University of Mumbai
Examination 2020 under cluster _7_ (Lead College:SSJCOE)

Examinations Commencing from 15th June 2021 to 26th June 2021

Program: BE Information Technology

Curriculum Scheme: Rev.2016

Examination: TE Semester: V

Course Code: ITC501 and Course Name: Microcontroller & Embedded Programming

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 an addressing mode of 8051?
Option A:	Direct addressing mode
Option B:	Register addressing mode
Option C:	Immediate addressing mode
Option D:	Arithmetic addressing mode
2.	Instruction used to Test equality of two 32-bit values in ARM7 is called _____.
Option A:	TEQ
Option B:	TST
Option C:	EOR
Option D:	SRQ
3.	Embedded system is
Option A:	Reactive
Option B:	Real time
Option C:	Proactive
Option D:	Reactive & Real time
4.	The problem of priority inversion can be solved by _____
Option A:	priority inheritance protocol
Option B:	priority inversion protocol
Option C:	both priority inheritance and inversion protocol
Option D:	priority interrupt protocol
5.	When the microcontroller executes some arithmetic operations, then the flag bits of which register are affected?
Option A:	PSW
Option B:	SP
Option C:	DPTR

Option D:	PC
6.	Which register is used as a stack pointer in ARM7?
Option A:	R15
Option B:	R13
Option C:	R11
Option D:	R8
7.	Name the Operating System that works on Raspberry Pi?
Option A:	Android
Option B:	Linux
Option C:	Windows 10
Option D:	Rasbian
8.	Timer 0 is a _____ bit register.
Option A:	32-bit
Option B:	16-bit
Option C:	8-bit
Option D:	10-bit
9.	For real time operating systems, interrupt latency should be _____
Option A:	minimal
Option B:	maximum
Option C:	zero
Option D:	dependent on the scheduling
10.	Which pin of 8051 used to demultiplex AD0-Ad7 ?
Option A:	EA
Option B:	ALE
Option C:	PSEN
Option D:	VCC
11.	FIQ stands for_____
Option A:	Fast Interrupt Request
Option B:	For Interrupt Request
Option C:	Fast Input Request
Option D:	First Input Request
12.	How many external interrupts are there in micro controller 8051
Option A:	5
Option B:	8

Option C:	2
Option D:	4
13.	The concept of start of conversion and end of conversion is applicable to
Option A:	DAC
Option B:	ADC
Option C:	LCD
Option D:	RTC
14.	For writing commands on an LCD, RS bit is
Option A:	Set
Option B:	reset
Option C:	set & reset
Option D:	not used
15.	A program written with the IDE for Arduino is called _____
Option A:	IDE source
Option B:	Sketch
Option C:	Cryptography
Option D:	Source code
16.	The internal RAM Memory of 8051 is
Option A:	32 Bytes
Option B:	64 Bytes
Option C:	128 Bytes
Option D:	256 Bytes
17.	ARM7 is _____ pipelined microcontroller.
Option A:	3-Stage
Option B:	4-Stage
Option C:	5-Stage
Option D:	2-stage
18.	The binary semaphore is also known as_____
Option A:	Cluster
Option B:	Mutex
Option C:	Scheduler
Option D:	Spooling
19.	The pin that clears the control word register of 8255 when enabled is
Option A:	CLEAR
Option B:	SET
Option C:	RESET

Option D:	CLK
20.	An instruction that is used to move data from an ARM Register to a Status Register (CPSR or SPSR) is called _____.
Option A:	MRC
Option B:	MRS
Option C:	MSR
Option D:	MCS
Q2. A	**Solve any Two** **5 marks each**
i.	Differentiate between Real-Time Operating System and General Purpose Operating System.
ii.	Draw interfacing of DAC to 8051 and write program to generate ramp wave.
iii.	List important features of ARM7 processor
B	**Solve any One** **10 marks each**
i.	Explain different addressing modes of 8051 with example
ii.	List and explain how exceptions and interrupts handled in ARM7.
Q3. A	**Solve any Two** **5 marks each**
i.	List various microcontroller cores used for an Embedded system & explain any one in detail
ii.	List various components of Raspberry_pi board.
iii.	Explain SCON SFR in detail
B	**Solve any One** **10 marks each**
i.	Draw & explain internal RAM structure of 8051 in detail
ii.	Write short note on Pipelining of ARM7

