in which the desire to transmit is broadcast before the actual transmission are called as
Option A:	Reservation Protocol
Option B:	Aloha Protocol
Option C:	Bit Map protocol
Option D:	TCP Protocol
14.	Find the class of address 14.23.120.8.
Option A:	Class B
Option B:	Class C
Option C:	Class A
Option D:	Class D
15.	HTTP is _____ protocol.
Option A:	Application Layer

Option B:	Transport Layer
Option C:	Network Layer
Option D:	Data Link Layer
16.	_____ allows you to connect and login to a remote computer
Option A:	TELNET
Option B:	FTP
Option C:	HTTP
Option D:	SMTP
17.	Bytes of data being transferred in each connection are numbered by TCP. These numbers start with a
Option A:	Fixed number
Option B:	Zero
Option C:	One
Option D:	Randomly generated number
18.	Which of the following control fields in TCP header is used to specify whether the sender has no more data to transmit?
Option A:	FIN
Option B:	RST
Option C:	SYN
Option D:	PSH
19.	In which technique station transmits with a probability of 1 when it finds the channel idle.
Option A:	1 persistent
Option B:	P persistent
Option C:	Non persistent
Option D:	K persistent
20.	Which of the following routing algorithms cannot be used for network layer design?
Option A:	Shortest path algorithm
Option B:	Distance vector routing
Option C:	Link state routing
Option D:	Error-correction protocol
21.	TCP packet is encapsulated in a.....
Option A:	UDP Datagram
Option B:	IP Datagram
Option C:	TCP Segment
Option D:	Frame
22.	Encryption and Decryption are the functions of the following layer of OSI mode
Option A:	Transport
Option B:	Session
Option C:	Data link layer
Option D:	Presentation
23.	Header size of the ICMP message is _____

Option A:	8-bytes
Option B:	8-bits
Option C:	16-bytes
Option D:	16-bits
24.	Which of the following file transfer protocols use TCP and establishes two virtual circuits between the local and remote server?
Option A:	FTP
Option B:	TFTP
Option C:	TELNET
Option D:	NFS
25.	Typically the TCP port used by SMTP is _____
Option A:	25
Option B:	35
Option C:	50
Option D:	15
26.	By using which of the following gives us constant time delay?
Option A:	FDM Technique
Option B:	WDM Technique
Option C:	Synchronous TDM Technique
Option D:	CDM Technique
27.	Frame relay has error detection at the _____
Option A:	physical layer
Option B:	data link layer
Option C:	network layer
Option D:	Transport layer
28.	The number of layers in ISO OSI reference model is _____
Option A:	5
Option B:	7
Option C:	6
Option D:	10
29.	In Byte stuffing a special byte is added to the data section of frame when there is a character with the same pattern as the
Option A:	Flag
Option B:	Error
Option C:	Sender
Option D:	Destination
30.	In HDLC protocol , the frames sent by the secondary station are called
Option A:	commands
Option B:	responses
Option C:	data
Option D:	inputs
31.	Which multiple access technique is used by IEEE 802.11 standard for wireless LAN?
Option A:	CDMA
Option B:	CSMA/CA
Option C:	ALOHA
Option D:	CSMA/CD

32.	What are the common protocols associated with the network layer?
Option A:	Address Resolution Protocol
Option B:	Reverse Address Resolution Protocol
Option C:	Internet protocol
Option D:	Neighbour Discovery Protocol
33.	Connection establishment in TCP is done by which mechanism?
Option A:	Flow control
Option B:	Three-Way Handshaking
Option C:	Forwarding
Option D:	Synchronization
34.	Following is not the function of the MAC sublayer :
Option A:	Control of access to media
Option B:	Unique addressing to the stations directly connected to LAN
Option C:	Error Detection
Option D:	Flow control operation
35.	Which of this is not a guided media?
Option A:	Fiber optical cable
Option B:	Coaxial cable
Option C:	Wireless LAN
Option D:	Copper wire
36.	The TCP segment begins with a _____ fixed format header.
Option A:	16 byte
Option B:	20 byte
Option C:	32 byte
Option D:	64 byte
37.	TCP process may not write and read data at the same speed, So we need _____ for storage.
Option A:	Packets
Option B:	Buffers
Option C:	Segments
Option D:	Stacks
38.	Which of the following tasks is not done by data link layer?
Option A:	Framing
Option B:	Error Control
Option C:	Flow Control
Option D:	Channel Coding
39.	The frame type that refers to High-level Data Link Control error detection field is
Option A:	Frame check sequence field
Option B:	Control field
Option C:	flag field
Option D:	Information field
40.	_____ work at the network layer of the OSI model.
Option A:	Bridges
Option B:	Hubs
Option C:	Routers

Option D:	Gateways

Questions	
A	5 marks each
1	Explain the persistent strategies of CSMA.
2	What is data transparency? How it can be overcome using bit stuffing.
3	An organization is granted the block 211.17.180.0/24. The administrator wants to create 32 subnets. i) Find the subnet mask. ii) Find the number of addresses in each subnet. iii) Find the first and last address in subnet 1. iv) Find the first and last addresses in subnet 32.
4	Explain Connection establishment in TCP using three way handshaking.
5	a) The following is a dump of a TCP header in hexadecimal format : 05320017 00000001 00000000 500207FF 00000000 i) What is the source port number? ii) What is the destination port number? iii) What is the length of the header? iv) What is the type of segment? What is the window size?
6	Compare between distance vector routing and link state routing.
7	Compare between Packet switching and Circuit Switching.
8	Explain the fields related to fragmentation in IP datagram.
9	Which is better, ADSL or Cable? Justify your answer.
10	Explain the features of TCP.
11	Draw the IPV4 header.
12	Explain Selective repeat ARQ protocol.
13	Differentiate between Bus Topology and Ring Topology.
14	Explain the functions of Data Link Layer.
15	Write a short note on slotted ALOHA.
16	Compare Twisted pair cable, Coaxial cable and Fiber optical cable.
17	Write a short note on Bit Stuffing framing method.
18	Explain the TCP/IP model.
19	Explain Stop and Wait protocol for error free channel.
20	The following is a dump of a UDP header in hexadecimal format. CB8400D001C001C a. What is the source port number? b. What is the destination port number? c. What is the total length of the user datagram? d. What is the length of the data? Is the packet directed from a client to a server or vice versa?
21	Write a short note on Adaptive tree walk Protocol
22	Write a short note on CSMA/CD.
23	A group of N stations share 100 Kbps slotted ALOHA channel. Each station output a 500 bits frame on an average of 5000 ms even if previous one has not been sent. What is the required value of N?.
B	10 marks each

