Maratha Vidya Prasarak Samaj's

Rajarshi Shahu Maharaj Polytechnic, Nashik

Udoji Maratha Boarding Campus, Near Pumping Station, Gangapur Road, Nashik-13.

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Subject: -Emerging Trends in Electronics (22636)

SYLLABUS

Chapter No.	Name of chapter	Marks
1	**Advance Processors**	**16**
2	**Recent Electronic Components**	**10**
3	**Next Generation Telecom Network**	**16**
4	**Digital Factory**	**16**
5	**Smart World**	**12**
	Total Marks :-	**70**

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BOARD THEORY PAPER PATTERN FOR ALL BRANCHES

1	ARM stands for _____.
2	Main processor chip in computers is _____.
3	The CISC stands for _____.
4	The GPIO stands for _____.
5	A program written with IDE for arduino is called _____.
6	Most of processor designed by ARM is _____.
7	The function of link resister in ARM7TDMI is _____.
8	The function of register r15 in ARM7TDMI is as _____.
9	Main importance of ARM micro-processor is providing operation with _____.
10	In CISC processor nature of instruction size is _____.
11	In ATmega328p 'P' refers to _____.
12	Throughput of a super scalar processor is _____.
13	Each stage in pipelining should be completed within _____ cycle.
14	Default boot loader for Arduino UNO is _____.
15	The function of Barrel shifter is _____.
16	Select proper microcontroller for Arduino UNO _____.
17	SMT is method for producing _____ in which the components are mounted or placed directly onto the surface of PCB.
18	In Li-ion battery, the _____ is lithium ion based.
19	A nuclear battery is a device which uses energy from _____ to generate electricity.
20	Compare to other batteries, nuclear batteries are very _____, but have an extremely _____ and high energy density.
21	SMT is method for producing _____ in which the components are mounted or placed directly onto the surface of PCB.
22	In Li-ion battery, the _____ is lithium ion based.
23	A nuclear battery is a device which uses energy from _____ to generate electricity.
24	Compare to other batteries, nuclear batteries are very _____, but have an extremely _____ and high energy density.

25	8000 frames/ sec are transmitted in 125 usec, in _____.
26	The E2E optical path in an OTN network is specified by layer _____.
27	The NGN stands for _____.
28	In NGN, interface not supporting media interaction is _____.
29	The UNI stands for _____.
30	The ANI stands for _____.
31	The API stands for _____.
32	In NGN communication is possible _____.
33	Layers of NGN are _____.
34	In NGN, CDF is a function of _____.
35	_____ Multiplexing is used in 3G.
36	MPLS header length is a field of ____ bits.
37	Nu and Bolt manufacturing is an example of discrete manufacturing with _____.
38	Which of the following is first and most commonly used smart, interactive IoT device?
39	IoT Is evolved from _____.
40	_____ are smart devices that users embedded processors, sensors and communication hardware to collect and send data which is acquired from environment.
41	_____ is physical device or software program that serves as the connection point between cloud and controllers.
42	Sequence of devices in IoT architecture from bottom layer to top layer is _____.
43	Which is IEEE standard refers to WiFi for IoT devices?
44	Top layer in IoT architecture is _____.
45	Agriculture IoT stick is smart gadget work on principle of _____.
46	Vehicle communication, driverless car are examples of IoT in _____.
47	The brain of IoT system is _____.
48	HVAC provides _____.
49	Smart waste deals with _____.
50	Smart bins indicate status of bin using _____.
51	Smart bins can be monitored using _____.

52	M2M communication is a commutation between _____.
53	Function of device domain in M2M network _____.
54	Subnet in M2M is used for generating the communication link between the M2M devices and M2M _____.
55	The thickness of cover lay should be _____.
56	Memristor features unique property like _____.
57	FTTH stands for _____.
58	The use of EXP bits is _____.
59	The protection scheme in an OTN network is defined by _____.
60	SDH is a _____.
61	Data speed in 5G is _____.
62	TTL in a MPLS label is _____.
63	Steps to turn big data become smart data are _____.
64	Movement of materials from supplier to shop can be tracked with help of _____.
65	The first revolution is about _____.
66	The IEEE stands for _____.
67	What is Industrial Revolution?
68	Electrical power and locomotives are inventions of _____.
69	One out of these is not LPWAN technologies _____.
70	Frequency band used by Z-WAVE is _____.