University of Mumbai

Examination 2020 under cluster 7 (Lead College: SCSJCE)

Examinations Commencing from 15th June 2021 to 26th June 2021

Program: **Information Technology**

Curriculum Scheme: **Rev 2016**

Examination: **TE** Semester **V**

Course Code: **ITC502** and Course Name: **Internet Programming**

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.	Full form of isNaN is
Option A:	is not a number
Option B:	is number not
Option C:	is not number
Option D:	is number
2.	The correct sequence of HTML tags for starting a webpage is
Option A:	Head, Title, HTML, body
Option B:	HTML, Body, Title, Head
Option C:	HTML, Head, Body, Title,
Option D:	HTML, Head, Title, Body
3.	How to create an unordered list (a list with the list items in bullets) in HTML?
Option A:	
Option B:	
Option C:	
Option D:	<i>
4.	If we want to use a nice looking green dotted border around an image, which css property will we use?
Option A:	border-color
Option B:	border-decoration
Option C:	border-style
Option D:	border-line
5.	The following elements <header>, <footer>, <article>, <section> are the new elements in HTML5. These elements are called,
Option A:	Control attributes
Option B:	Semantic elements
Option C:	Graphic elements
Option D:	Multimedia elements
6.	Which of the following Media Query determines if output is grid, like a simple terminal or phone, or bitmap, like a standard monitor or printer?
Option A:	monochrome
Option B:	grid
Option C:	resolution

Option D:	device-height
7.	Which of the following selector is used to selects the element that is the first child of its parent that is of its type?
Option A:	:nth-child(n)
Option B:	::first-line
Option C:	:last-of-type
Option D:	:first-of-type

8.	h1 {
	text-shadow: 2px 2px;
	}
	first value of text-shadow property is

Option A:	horizontal shadow
Option B:	vertical shadow
Option C:	Left Shadow
Option D:	Right Shadow
9.	Analyze and reformat the data on a remote server and transmit the data to the user's browser in its final form.
Option A:	Web-based mashups
Option B:	Server-based mashups
Option C:	Ajax mashup
Option D:	JSON mashup
10.	JSON name/value pair is written as
Option A:	name’ : ‘value’
Option B:	name = ‘value’
Option C:	name = “value”
Option D:	“name” : “value”
11.	What does the XMLHttpRequest object accomplish in Ajax?
Option A:	It's the programming language used to develop Ajax applications.
Option B:	It provides a means of exchanging structured data between the Web server and client.
Option C:	It provides the ability to asynchronously exchange data between Web browsers and a Web server.
Option D:	It provides the ability to mark up and style the display of Web-page text.
12.	What is the file extension of JSON?
Option A:	.jn
Option B:	.js
Option C:	.jsn
Option D:	.json
13.	What is the type of configuration Django requires for logging?
Option A:	Django requires a dictConfig in settings.py.
Option B:	Django requires no configuration. Use logging by an import.
Option C:	Django requires a configuration of handlers and loggers.
Option D:	Logging can be directly used in each module separately.