24	An ISP is granted a block of addresses starting with 150.80.0.0/16. The ISP wants to distribute these blocks to 2400 customers as follows: i) the first group has 400 small businesses: each needs approximately 16 addresses ii) the second group has 2000 households: each needs 4 addresses Design the sub blocks and give the slash notation for each sub block. Find out how many addresses are still available after these allocations
25	Explain DHCP on the same and the different networks
26	Explain the various types of frames in HDLC.
27	Explain the OSI-RM model and functions of each layer.
28	Explain Go-Back-N ARQ and Selective Repeat ARQ.
29	Explain the different error reporting messages in ICMP with message format.
30	Explain in detail the physical media used for computer communication.
31	Explain Congestion control in TCP.
32	Explain TELNET and SSH
33	Explain in brief DSL and HFC.
34	Explain the Transition States of TCP with neat diagram.
35	Draw IPv4 Header, and explain the meaning of various fields associated with it.
36	What are the Hardware network devices? Explain any four in details.
37	Explain Distance Vector Routing Algorithm.
38	Explain the classful addresses of IPV4 with net-id and host-id
39	Explain the concept of sending an E-mail using an appropriate application layer protocol.
40	Explain the transition states of DHCP with a neat diagram.

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

Q18.	A
Q19.	A
Q20.	D
Q21.	B
Q22.	D
Q23.	A
Q24.	A
Q25.	A
Q26.	C
Q27.	A
Q28.	B
Q29.	A
Q30.	B
Q31.	B
Q32.	C
Q33.	B
Q34.	B
Q35.	C
Q36.	B
Q37.	B
Q38.	C
Q39.	A
Q40.	A

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Program: Electronic & Telecommunication Engineering
SEM-VI (C Scheme) (R2019)

Subject: IPMV

Course Code: ECC603

Time: 2hour 30 minutes

Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	Which is not a color model
Option A:	HIS
Option B:	RGB
Option C:	RCB
Option D:	CMYK
2.	Haar Transformation is defined by
Option A:	T=HFT
Option B:	T=HFH
Option C:	T=HFHT
Option D:	T=HT
3.	Image can be sharpened using
Option A:	contouring
Option B:	High Pass Filter
Option C:	Erosion
Option D:	Low pass filter
4.	Noise reduction can be obtained by blurring the image using smoothing filter
Option A:	False
Option B:	True
Option C:	Maybe
Option D:	Can't say
5.	Hit and miss transformation is used for shape
Option A:	compression
Option B:	decompression
Option C:	detection
Option D:	removal
6.	Opening and closing are each other
Option A:	Duals
Option B:	Centers
Option C:	Corners
Option D:	Neighbors
7.	Dilation Process makes images
Option A:	thinner
Option B:	Thickened
Option C:	sharpened
Option D:	shrunked
8.	_____ is process of partition the digital image in to multiple regions
Option A:	transform

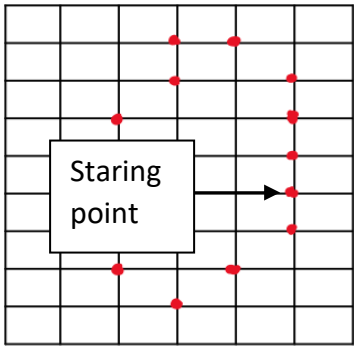
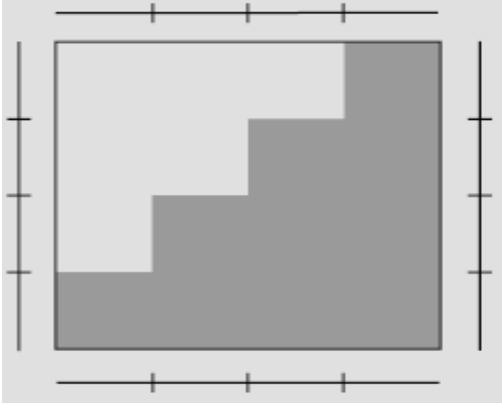
Option B:	splitting
Option C:	filling
Option D:	merging
9.	_____ is the position of sign change of the first derivative among neighboring points
Option A:	point
Option B:	line
Option C:	edge
Option D:	zero-crossing
10.	Canny edge detection algorithm is based on
Option A:	Step edge
Option B:	Real model
Option C:	smoothing model
Option D:	ideal model
11.	_____ is the starting pixel of region growing process.
Option A:	image
Option B:	base pixel
Option C:	original pixel
Option D:	seed pixel
12.	Which of the following of a boundary is defined as the line perpendicular to the major axis?
Option A:	Minor axis
Option B:	Equidistant axis
Option C:	Equilateral axis
Option D:	Median axis
13.	The effectiveness of an SVM depends upon:
Option A:	Selection of Kernel
Option B:	Kernel Parameters
Option C:	Soft Margin Parameter C
Option D:	Selection of Kernel, Kernel Parameters and Soft Margin Parameter C
14.	Which of the following is the useful descriptor of a boundary, whose value is given by the ratio of length of the major axis to the minor axis?
Option A:	Eccentricity
Option B:	Perimeter
Option C:	Area
Option D:	Radius
15.	The order of shape number for a closed boundary is:
Option A:	Even
Option B:	Odd
Option C:	1
Option D:	Any positive value
16.	The term, Curvature is defined as:
Option A:	Rate of change of area
Option B:	Rate of change of diameter
Option C:	Slope
Option D:	Rate of change of slope
17.	In 4-neighbours of a pixel p, how far are each of the neighbours located from p?
Option A:	one pixel apart