CLASS TEST - I
PAPER PATTERN
Syllabus:-

Unit No.	Name of the Unit	Course Outcome (CO)
1	**Advance Processors**	**CO-636.1**
2	**Recent Electronic Components**	**CO-636.2**
3	**Next Generation Telecom Network**	**CO-636.3**

Sr. No.	Question	Course Outcome (CO)
1	The function of register r15 in ARM7TDMI is as _____.	**CO-636.1**
2	The function of link resister in ARM7TDMI is _____.	**CO-636.1**
3	The function of Barrel shifter is _____.	**CO-636.1**
4	Main importance of ARM micro-processor is providing operation with _____.	**CO-636.1**
5	Each stage in pipelining should be completed within _____ cycle.	**CO-636.1**
6	Throughput of a super scalar processor is _____.	**CO-636.1**
7	In ATmega328p 'P' refers to _____.	**CO-636.1**
8	In CISC processor nature of instruction size is _____.	**CO-636.1**
9	In architecture aimed at reducing time of execution of instruction is _____.	**CO-636.1**
10	Memristor features unique property like _____.	**CO-636.2**
11	SMT is method for producing _____ in which the components are mounted or placed directly onto the surface of PCB.	**CO-636.2**
12	The PCB stands for _____.	**CO-636.2**
13	OLED are simpler than LCD because they do not require _____.	**CO-636.2**
14	In cover lay of FPC, to reduce conductor damage from frequent bending, the thickness of cover lay should be _____.	**CO-636.2**
15	In Li-ion battery, the _____ is lithium ion based.	**CO-636.2**
16	The E2E optical path in an OTN network is specified	**CO-636.3**

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	by layer _____.	
17	The ANI stands for _____.	**CO-636.3**
18	The UNI stands for _____.	**CO-636.3**
19	In NGN, interface not supporting media interaction is _____.	**CO-636.3**
20	The NGN stands for _____.	**CO-636.3**

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CLASS TEST - I
PAPER PATTERN

Syllabus:-

Unit No.	Name of the Unit	Course Outcome (CO)
3	**Next Generation Telecom Network**	**CO-636.3**
4	**Digital Factory**	**CO-636.4**
5	**Smart World**	**CO-636.5**

Sr. No.	Question	Course Outcome (CO)
1	The protection scheme in an OTN network is defined by _____.	**CO-636.3**
2	In NGN, CDF is a function of _____.	**CO-636.3**
3	_____ Multiplexing is used in 3G.	**CO-636.3**
4	MPLS header length is a field of ____ bits.	**CO-636.3**
5	8000 frames/ sec are transmitted in 125 usec, in _____.	**CO-636.3**
6	Steps to turn big data become smart data are _____.	**CO-636.4**
7	Top layer in IoT architecture is _____.	**CO-636.4**
8	Agriculture IoT stick is smart gadget work on principle of _____.	**CO-636.4**
9	Vehicle communication, driverless car are examples of IoT in _____.	**CO-636.4**
10	Nut and Bolt manufacturing is an example of discrete manufacturing with _____.	**CO-636.4**
11	Movement of materials from supplier to shop can be tracked with help of _____.	**CO-636.4**
12	The first revolution is about _____.	**CO-636.4**
13	The IEEE stands for _____.	**CO-636.4**
14	Electrical power and locomotives are inventions of _____.	**CO-636.4**
15	What is Industrial Revolution?	**CO-636.4**
16	One out of these is not LPWAN technologies _____.	**CO-636.5**
17	One of this is not a networking device_____.	**CO-636.5**
18	Limitation of WSN is _____.	**CO-636.5**
19	One of this is not a sensor _____.	**CO-636.5**
20	_____ helps in navigation systems.	**CO-636.5**

COURSE OUTCOME (CO)

COURSE: -Emerging Trends in Electronics (22636)   PROGRAMME: -E&TC

CO. NO	Course Outcome
CO-636.1	Suggest relevant computing system for specific application.
CO-636.2	Suggest relevant components for emerging applications.
CO-636.3	Suggest different telecom network for given application.
CO-636.4	Suggest relevant IoT technologies for Digital Factory.
CO-636.5	Suggest different electronic systems for smart world.

1. Advanced Processors

Total Marks-16

MCQ Question

(Total number of Question=Marks*3=16*3=48)

Note: Correct answer is marked with **bold.**

1. ARM stands for _____.
   a) Advanced Rate Machines
   b) Advanced RISC Machines
   c) Artificial Running Machines
   d) Aviary Running Machines

2. Main processor chip in computers is _____.
   a) ASIC
   b) ASSP
   c) CPU
   d) CPLD

3. The CISC stands for _____.
   a) Computer Instruction Set Compliment
   b) Complete Instruction Set Compliment
   c) Computer Indexed Set Components
   d) Complex Instruction set computer

4. The GPIO stands for _____.
   a) General Purpose Inner Outer Propeller
   b) General Purpose Input Output Pins
   c) General Purpose Interested Old People
   d) General Purpose Input Output Processor