14.	What are request.GET and request.POST objects?
Option A:	Python Dictionary-Like objects
Option B:	Python Lists
Option C:	Python Dictionaries
Option D:	Python Tuple
15.	What will be the output of the following PHP code? <?php $i= 1; print($i); print $i; ?>
Option A:	10
Option B:	01
Option C:	11
Option D:	error
16.	Which of the following contains a reference to every variable which is currently available within the global scope of the script?
Option A:	$_SERVER
Option B:	$_COOKIE
Option C:	$_SESSION
Option D:	$GLOBALS
17.	What will be the output of the following PHP code? <?php $num = "4"; $num1 = "5"; print $num+$num1; ?>
Option A:	4
Option B:	4+5
Option C:	45
Option D:	9
18.	Which is a language for finding information in an XML document.
Option A:	Xpath
Option B:	XSLT
Option C:	XLink
Option D:	XPointer
19.	To match the specific XML elements child like of parent element is the syntax will be
Option A:	<xsl:template match=”PLANET_NAME”>
Option B:	<xsl:template match=”PLANET/NAME”>
Option C:	<xsl:template match=”/NAME”>
Option D:	<xsl:template match=”//”>
20.	Which internet language is used for describing available web services in XML.
Option A:	WSDL
Option B:	RSS

Option C:	RDF
Option D:	OWL

Q2	
A	**Solve any Two 5 marks each**
i.	Explain native objects in JavaScript.
ii.	How you will embed audio and video in webpage.
iii.	Define and describe mash ups. What are the primary reasons for the success of mashups?
B	**Solve any One 10 marks each**
i.	Write an XML to accept student details (Name, ID, Branch, Address and CGPA). Write an XSL to display to list of the students in descending order of their CGPA.
ii.	Write a PHP code to database connectivity with Insert, Update, Delete, record using MYSQL?

Q3.	
A	**Solve any Two 5 marks each**
i.	What are features of Web Services?
ii.	Write a PHP Program to create a simple login form using GET method?
iii.	Difference between HTML and XML?
B	**Solve any One 10 marks each**
i.	Draw the diagram for AJAX application model and traditional web application Model and compare them.
ii.	Demonstrate CSS3 Animation with an example.

University of Mumbai

Examination June 2021

Examinations Commencing from 15th June 2021 to 26th June 2021

Program: Electronics and Telecommunication Engineering

Curriculum Scheme: Rev2016

Examination: Third Year Semester V

Course Code: **ECC503** and Course Name: **Electromagnetic 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.	If a negative charge is absent, then where do the flux lines terminate?
Option A:	At zero
Option B:	At unity
Option C:	At infinity
Option D:	At radial field
2.	Divergence theorem is applicable for
Option A:	Static fields only
Option B:	Time varying fields only
Option C:	Both static and time varying fields
Option D:	Not applicable to any field
3.	The capacitance of a material refers to
Option A:	Ability of the material to store magnetic field
Option B:	Ability of the material to store electromagnetic field
Option C:	Ability of the material to store electric field
Option D:	Potential between two charged plates
4.	Find the characteristic impedance expression in terms of the inductance and capacitance parameters.
Option A:	Zo = sqrt(LC)
Option B:	Zo = LC
Option C:	Zo = sqrt(L/C)
Option D:	Zo = L/C
5.	Copper behaves as a
Option A:	Conductor always
Option B:	Conductor or dielectric depending on the applied electric field strength
Option C:	Conductor or dielectric depending on the frequency
Option D:	Conductor or dielectric depending on the electric current density
6.	Curl (E) = -∂B/∂t is called
Option A:	Maxwell's equation for static fields
Option B:	Maxwell's equation for time varying fields
Option C:	Gauss Law of electrostatics

Option D:	Biot Savart's law
7.	A boundary of separation between two magnetic materials is identified by which factor?
Option A:	Change in the permeability
Option B:	Change in permittivity
Option C:	Change in magnetization
Option D:	Conduction
8.	Given that the reflection coefficient is 0.6. Find the VSWR.
Option A:	2
Option B:	4
Option C:	6
Option D:	8
9.	The ratio of conduction to displacement current density is referred to as
Option A:	Attenuation constant
Option B:	Propagation constant
Option C:	Loss tangent
Option D:	Dielectric constant
10.	The SI unit of magnetic field intensity is
Option A:	A/m
Option B:	V/m
Option C:	C/m
Option D:	F/m
11.	Which component of the electric field intensity is always continuous at the boundary?
Option A:	Tangential
Option B:	Normal
Option C:	Horizontal
Option D:	Vertical
12.	Which of the following cannot be computed using the Biot-Savart's law?
Option A:	Magnetic field intensity
Option B:	Magnetic flux density
Option C:	Electric field intensity
Option D:	Permeability
13.	Consider a transmission line of characteristic impedance 50 ohm. Let it be terminated at one end by +j50 ohm. The VSWR produced by it in the transmission line will be
Option A:	1
Option B:	0
Option C:	Infinity
Option D:	+j