Option B:	Two pixels apart
Option C:	Four pixels apart
Option D:	Alternate pixels apart
18.	Discrete cosine transform (DCT) applied to predict error on
Option A:	2x2 pixels
Option B:	4x4 pixels
Option C:	8x8 pixels
Option D:	3x3 pixels
19.	DTFT is the representation of
Option A:	Periodic continuous signals
Option B:	Aperiodic continuous signals
Option C:	Aperiodic Discrete time signals
Option D:	Periodic Discrete time signals
Q20.	Which of the following is a second-order derivative operator
Option A:	Spatial
Option B:	Gaussian
Option C:	Histogram
Option D:	Laplacian
Q21.	Spatial domain refers to
Option A:	Manipulations on whole image
Option B:	Direct manipulation of image pixel
Option C:	Modifications on Fourier transform of an image
Option D:	Contrast shrinking
Q22.	Gray level enhancement improves
Option A:	Contrast stretching
Option B:	Bandwidth
Option C:	Gamma Factor
Option D:	Resolution
Q23.	What is the name of the filter that multiplies two functions $F(u, v)$ and $H(u, v)$, where F has complex components too since is Fourier transformed function of $f(x, y)$, in an order that each component of H multiplies both real and complex part of corresponding component in F ?
Option A:	Unsharp mask filter
Option B:	High-boost filter
Option C:	Zero-phase-shift-filter
Option D:	High pass filter
Q24.	Histogram Equalisation also called as?
Option A:	Histogram Matching
Option B:	Image Enhancement
Option C:	Histogram linearization
Option D:	None of the Mentioned
Q25.	Purpose of restoration is to gain
Option A:	Degraded image
Option B:	Original image
Option C:	Pixels
Option D:	Coordinated
26.	Degraded image is given in a

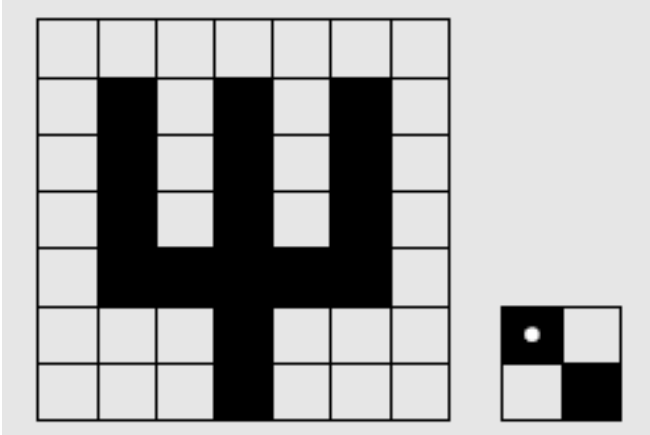
Option A:	Frequency domain
Option B:	Time domain
Option C:	Spatial domain
Option D:	Plane
27.	Degraded image is produced using degradation process and
Option A:	Additive noise
Option B:	Destruction
Option C:	Pixels
Option D:	Coordinates
28.	Segmentation is usually not perfect due to number of factors such as
Option A:	Noise, Bad illumination
Option B:	Object Contain several regions
Option C:	Due to boundary-filling
Option D:	Due to closed contour
29.	Laplacian is a
Option A:	First order derivative filter
Option B:	Sobel operator
Option C:	Canny operator
Option D:	Second order derivative filter
30.	Dilation followed by erosion is called as
Option A:	Opening
Option B:	Closing
Option C:	Burring
Option D:	Translation
31.	For point detection we use
Option A:	Second derivative
Option B:	First Derivative
Option C:	Third Derivative
Option D:	Fourth Derivative
32.	Thresholding gives the
Option A:	Binary Image
Option B:	Large Image
Option C:	Grayscale Image
Option D:	Color Image
33.	If the standard deviation of pixels is positive, then the sub image is labelled as
Option A:	Red
Option B:	White
Option C:	Green
Option D:	Black
34.	Which of the following is process of partition the digital image in to multiple regions
Option A:	Merging
Option B:	Filling
Option C:	Transform
Option D:	Splitting
35.	Which of the following of a boundary is defined as the line perpendicular to the major axis?
Option A:	Equidistant axis

Option B:	Equilateral axis
Option C:	Median axis
Option D:	Minor axis
36.	Erosion also known as
Option A:	Shrinking
Option B:	Growing
Option C:	Convolution
Option D:	integration
37.	If the boundary is traversed in the clockwise direction, a vertex point 'p' is said to be a part of the convex segment if the rate of change of slope at 'p' is:
Option A:	Positive
Option B:	Negative
Option C:	Zero
Option D:	Non-negative
38.	Erosion also known as
Option A:	Shrinking
Option B:	Growing
Option C:	Convolution
Option D:	integration
39.	What is the order of the shape number of a rectangular boundary with the dimensions of 3×3?
Option A:	2
Option B:	6
Option C:	12
Option D:	9
40.	In object recognition, the sensed object properties are called as _____
Option A:	Patterns
Option B:	Classes
Option C:	Labels
Option D:	Objects

Sr. No.	Q.1 or Q2 or Q3	5 marks each
1	Explain Unsharp Masking and High-boost Filtering,	
2	Explain different color models.	
3	Explain Histogram equalization and Histogram Specification	
4	Explain Sobel, Prewitt and Roberts operators for sharpening image.	
5	Explain 2-D DFT.	
6	Explain 2-D DFT application in frequency domain filtering	
7	Explain Boundary extraction , Hole filling, Thinning and thickening	
8	Explain Model of the Image Degradation/Restoration Process	
9	Explain removal of periodic noise and inverse filtering	
10	Compare Ideal, Butterworth and gaussian filtering	
11	Find chain code and shape number 8-connectivity. Use anticlockwise direction.	

	
12	List different knowledge representation methods..
13	<p>Show the segmentation of the image shown in Fig using split-and-merge technique.</p> 
14	Explain Ideal, Butterworth and Gaussian filter.
15	Explain Wavelet transform.
16	Explain Model of the Image Restoration Process and Removal of periodic noise
17	Explain Thinning and thickening and inverse filtering.
18	Explain edge linking.
19	Explain thresholding.
20	Explain principle of machine vision.