5. A program written with IDE for arduino is called _____.
   a) IDE source
   b) Sketch
   c) Cryptography
   d) Source code

6. Most of processor designed by ARM are _____.
   a) 16 bit
   b) 32 bit
   c) 64 bit
   d) 8 bit

7. The IDE stand for_____.
   a) In Deep Environment
   b) Integrated Development Environment
   c) Internal Deep Escape
   d) IDE

8. The function of link resister in ARM7TDMI is _____.
   a) **To store return address whenever subroutine is called**
   b) To store address of I/O device
   c) Multiplex the address and data lines
   d) Perform addition

9. The function of register r15 in ARM7TDMI is as _____.
   a) **Program Counter**
   b) CPSR
   c) SPSR
   d) ALU

10. In architecture aimed at reducing time of execution of instruction is _____.
    a) **RISC**
    b) CISC
    c) Von Neuman
    d) Harvard

11. In CISC processor nature of instruction size is _____.
    a) Small
    b) Reduced
    c) **Variable**
    d) Fixed

12. If the three stages of execution in pipelining are overlapped, how would be the speed of execution?
    a) **Higher**
    b) Moderate
    c) Lower
    d) Unpredictable

13. In ATmega328p 'P' refers to _____.
    a) Production
    b) **Pico-Power**
    c) Peripheral
    d) Programmable on chip

14. In RISC Processors configuration status of control unit is_____.
    a) Hardwired
    b) Micro programmed
    c) **Both A and B**
    d) None of the above

15. Throughput of a super scalar processor is _____.
    a) less than 1
    b) 1
    c) **More than 1**
    d) Not Known

16. A function is a series of programming statements that can be called by name. Which command is called once when the program starts:
    a) loop()
    b) **setup()**
    c) (output)
    d) (input)

17. Each stage in pipelining should be completed within _____ cycle.
    a) **1**
    b) 2
    c) 3
    d) 4

18. Main importance of ARM micro-processor is providing operation with _____.
    a) Low cost and low power consumption
    b) **Higher degree of multi-tasking**

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c) Lower error or glitches

d) Efficient memory management

19. The function of Barrel shifter is _____.

   a) Shift Operation in same instruction cycle

   b) Shift operation in 2 instruction cycle

   c) Shift operation in 4 instruction cycle

   d) None of the above

20. Select proper microcontroller for Arduino UNO _____.

   a) ATmega328p   c) ATmega32114

   b) ATmega2560   d) AT91SAM3x8E

21. Default boot loader for Arduino UNO is _____.

   a) Optibootloader   c) Bare box

   b) AIR-boot   d) GAG

22. When the processor is executing simple data processing instructions, the pipeline enables one instruction to be completed every clock cycle, this is also called as _____ .

   a) Throughput   c) Execution

   b) Latency   d) None of the above

23. It starts with a /* and continues until */. What does this do? _____.

   a) Loads a sketch   c) Compiles quicker

   b) Makes comments   d) Makes stars appear

24. In ARM processor when Interrupt occurs ARM processor goes into following mode

   a) FIQ mode   c) Supervisor mode

   b) Abort mode   d) Undefined mode

25. The throughput of a super scalar processor is _____

   a) less than 1   **c) More than 1**

   b) 1   d) Not Known

26. ARM7TDMI Processor Core is _____.

   a) 2 stage pipelining   c) 4 stage pipelining

   b) 3 stage pipelining   d) 5 stage pipelining

27. In ARM7TDMI, D stands fro _____.

   a) Double.   c) Data

   b) Django   **d) Debug**

28. Out of following which is not any mode of operation of ARM7TDMI.

   a) FIQ Mode   c) Abort Mode

   b) IRQ Mode   **d) Control Mode**

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29. To write digital output in arduino programming _____ instruction is used.

a) DigitalRead
c) Loop
b) DigitalWrite
d) Setup

30. To use any pin as input/output following instruction is used.

a) DigitalRead
c) pinMode
b) DigitalWrite
d) PWD

31. Which of the following are not processor selection criteria?

a) Power considerations
c) Price
b) Memory
d) Dimesnions

32. Processor or controller operating voltage range is _____.

a) 2 to 5
c) 1.5 to 3.5
b) 3.3 to 5
d) 4 to 6

33. Which of the following is not a pipelining sequence?

a) Calculate
c) Fetch
b) Debug
d) ALU

34. Total analog input pins of arduino Uno are _____.

a) 2
c) 6
b) 4
d) 8

35. AVR generally uses clock speed of _____ .

a) 11 MHz
c) 20 MHz
b) 15 MHz
d) 24 MHz

36. Internal data memory of AVR is _____ .

a) 2 Kbytes
c) 6 Kbytes
b) 4 Kbytes
d) 8 Kbytes

37. _____ Timers has AVR internally.