14.	_____ provides a method whereby the potential function can be obtained subject to the conditions on the boundary.
Option A:	Poisson's Equation
Option B:	Faraday's Law
Option C:	Laplace's Equation
Option D:	Poynting Theorem
15.	If divergence of a field is positive, then field acts as a
Option A:	Reducing field
Option B:	Increasing field
Option C:	Converging field
Option D:	Diverging field
16.	Total magnetic flux crossing a closed surface is
Option A:	Total flux enclosed by the surface
Option B:	Total current enclosed by the surface
Option C:	Total charge enclosed by the surface
Option D:	Zero
17.	The open wire transmission line consists of
Option A:	Conductor
Option B:	Dielectric
Option C:	Both conductor and dielectric
Option D:	Either conductor or dielectric
18.	The magnitude of the Ex and Ey components are the same in which type of polarization?
Option A:	Linear
Option B:	Circular
Option C:	Elliptical
Option D:	Perpendicular
19.	A bar magnet is divided in two pieces. Which of the following statements is true?
Option A:	The bar magnet is demagnetized.
Option B:	The magnetic field of each separated piece becomes stronger.
Option C:	The magnetic poles are separated.
Option D:	Two new bar magnets are created.
20.	One Tesla is equal to
Option A:	1 Wb/m^2
Option B:	1 C/m^2
Option C:	1 Wb/C
Option D:	1 N/C

Q2	**Solve any Two Questions out of Three** **10 marks each**
A	If $\underline{E} = 2r^2\ cos\ cos\ \varphi\ \underline{a_\varphi}$ ... $\frac{V}{m}$ found in chemical ($\varepsilon = 2\varepsilon_0$) filled cylindrical chamber having radius r = 0.2m and height z = 1m, find total charge lying on the chemical.
B	Two isolated cone having same radius suspended on two angles $\theta = 30°$ & $\theta = 60°$ excited by voltage $V(\theta = 30°) = 100\ V$ & $V(\theta = 60°) = 200\ V$, then find out Electric field generated between two cones and prove it in between two cone Electric fields passing through the charge free region.
C	Derive magnetic field due infinite straight current carrying conductor.

Q3	**Solve any Two Questions out of Three** **10 marks each**
A	Oscillating EM wave used to check properties of non-magnetic dielectric paraffin wax ($\sigma = 0, \mu = \mu_0$) at $f = 100\ MHz$. By experimentation we get ($\varepsilon = 4\varepsilon_0$) for paraffin wax. Find out following properties of EM wave generated in given paraffin wax material: i) Attenuation constant ii) Phase constant iii) Phase velocity iv) Intrinsic impedance v) Magnetic field induced in material if $\lvert\underline{E}\rvert = 10\frac{KV}{m}$
B	Strip of transmission line is designed on Fibre glass substrate having relative permittivity of $\varepsilon_r = 4$ operating at $f = 2\ GHz$ and terminated with load impedance of $Z_L = 120 + 150j\ \Omega$ with $Z_0 = 100\ \Omega$; find out input impedance of transmission line if strip length is $l = 0.2\lambda$ at a given frequency. Solve by Analytical methods.
C	Explain electrostatic breakdown in lightning and its conditions.

University of Mumbai

Examination 2021 under cluster 7

Examinations Commencing from 15th June 2021 to 26th June 2021

Program: BE Information Technology Engineering
Curriculum Scheme: Rev 2016
Examination: Third Year Semester V

Course Code: ITC504 Course Name: Cryptography & Network Security
Time: 2 hours Max. Marks: 80

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For the students:- All the Questions are compulsory and carry equal marks .