Sr. No.	Q.1 or Q2 or Q3	10 marks each																		
1	Explain different point processing techniques.																			
2	Explain average and median/ Order-Statistic Filters with example.																			
3	Explain wavelet and Haar transform.																			
4	Explain erosion, dilation and Hit and Miss transform,																			
5	Determine median value of marked pixels using 3 x 3 mask For pixels 128 24 172 and 26 (in second row) [18 22 33 25 32 34; 34 128 24 172 26 23; 22 19 32 31 28 26																			
6	Calculate histogram equalization for	<table border="1" data-bbox="518 1877 1264 2020"> <tr> <td>Gray level r</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> </tr> <tr> <td>No. of pixels with</td> <td>200</td> <td>170</td> <td>130</td> <td>50</td> <td>70</td> <td>80</td> <td>140</td> <td>160</td> </tr> </table>	Gray level r	0	1	2	3	4	5	6	7	No. of pixels with	200	170	130	50	70	80	140	160
Gray level r	0	1	2	3	4	5	6	7												
No. of pixels with	200	170	130	50	70	80	140	160												

		gray level n_r									
7	Explain Canny edge detection.										
8	Explain Laplacian of Gaussian method for edge detection.										
9	Explain region growing and region splitting and merging.										
10	Explain Image Segmentation using the Second Derivative-The Laplacian.										
11	Explain boundary detection using polygonal method.										
12	Explain various boundary descriptors.										
13	Explain Fourier transform of boundaries.										
14	Explain Boundary description using segment sequences										
15	Explain K-means algorithm.										
16	Explain Bayesian Classifiers and its types.										
17	Explain SVM.										
18	Explain Confusion matrix and co-occurrence matrix with example.										
19	Explain classifier settings and learning										
20	<p>Determine opening and closing for</p> 										

Sr. No.	Q=QUESTION question_description A=ANSWER answer_description	question_type answer_isright
1	Q Sigmoidal functions are:	M
	A Hard limiting activation functions	0
	A Soft limiting activation functions	1
	A Hard-Soft limiting activation functions	0
	A Soft-Hard limiting activation functions	0
2	Q In relationship between biological and artificial neurons: Cell represents	M
	A interconnection	0
	A Weight	0
	A Output	0
	A Neuron	1
3	Q In relationship between biological and artificial neurons: Axon represents	M
	A Neuron	0
	A Output	1
	A weight	0
	A Interconnection	0
4	Q Weights in MP Neuron model can take values:	M
	A 0 and 1	0
	A 1 and -1	1
	A 1 and 0	0
	A -1 and -1	0
5	Q Symptoms of overfitting are:	M
	A Low bias, High variance	1
	A Low bias, Low variance	0
	A High bias, Low variance	0
	A High bias, High variance	0
6	Q Symptoms of underfitting are:	M
	A High bias, High variance	1
	A Low bias, Low variance	0
	A Low bias, High variance	0
	A High bias, Low variance	0
7	Q Epoch represents:	M
	A Iteration	1
	A Presenting one input to ANN	0
	A Presenting some inputs to ANN	0
	A Presenting all inputs to ANN multiple times	0
8	Q _____ can be used to process non-linear dataset.	M
	A Perceptron – Multilayer	1
	A Perceptron - Single Layer	0
	A MP Neuron	0
	A Artificial Neuron	0
9	Q Mexican Hat Net is a:	M
	A negative net competitive network	0
	A Fix net competitive network	1
	A variable net competitive network	0
	A positive net competitive network	0
10	Q In hopfield model, when a unit is selected at random and its new state is computed, it is	M
	A synchronous update	0

A	asynchronous update	1
A	synchronously asynchronous update	0
A	asynchronously synchronous update	0
11 Q	In Hopfield model, when all units are updated simultaneously, it is	M
A	synchronous update	1
A	asynchronous update	0
A	synchronously asynchronous update	0
A	asynchronously synchronous update	0
12 Q	K means is _____ algorithm.	M
A	Classification	0
A	association rule	0
A	clustering	1
A	neural network	0
13 Q	K means algorithm is _____	M
A	unsupervised	1
A	supervised	0
A	reinforcement and supervised	0
A	reinforcement	0
14 Q	What will not be a descriptor if distance is input variable?	M
A	Distance	1
A	Long Distance	0
A	Short Distance	0
A	Medium Distance	0
15 Q	Which is the last step, when applying fuzzy controller to any system?	M
A	fuzzification	0
A	database creation	0
A	defuzzification	1
A	rule base creation	0
	In home heating system, if the temperature is cool. Then cool descriptor of temperature represents use of linguistic variable is used can be represented by	
16 Q	_____	M
A	Crisp Set	0
A	Fuzzy Set	1
A	Binary Set	0
A	Real value set	0
17 Q	A and B are fuzzy sets then, following expression shows Commutative property	M
A	$A \cup B = B \cup A$	1
A	$A \cup B = B \cap A$	0
A	$A \cap B = A \cup B$	0
A	$A \cap B = B \cup A$	0
18 Q	Algebraic product of fuzzy sets A and B is equal to:	M
A	$\text{Min}(1, \mu_A(x) * \mu_B(x))$	0
A	$\mu_A(x) * \mu_B(x)$	1
A	$\text{Max}(1, \mu_A(x) * \mu_B(x))$	0
A	$\text{Min}(0, \mu_A(x) * \mu_B(x))$	0
19 Q	Bounded sum of fuzzy sets A and B is equal to:	M
A	$\mu_A(x) + \mu_B(x)$	0
A	$\text{Max}(1, \mu_A(x) + \mu_B(x))$	0
A	$\text{Min}(1, \mu_A(x) + \mu_B(x))$	1
A	$\text{Min}(0, \mu_A(x) + \mu_B(x))$	0

20 Q	Crosspoint of a fuzzy set has membership value:	M
A	between 0 and 1	0
A	0	0
A	0.5	1
A	1	0
21 Q	Defuzzification method converts:	M
A	fuzzy values to crisp values	1
A	crisp values to fuzzy values	0
A	fuzzy value to two-valued fuzzy	0
A	crisp values to binary valued fuzzy	0
22 Q	Core point of fuzzy set has membership value equal to	M
A	between 0.5 and 1	0
A	0.5	0
A	between 0 and 0.5	0
A	1	1
23 Q	OCR full form	M
A	Optical character recognition	1
A	Operational character recognition	0
A	Optical characteristics recognition	0
A	Optical character redesign	0
24 Q	Number of attributes in a dataset is number of _____ in the input layer of neural network.	M
A	Layers	0
A	Hidden layers	0
A	Output layers	0
A	Neurons	1
25 Q	Number of tuples in a dataset is number of _____ in neural network training.	M
A	steps in one epoch	1
A	Neurons	0
A	Layers	0
A	epochs	0
26 Q	$\theta \geq nw-p$ is the condition of _____ algorithm	M
A	Perceptron network	0
A	M-P Neuron	1
A	Back propagation	0
A	Linear separability	0
27 Q	The function shown below is _____ $f(x)=1$ if $x \geq \theta$ and $f(x)=-1$ if $x < \theta$	M
A	Binary sigmoidal function	0
A	Bipolar sigmoidal function	0
A	Ramp function	0
A	Bipolar step function	1
28 Q	$f'(x) = 1/(1+e^{-\lambda x})$ is _____ activation function	M
A	Bipolar Continuous function	0
A	Unipolar Continuous function	1
A	Bipolar step function	0
A	Unipolar step function	0

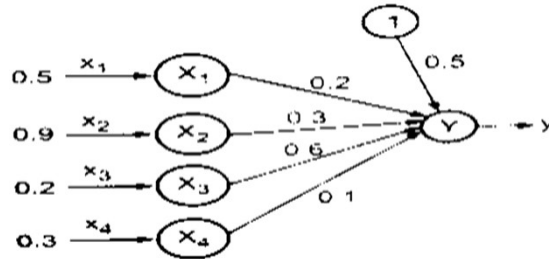
	When output is forwarded from inputs to outputs then it results in the	
29 Q	formation of _____	M
A	Feedback neural networks	0
A	Feed forward neural network	1
A	recurrent neural networks	0
A	back propagated neural network	0
30 Q	$f'(net) = 1/2 * (1 - O^2)$ is _____ activation function	M
A	Bipolar Continuous function	1
A	Unipolar Continuous function	0
A	Ramp function	0
A	Bipolar step function	0
31 Q	Is Training dataset bigger than testing dataset?	M
A	Yes	1
A	No	0
A	They are equal	0
A	Testing data is same as training data.	0
32 Q	Perceptron is _____ learning algorithm.	M
A	supervised	1
A	Reinforcement	0
A	unsupervised	0
A	none of the above	0
33 Q	Error back propagation is _____ learning algorithm.	M
A	supervised	1
A	Reinforcement	0
A	unsupervised	0
A	none of the above	0
34 Q	Radial Basis Function (RBF) neural network hidden layer has a:	M
A	linear RBF activation function	0
A	non-linear RBF activation function	1
A	linear and non-linear RBF activation function	0
A	step activation function	0
35 Q	Radial Basis Function (RBF) neural network is	M
A	Single layer neural network	0
A	Multilayer neural network	1
A	organizing map neural network	0
A	competitive neural network	0
36 Q	Support vector machine is _____ algorithm.	M
A	Classification	1
A	clustering	0
A	neural network	0
A	association rule	0
37 Q	In support vector machine value of $y_i(wtx_i + b)$ is always	M
A	1	0
A	>1	0
A	>=1	1
A	<1	0
38 Q	Kohonen self organizing map is _____ learning	M
A	reinforcement	1
A	unsupervised	0
A	supervised	0
A	reinforcement and supervised	0

39 Q	In train break control system, the rule is formed as, IF distance is VERY CLOSE and speed is VERY SLOW then braking is LIGHT. In above rule 'distance' is:	M
A	Input variable	1
A	descriptor	0
A	Output variable	0
A	action	0
40 Q	In train break control system, the rule is formed as, IF distance is VERY CLOSE and speed is VERY SLOW then braking is LIGHT. In above rule 'braking' is:	M
A	Input variable	0
A	descriptor	0
A	Output variable	1
A	action	0
41 Q	In train break control system, the rule is formed as, IF distance is VERY CLOSE and speed is VERY SLOW then braking is LIGHT. In above rule VERY SLOW is:	M
A	Input variable	0
A	descriptor	1
A	output variable	0
A	action	0
42 Q	When a fuzzy increasing membership function is specified by a and b then, value of membership = 0 if	M
A	$x \leq a$	1
A	$x \geq a$	0
A	$x > a$	0
A	$a < x < b$	0
43 Q	Following is not a defuzzification method:	M
A	centre of largest area	0
A	centre of smallest area	1
A	centre of area	0
A	Max-membership principle	0
44 Q	Fuzzy logic is a form of	M
A	Two-valued logic	0
A	Crisp set logic	0
A	Many-valued logic	1
A	Binary set logic	0
45 Q	Which of the following fuzzification method defined on universe of angles	M
A	Induction reasoning	0
A	Intuition	0
A	angular fuzzy sets	1
A	Inference	0
46 Q	What is the first and last step of Fuzzy Inference System:	M
A	fuzzification, defuzzification	1
A	rule base, decision making	0
A	data base, decision making	0
A	rule base, database	0
47 Q	Which are the components of Knowledge base in Fuzzy Inference System:	M
A	fuzzification, defuzzification	0
A	rule base, decision making	0

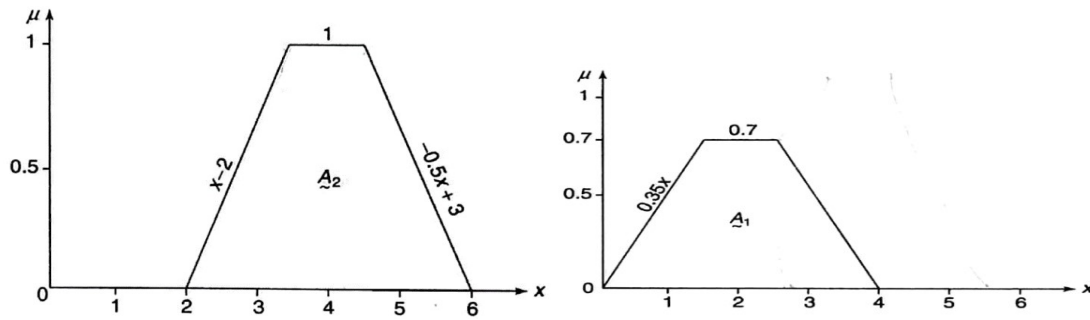
A	data base, decision making	0
A	rule base, database	1
48 Q	Automated vehicle is an example of _____	M
A	Supervised learning	1
A	Unsupervised learning	0
A	Active learning	0
A	Reinforcement learning	0
49 Q	The recalled output in pattern association problem depends on?	M
A	nature of input-output	0
A	design of network	0
A	input & design	0
A	nature of input-output & design of network	1
	What is the effect of dimensionality increase of tuples in a dataset on linear separability?	
50 Q		M
A	increases	1
A	decreases	0
A	no effect	0
A	doesn't depend on dimensionality	0