Q1.	The counter measure to eavesdropping on the communication link is the use of
Option A:	a login name and password
Option B:	a cryptographic sum
Option C:	Encryption
Option D:	a fake identity
Q2.	Which one of the following security service ensures that the sender and the intended recipients only can understand the contents of the message?
Option A:	Integrity
Option B:	Confidentiality
Option C:	Access control
Option D:	Authentication
Q3.	In a Digital Certificate, _____ entity should never appear.
Option A:	Private Key
Option B:	User's Name
Option C:	Organisation Name
Option D:	Public Key
Q4.	Using Rail fence cipher technique, The Cipher text for the plaintext "COME HOME TOMORROW" is
Option A:	CMHMTMEOORWOEOER
Option B:	ROOEOECMHMTMOORW
Option C:	CMHMTMROOEOEOORW
Option D:	EOORWCMHMTMROOEO
Q5.	Firewall Should be situated _____ .
Option A:	Inside a corporate network
Option B:	outside a corporate network
Option C:	between a corporate network and the outside network.
Option D:	inside the server

Q6.	In which mode of IPSec protocol, the entire IP Datagram including it's original header is encrypted and a new header is added?
Option A:	Transport mode
Option B:	Tunnel Mode
Option C:	In both Transport and Tunnel mode
Option D:	Encryption mode
Q7.	In which one of the following modes of operation the output of the Initialization vector of the encryption process is fed into the next stage of the encryption process?
Option A:	Cipher Feedback
Option B:	Electronic Code Book
Option C:	Counter Mode
Option D:	Output FeedBack
Q8.	Blowfish algorithm uses variable length key ranges from ____ to _____ bits.
Option A:	32 to 448 bits
Option B:	36 to 512 bits
Option C:	32 to 512 bits
Option D:	36 to 448 bits
Q9.	For the Knapsack: {1 6 8 15 24}, Find the cipher text value for the plain text 11010.
Option A:	40
Option B:	45
Option C:	22
Option D:	0
Q10.	What is the value of ipad in the HMAC algorithm?
Option A:	0x5C
Option B:	0x36
Option C:	0x34
Option D:	0x5B
Q11.	Message Authentication Code takes two inputs such as _____- and _____ .
Option A:	message and message digest
Option B:	message and hash value
Option C:	message and a secret key
Option D:	message and ipad value
Q12.	The Certification Authority signs a Digital Certificate with _____ .
Option A:	User's Public key
Option B:	User's Private key
Option C:	CA's Public key
Option D:	CA's Private key
Q13.	In an asymmetric-key cipher, the receiver uses which key for decrypting the Cipher Text?
Option A:	Receiver's Private Key

Option B:	Sender's Private Key
Option C:	Receiver's Public key
Option D:	Sender's Public key
Q14.	The relationship between RSA encryption and decryption keys is
Option A:	$ed \equiv 1 \bmod n$
Option B:	$ed \equiv 0 \bmod n$
Option C:	$ed \equiv 1 \bmod phi(n)$
Option D:	$ed \equiv 0 \bmod phi(n)$
Q15.	A digital certificate is used to bind
OptionA:	A person's public key to his private key
Option B:	A person's public key to his identity
Option C:	A person's private key to his identity
Option D:	A person's signature to his private key
Q16.	Which one of the following may be negotiated as part of the SSL Handshake?
Option A:	New Session ID
Option B:	Nounces
Option C:	Initial Sequence number
Option D:	Encryption algorithm
Q17.	Kerboros protocol protects against which of the following attack?
Option A:	Dictionary Attack
Option B:	Man in the middle Attack
Option C:	Replay Attack
Option D:	Logarithmic Attack
Q18.	Entity Authentication is used to protect against
Option A:	session hijacking
Option B:	Impersonation
Option C:	replay attack
Option D:	identity theft
Q19.	Attackers establish a large number of half open connections using _____ .
Option A:	ARP spoofing
Option B:	Session hijacking
Option C:	ARP poisoning
Option D:	IP spoofing
Q20.	Which one of the following security service is not achieved by Digital Signature Scheme?
Option A:	Integrity
Option B:	Non-Repudiation
Option C:	Confidentiality
Option D:	Authentication