Mark

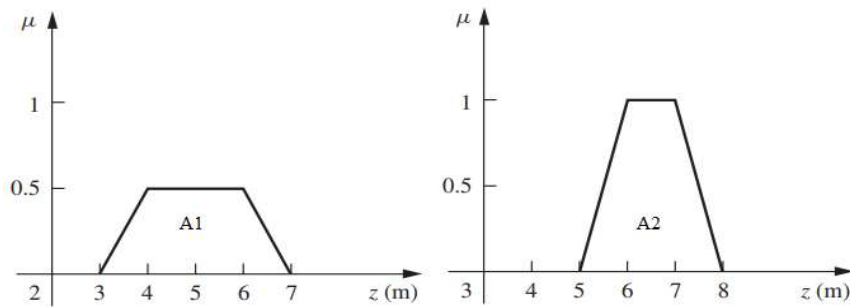
- 1 a) Draw and explain McCulloch Pitts neuron architecture. [5]
- 2 b) Explain linearly separable and linearly non-separable with example. [5]
- 3 c) For the network shown in figure calculate the net output using activation function: [5]
 - i) binary sigmoidal
 - ii) bipolar sigmoidal



- 4 d) List and explain various types of activation functions. [5]
- 5 a) Implement AND function using perceptron network for bipolar inputs and targets. [10]
- 6 b) Implement OR function with binary inputs and bipolar targets using perceptron training algo for 3 epochs. [10]
- 7 c) Explain gradient descent algorithm [5]
- 8 d) Explain error back propagation algorithm. [5]
- 9 a) Classify the four vectors into two clusters using Kohonen self-organizing map: (0 0 1 1), (1 0 0 0), (0 1 1 0), (0 0 0 1). Assume learning rate as 0.5. Assume initial weights to be [0.2, 0.4, 0.6, 0.8; 0.9, 0.7 0.5 0.3]T [10]
- 10 b) Explain in detail the discrete Hopfield network. [10]
- 11 c) Find the weight matrix required to store the vectors [1, 1, -1, -1], [-1, 1, 1, -1], [-1, 1, -1, 1] into W1, W2, W3 respectively. Calculate the total weight matrix to store all the vector. Let the matrix be with no self-connections. [5]
- 12 d) Explain K-means clustering. [5]
- 13 a) List and explain types of learning. Also list a few applications of Machine Learning. [5]
- 14 b) What is Inner-Product Kernel? [5]
- 15 c) Short Note: Least Mean Square Algorithm [5]
- 16 d) What are limitations and benefit of the LSM Algorithm? [5]
- 17 a) Explain CNN architecture. [10]
- 18 b) Discuss rectified linear unit and its advantages. [10]
- 19 c) Difference between machine learning and deep learning. [5]
- 20 d) Explain convolutional network. [5]
- 21 a) For the given membership function as shown in figures below, determine the defuzzified output value by seven methods. [10]



- 22 b) For the given problem as shown in figure below, determine defuzzified output by using weighted average method, center of sums and mean max membership methods. A1 has the membership value 0.5 and A2 has the membership value 1. [10]



- 23 a) Given two fuzzy sets A and B, find out algebraic sum, algebraic product, bounded sum and bounded product. [5]
 $A = \{0.2/1 + 0.3/2 + 0.1/3 + 0.5/4 + 0.8/5 + 0.4/6 + 0.7/7\}$
 $B = \{0.1/1 + 0.8/2 + 0.6/3 + 0.4/4 + 0.7/5 + 0.1/6 + 0.9/7\}$
- 24 a) For a speed control of DC motor, the membership function of series resistance, armature current and speed are given as follows: [5]
 Compute relation T for relating series resistance to motor speed, i.e., Rse to N.
 Perform max-min composition only.

$$\tilde{R}_{sc} = \left\{ \frac{0.4}{30} + \frac{0.6}{60} + \frac{1.0}{100} + \frac{0.1}{120} \right\} \text{ wei}$$

$$\tilde{I}_a = \left\{ \frac{0.2}{20} + \frac{0.3}{40} + \frac{0.6}{60} + \frac{0.8}{80} + \frac{1.0}{100} + \frac{0.2}{120} \right\}$$

$$\tilde{N} = \left\{ \frac{0.35}{500} + \frac{0.67}{1000} + \frac{0.97}{1500} + \frac{0.25}{1800} \right\} \text{ ped}$$

25

[5]

6. Implement OR function with bipolar inputs and targets using Adaline network.

26 Implement AND function using perceptron network for bipolar inputs and targets. [10]

27 Implement OR function with binary inputs and bipolar targets using perceptron training algorithm upto 3 epochs [10]

28 Find the weights using perceptron network for ANDNOT function when all the inputs are presented only one time. Use bipolar inputs and targets. [5]

29 Define classical sets and fuzzy sets. [5]

30 Discuss in detail the operations and properties of fuzzy sets. [10]

31 Compare and contrast classical logic and fuzzy logic [10]

32 Give details on membership value assignments using inductive reasoning. [5]

33 Describe how neural network is used to obtain fuzzy membership functions. [10]

34 Write short note on fuzzification. [10]

35 Define an artificial neural network. [5]

36 Differentiate between supervised and unsupervised learning. [5]

37 Which of the seven methods of the defuzzification technique is the best? [10]

38 How is a fuzzy relation converted into a crisp relation using lambda-cut process? [10]

39 State the necessity of defuzzification process. [5]

40 Explain in detail the methods employed for converting fuzzy form into crisp form. [5]

University of Mumbai

Examinations Summer 2022

Examination: Third Year Semester VI

Course Code: **ECCDLO6014** and Course Name: **DBMS**

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Q1.	_____ is a set of one or more attributes taken collectively to uniquely identify a record.
Option A:	Primary key
Option B:	Super key
Option C:	Foreign key
Option D:	Candidate key
Q2.	Data independence means
Option A:	Data is defined separately and not included in programs
Option B:	Data and programs are maintained in separate files
Option C:	Is the capacity to change the schema at one level of a database system without having to change the schema at the next higher level
Option D:	Data is defined separately and included in programs
Q3.	A relational database developer refers to a record as
Option A:	A criteria
Option B:	A relation
Option C:	A tuple
Option D:	An attribute
Q4.	Key to represent relations between tables is called
Option A:	Super key
Option B:	Foreign key
Option C:	Primary key
Option D:	Secondary key
Q5.	A logical schema
Option A:	is the entire database
Option B:	is the standard way of organizing information into accessible parts
Option C:	Describes how data is actually stored on disk.
Option D:	Is the Entire Data base as well as the standard way of organizing information into accessible parts.
Q6.	E-R model uses this symbol to represent weak entity set?
Option A:	Dotted rectangle
Option B:	Diamond
Option C:	Doubly outlined rectangle
Option D:	Dotted square
Q7.	What is an Instance of a Database?
Option A:	The logical design of the database system
Option B:	The entire set of attributes of the Database put together in a single relation
Option C:	The state of the database system at any given point of time
Option D:	The initial values inserted into the Database immediately after its creation