Q2	
A	**Solve any Two** **5 marks each**
i.	Explain with examples,keyed and keyless transposition ciphers.
ii.	Explain the Key Generation Process in DES.
iii.	Explain HMAC and CMAC in detail
B	**Solve any One** **10 marks each**
i.	Calculate Cipher text using RSA Algorithm for the following data: Prime Numbers p and q are 7, 17 respectively. Plain text message M= 10. Assume that e = 5. a) Find the private key 'd' and the CipherText CT. b) Can we select e as 3? Justify your answer.
ii.	List the functions of Different SSL protocols and explain handshake protocol in detail.

Q3	
A	**Solve any Two** **5 marks each**
i.	Draw a sample Digital Certificate and explain each and every field of it.
ii.	Explain the different ways of distributing the public keys.
iii.	Differentiate between the transport mode and tunnel mode of IPSec
B	**Solve any One** **10 marks each**
i.	Draw AES block diagram and explain the round function in detail.
ii.	Define DOS attack.Explain different types of DoS attacks.

University of Mumbai

Examination 2020 under cluster 7 (Lead College: SCSJCE)

Program: Information Technology

Curriculum Scheme: Rev2016

Examination: TE Semester V

Course Code: ITDLO5011 and Course Name: Advanced Data Structures & Analysis of Algorithms

Time: 2 hour Max. Marks: 80

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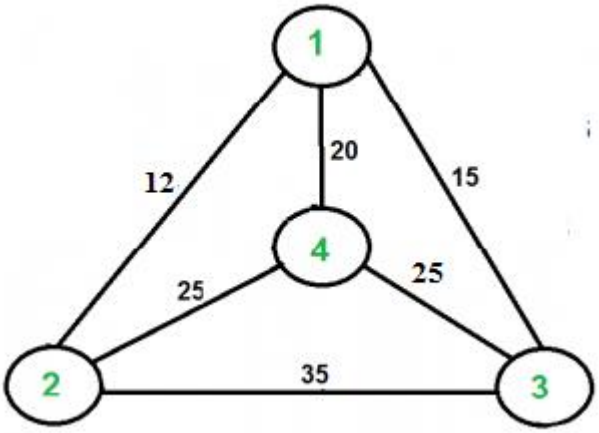
Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Solve the following recurrence using Master's theorem. T(n) = T (2n/3) + 1
Option A:	T(n)=O(log n)
Option B:	T(n)=O(1)
Option C:	T(n)=O(n.logn)
Option D:	$T(n)=O(n^2)$
2.	Solve the following recurrence using Master's theorem. T(n) = 3T (n/3) + n
Option A:	T(n)=O(n.logn)
Option B:	T(n)=O(n)
Option C:	T(n)=O(logn)
Option D:	$T(n)=O(n^2)$
3.	Find out the time complexity of following equation. T(n)=T(n/2)+1
Option A:	T(n)=O(1)
Option B:	T(n)=O(n)
Option C:	T(n)=O(logn)
Option D:	T(n)=O(n.logn)
4.	Solve with the help of recursive tree method. T(n)=T(n/2)+T(n/4)+n^3
Option A:	$T(n)=O(n^3)$
Option B:	T(n)=O(n logn)
Option C:	T(n)=O(n^3. logn)
Option D:	T(n)=O(logn)
5.	Which of the following algorithms is the best approach for solving Huffman codes?
Option A:	exhaustive search
Option B:	greedy algorithm
Option C:	brute force algorithm
Option D:	divide and conquer algorithm
6.	In Huffman coding, data in a tree always occur?
Option A:	Roots
Option B:	Leaves
Option C:	left sub trees
Option D:	right sub trees
7.	Consider a binary max-heap implemented using an array. Which one of the