Q8.	Relational Algebra is
Option A:	Data Definition Language
Option B:	Meta Language
Option C:	Procedural query Language
Option D:	High level Language
Q9.	_____ refers to the correctness and completeness of the data in a database
Option A:	Data security
Option B:	Data integrity
Option C:	Data constraint
Option D:	Data independence
Q10.	Every attribute has some predefined value scope that is called
Option A:	Tuple
Option B:	Tables
Option C:	Attribute domain
Option D:	Relation schema
Q11.	_____ produces the relation that has attributes of R1 and R2.
Option A:	Cartesian product
Option B:	Difference
Option C:	Intersection
Option D:	Product
Q12.	Which is not advantage of concurrent execution
Option A:	Improved throughput
Option B:	Reduced waiting time
Option C:	Less storage space required
Option D:	Resource utilization
Q13.	A transaction completes its execution is said to be
Option A:	Saved
Option B:	Loaded
Option C:	Rolled
Option D:	Committed
Q14.	Which of the following is not an Aggregate function?
Option A:	Min
Option B:	Max
Option C:	Select
Option D:	Avg
Q15.	A type of query that is placed within a WHERE or HAVING clause of another query called
Option A:	Super query
Option B:	Sub query
Option C:	Master query
Option D:	Multi-query
Q16.	What is ACID properties of Transactions?

Option A:	Atomicity, Consistency, Isolation, Database
Option B:	Atomicity, Consistency, Isolation, Durability
Option C:	Atomicity, Consistency, Inconsistent, Durability
Option D:	Automatically, Consistency, Isolation, Durability
Q17.	The attribute that can be divided into other attributes is called
Option A:	Simple Attribute
Option B:	Composite Attribute
Option C:	Multi-valued Attribute
Option D:	Derived Attribute
Q18.	Count function in SQL returns the number of
Option A:	Values
Option B:	Columns
Option C:	Groups
Option D:	Distinct values
Q19.	A relation that has zero partial dependencies is in which normal form
Option A:	First
Option B:	Second
Option C:	Third
Option D:	BCNF
Q20.	In SQL, which of the following is not a data manipulation Language commands?
Option A:	DELETE
Option B:	SELECT
Option C:	UPDATE
Option D:	CREATE
Q21.	A data manipulation command that combines the records from one or more tables is called
Option A:	SELECT
Option B:	PROJECT
Option C:	JOIN
Option D:	PRODUCT
Q22.	Consider the following schema Employee(Eno, Ename, deptNo) Department(deptNo, deptName) Find the correct query to find the name of the employees working in the research department
Option A:	Select Ename from Employee, Department where Employee.deptNo=Department.deptNo and deptName='Research'
Option B:	Select Ename from Employee where Department.deptName='Research'
Option C:	Select Ename from Employee where deptName='Research'
Option D:	Select Ename from Employee where deptName='Acedemic'
Q23.	Employee(person_name,street, city) Works(person_name, company_name, salary) Company(company_name, city) Manages(person_name, manager_name) Consider the relational database given above where primary key is in bold letters.

	Give an expression in the relational algebra to express each of the following queries: 1. Find the names of the employees who work for First Bank Corporation.
Option A:	$\Pi_{person_name} (\sigma_{comapny_name="FirstBankCorporation"} (works))$
Option B:	$\sigma_{person_name} (\Pi_{comapny_name="FirstBankCorporation"} (works))$
Option C:	$(\sigma_{comapny_name="FirstBankCorporation"} (works))$
Option D:	$\Pi_{comapny_name="FirstBankCorporation"} (works)$
Q24.	The different events in Triggers are
Option A:	Define, Create
Option B:	Drop, Comment
Option C:	Insert, Update, Delete
Option D:	Select, Commit
Q25.	An attribute of a table cannot hold multiple values is the property of
Option A:	First Normal form (1NF)
Option B:	Second normal form (2NF)
Option C:	Third normal form(3NF)
Option D:	Fourth normal form (4NF)
Q26.	DDL and DML statements are compiled and executed by
Option A:	query processor
Option B:	storage manager
Option C:	transaction manager
Option D:	data model
Q27.	SELECT * FROM employees WHERE department_id IN(1, 2, 5) AND salary > 20000; Which values would cause the logical condition to return TRUE?
Option A:	Department_ID=1 and salary=20000
Option B:	Department_ID=5 and salary=20000
Option C:	Department_ID=null and salary=20001
Option D:	Department_ID=2 and salary=20001
Q28.	Consider the following query Select AVG(mark) From student Where subject_id='EC703' Which one of the following values will returned by the above query if marks values in EC703 are 90, 60 and NULL?
Option A:	75
Option B:	50
Option C:	Null
Option D:	Not defined
Q29.	Consider the following relation with given functional dependencies as, R(ABCDEFGH)

	AB→C , BD→EF, AD→G, A→H Find the candidate keys of the relation.
Option A:	ABD
Option B:	AB and BD
Option C:	ACD
Option D:	AD and CD
Q30.	Which of the following normal form removes the transitive dependency between the non key attributes and candidate key?
Option A:	1NF
Option B:	2NF
Option C:	3NF
Option D:	BCNF
Q31.	The attribute AGE is calculated from DATE_OF_BIRTH. The attribute AGE is Called as
Option A:	key valued
Option B:	Multi valued
Option C:	Composite
Option D:	Derived
Q32.	Which of the following is not a transaction state?
Option A:	Partially committed
Option B:	Aborted
Option C:	End
Option D:	committed
Q33.	Which of the following lock will be obtained by transaction then it can read but cannot write on the data item
Option A:	Shared mode
Option B:	Exclusive mode
Option C:	Read only mode
Option D:	Write only mode
Q34.	To hold transactions consistent, the database includes
Option A:	Commit
Option B:	Atomic
Option C:	Flashback
Option D:	Retain
Q35.	To remove a relation from an SQL database, we use the _____ command.
Option A:	Delete
Option B:	Purge
Option C:	Remove
Option D:	Drop table
Q36.	This Set operator combine the results of two or more SELECT statements without removing duplication
Option A:	Union
Option B:	Union all
Option C:	Intersect