	following array represents a binary max-heap?
Option A:	25,12,16,13,10,8,14
Option B:	25,12,16,13,10,8,14
Option C:	25,14,16,13,10,8,12
Option D:	25,14,12,13,10,8,16
8.	Which of the following is true about Red Black Trees?
Option A:	The path from the root to the furthest leaf is no more than twice as long as the path from the root to the nearest leaf
Option B:	At least one children of every black node is red
Option C:	Root may be red
Option D:	A leaf node may be red
9.	Merge sort uses which of the following technique to implement sorting?
Option A:	Backtracking
Option B:	greedy algorithm
Option C:	divide and conquer
Option D:	dynamic programming
10.	What is the best case complexity of Quicksort?
Option A:	O(nlogn)
Option B:	O(logn)
Option C:	O(n)
Option D:	O(n^2)
11.	If Matrix A is of order X*Y and Matrix B is of order M*N, then what is the order of the Matrix A*B given that Y=M?
Option A:	Y*N
Option B:	X*M
Option C:	X*N
Option D:	Y*M
12.	Which of the following algorithm is used to solve fractional knapsack problem efficiently?
Option A:	Dynamic Programming
Option B:	Greedy algorithm
Option C:	Divide and Conquer
Option D:	Backtracking
13.	What is the purpose of the Knapsack problem?
Option A:	To obtain minimum weight in the knapsack
Option B:	To obtain minimum total value in the knapsack
Option C:	To obtain maximum weight in the knapsack
Option D:	To obtain maximum total value in the knapsack
14.	Which of the following is true?
Option A:	Prim's algorithm can also be used for disconnected graphs
Option B:	Kruskal's algorithm can also run on the disconnected graphs
Option C:	Prim's algorithm is simpler than Kruskal's algorithm
Option D:	In Kruskal's sort edges are added to MST in decreasing order of their weights

15.	Which is not correct about NP-Complete
Option A:	It must be both NP and NP-hard problem.
Option B:	Can be solved by deterministic algorithm in polynomial time.
Option C:	It is not a Decision problem.
Option D:	It is exclusively Decision problem.
16.	Problems that can be solved in polynomial time are called.
Option A:	Intractable problems
Option B:	Tractable problems
Option C:	Undecidable problems
Option D:	Decidable problems
17.	Find out the cost of tour in following Travelling salesman problem. 
Option A:	62
Option B:	80
Option C:	77
Option D:	90
18.	The concept of prefix and suffix is used in which of the following algorithms?
Option A:	KMP
Option B:	Boyer-Moore
Option C:	Brute Force
Option D:	Advanced Brute Force
19.	What is the worst case time complexity of KMP algorithm for pattern searching, where n=length of text and m= length of pattern
Option A:	O(m)
Option B:	O(n)
Option C:	O(log n)
Option D:	O(n*m)
20.	What is the time complexity of the brute force algorithm used to find the longest common subsequence?
Option A:	O(n)
Option B:	$O(n^2)$

Option C:	$O(n^3)$
Option D:	$O(2^n)$

Q2. **(20 Marks Each)**	**Solve any Two Questions out of Three** **10 marks each**
A	Which are the different methods of solving recurrences? Explain with the help of example
B	Explain AVL trees. Explain the four cases that require rotation. Insert the following elements into an AVL Tree 63,52,49,83,92,29,23,54,13,99 along with the rotations used.
C	Explain divide & Conquer approach. Write a recursive algorithm to determine the max and min from given elements.

Q3. **(20 Marks Each)**	**Solve any Two Questions out of Three** **10 marks each**
A	Solve the following knapsack problem by using greedy approach where N=7,M=15,(P1,P2,P3,P4,P5,P6,P7)=(10,5,15,7,6,18,3), (W1,W2,W3,W4,W5,W6,W7)=(2,3,5,7,1,4,1)
B	Write a short note on Optimal Binary Search Tree.
C	Explain KMP Pattern Matching algorithm with a suitable example.