Option D:	Minus
Q37.	SQL Views are also known as
Option A:	Complex tables
Option B:	Simple tables
Option C:	Virtual tables
Option D:	Actual Tables
Q38.	A functional dependency is a relationship between or among
Option A:	Entities
Option B:	Rows
Option C:	Attributes
Option D:	Tables
Q39.	The ___ graph describes deadlocks precisely
Option A:	Wound wait graph
Option B:	Wait die graph
Option C:	Wait for graph
Option D:	Wait wait graph
Q40.	A _____ of the transactions can be obtained by finding a linear order consistent with the partial order of the precedence graph.
Option A:	Serializability order
Option B:	Direction graph
Option C:	Precedence graph
Option D:	Scheduling scheme

5 marks questions

1. Discuss advantages of DBMS over traditional file management system.
- 2 Explain the importance of UML diagram.
- 3 Explain different types of data base users.
- 4 Define Data Base Administrator. Discuss role of DBA.
- 5 What do you understand by the concurrent execution of the transactions? Mention any two advantages of concurrency.
- 6 Explain building blocks of DATA Model.
- 7 Explain data abstraction in brief.
- 8 Explain evaluation of data model.
- 9 Explain different types of attributes with example
- 10 Explain components of ER model.
- 11 Define following terms i) super key ii) candidate key iii) primary key iv) foreign key
- 12 Explain specialization and generalization in detail with suitable example

- 13 Explain weak entity with example.
- 14 Explain Domain relational calculus.
- 15 Describe trigger with example.
- 16 Explain ACID properties of transaction
- 17 Explain database recovery management in brief.
- 18 Explain Tuple relational calculus database recovery management in brief.
- 19 Explain constraints in SQL
- 20 What do you understand by schedule? Give an example of serializable schedule.

10 marks questions

1 Explain following types of attributes with an example.

- i) Single Valued ii) Multi Valued iii) Composite iv) Derived

2 Construct ER diagram and convert it into relational model for company which has several Employees working on different types of projects. Several Employees are working on one department. Department associated with many projects. Every Employee has a manager. Several employees are supervised by one employee.

Consider the necessary attributes of each entity.

3 We require to develop an information management system that supports some of the services involved in an Online Bookstore (e.g., Amazon.com). The Book store has registered customers in order to sell books. It also contains publishers' information and a customer can place the book he desires to buy on a shopping basket.

- A customer has an email, name, phone and address.
- A book has an ISBN, year, title and price.
- Publisher has a name, address, phone and url and publishes several books, but one book can be published by one publisher.
- An author has a name and address and can write several books.
- Books can be written by only one author and they are stored on many warehouses and one warehouse has many books.
- A customer can have several shopping baskets

Each shopping basket belongs to one customer, where each shopping basket can contain several books.

4 Explain following relational algebra operations with suitable example

- i) Project ii) Select iii) Union iv) Cartesian Product

5 What do you understand by joins? Explain following terms with example.

- i) Natural join ii) left outer join iii) right outer join iv) full outer join

6 Define Normalization. Explain 1NF, 2NF, 3NF and BCNF with example.

7 Consider the following relations

Sailors (sid, sname, rating, age)

Boats (bid, bname, color)

Reserves (sid, bid, day)

Write the following queries in SQL

- i) Find the name and ages of all the sailors
- ii) Find all sailors with rating above 7
- iii) Find the names of sailors who have reserved at least one boat
- iv) Find the name and age of the oldest sailor (nested query)
- v) Find the sid of sailors who have reserved a red boat

8 Explain data definition language and data manipulation language.

9 Draw the state diagram of transaction. Discuss every step in brief with an example.

10 Explain conflict serializability and view serializability with example

11 Define deadlock. Explain deadlock detection, prevention and recovery.

12 Explain the following with suitable example.

- 1) Time stamp-based concurrency protocol and
- 2) 2 PL based concurrency protocol.

13 Consider the following schedule S

T_1	T_2	T_3
	R(X)	
	W(X)	
		R(X)
	R(Y)	
	W(Y)	
	COMMIT	
R(X)		
		W(X)
		COMMIT
W(X)		
COMMIT		

R(X) denotes read operation on data X and W(X) denotes write operation on data X. Determine whether the schedule is recoverable or cascadeless.

14 What do you mean by conflict serializable schedule? Use the given schedule and determine whether it is conflict serializable?

T1	T2
Read(A)	
Write(A)	
	Read(A)
	Write(A)
Read(B)	
Write(B)	

	Read(B)
	Write(B)

15 Consider the following database:

Product (maker, model, type)

PC (model, speed, ram, hd, price)

Laptop (model, speed, ram, hd, screen, price)

Printer (model, color, type, price)

The Product relation gives the manufacturer, model number and type (PC, laptop, or printer) of various products. We assume for convenience that model numbers are unique over all manufacturers The PC relation gives for each model number that is a PC the speed (of the processor, in gigahertz), the amount of RAM (in megabytes), the size of the hard disk (in gigabytes), and the price.

Write SQL queries for the following (any FIVE)

1. Find the model number, speed and hard drive capacity for all the PCs with prices below \$500
2. Find the makers of PCs with a processor speed of 450 MHz or more
3. Find out the average speed of the PCs produced by maker A
4. Find the makers producing at least three distinct models of PCs. Result set: maker, number of PC models
5. Get the laptop models that have a speed smaller than the speed of any PC. Result set: type, model, speed.
6. Find the model number and maker of the lowest priced PC that has 64MB or more memory

16 Write short note on Log based recovery.

17 Explain three level schema architecture of DBMS. State different level of dependencies in this architecture

18 What do you mean by data modelling? Discuss different types of models

19 Draw ER diagram for Hospital management system. Convert ER diagrams into tables.

20 Construct an ER diagram for school with the sets of students and a set of teachers associated with each student with a log of various examinations conducted write a relational schema for the ER design

Question	Correct Option (Enter either 'A' or 'B' or 'C' or 'D')
Q1.	B
Q2.	C
Q3.	C
Q4	B

Q5	B
Q6	C
Q7	C
Q8.	C
Q9.	B
Q10.	C
Q11.	A
Q12.	C
Q13.	D
Q14.	C
Q15.	B
Q16.	B
Q17.	B
Q18.	D
Q19.	B
Q20.	D
Q21.	C
Q22.	A
Q23.	A
Q24.	C
Q25.	A
Q26.	A
Q27.	D
Q28.	A
Q29.	A
Q30.	C
Q31.	D

Q32.	C
Q33.	A
Q34.	B
Q35.	D
Q36.	B
Q37.	C
Q38.	C
Q39.	C
Q40.	A