a) One 8 Bits and two 16 Bits
c) Two 8 Bits and Six 16 Bits
b) Two 8 Bits and two 16 Bits
d) Two 8 Bits and Four 16 Bits

38. An arduino sketch ha file extension of _____ .

a) .exe
c) .ino
b) .pdf
d) .jpg

39. Out of following instruction which will print data serially of LCD?

a) DigitalRead
c) Setup
b) DigitalWrite
d) Serial.println

40. Out of following which is not input device to arduino?

a) LCD
c) Switch
b) Keypad
d) Sensor

41. _____ IC is used for interfacing of DC motor with Arduino UNO.

a) ULN 2008

c) DAC

b) ADC

d) L298

42. In user mode ARM7TDMI, which register holds status of all registers?

a) Program Counter

c) CPSR

b) Link Register

d) SPSR

43. During interrupt status of registers are saved in _____ .

a) Program Counter

c) CPSR

b) Link Register

d) SPSR

44. In thumb mode ARM7TDMI runs in _____ bits.

a) 16

c) 64

b) 32

d) 128

45. Out of following which processor is fastest processor?

a) PIC16F1425

c) ARM9TDMI

b) ARTM7TDMI

d) ARM10TDMI

46. Arduino IDE consists of 2 functions. What are they?

a) Build() and loop()

c) Setup() and loop()

b) Setup() and build()

d) Loop() and build and setup()

47. In ATmega328p 'P' refers to _____.

a) Production

c) Peripheral

b) Pico-Power

d) Programmable on chip

48. In RISC Processors configuration status of control unit is_____.

a) Hardwired

c) Both A and B

b) Micro programmed

d) None of the above

2. Recent Electronic Components

Total Marks-10

MCQ Question

(Total number of Question=Marks*3=10*3=30)

Note: Correct answer is marked with **bold.**

1. Statement 1: In Li-ion batteries, lithium ions move from the negative electrode to the positive electrode during discharge. Statement 2: In Li-ion batteries lithium ions move from the positive electrode to the negative electrode during charging. Select correct option for above statement
   a) Statement 1 is true but statement 2 is false
   b) Statement 2 is true but statement 1 is false
   c) Both statements are true
   d) Both statements are false

2. In Li-ion battery, the _____ is/are lithium ion based
   a) Positive electrode
   b) Negative electrode
   c) Positive and negative electrode
   d) Electrolyte

3. A nuclear battery is a device which uses energy from the _____ to generate electricity.
   a) Hydrocarbon
   b) Hydrogen
   c) Emission of radioactive isotopes
   d) chain reaction of radioactive element

4. Compared to other batteries, nuclear batteries are very _____, but have an extremely ____ and high energy density
   a) Cheap, long life
   b) Costly, long life
   c) Cheap, short life
   d) Costly, short life

5. Surface-mount technology (SMT) is a method for producing ____ in which the components are mounted or placed directly onto the surface of _____
   a) Electric circuit, electric board
   b) Electronic circuit, printed circuit board
   c) Pneumatic circuit, pneumatic bench
   d) Instrumentation circuit, control panel

6. OLED stands for _____
   a) Organic Light emitting display.
   b) Optical Light emitting display.

c) **Organic Light emitting diode**.   d) Optical Light emitting diode.

7. In OLED, at least one of the electrode is _____
   a) Reactive
   b) Transparent
   c) Passive
   d) Idle

8. OL EDs are used to create digital display in devices such as _____
   a) Only TV screens
   b) Only smart phones
   c) Only computer monitors
   d) All of above

9. Statement 1: An OLED display works without a backlight
   Statement 2: Because OLED emits visible light.
   Select correct option for above statement
   a) Statement 1 is true but statement 2 is false
   b) Statement 2 is true but statement 1 is false
   c) Both statements are true
   d) Both statements are false

10. Memristor is defined by relation _____
    a) **dφ = M*dq**.
    b) dq=C*dv.
    c) dφ =L*di.
    d) dv=R*di.

11. The surface mount components are accurately placed onto the pads with the help of _____
    a) Pick and place machine.
    b) Manually.
    c) **Reflow Machine**.
    d) Printing Machine.

12. Desirable feature of electronics components suitable for emerging applications is _____
    a) Higher power consumption.
    b) **Miniature size**.
    c) Lower operation speed.
    d) Low operating frequency.

13. _____allow number of components placing on both sides of the flexible dielectric film.
    a) Single sided flexible circuits
    b) Single mounted flexible circuits
    c) **Double access flexible circuits**
    d) Sculptured Flex circuits.

14. Memristor features unique properties like _____ and _____.
    a) Nonvolatile, linearity
    b) Volatile nature, non-linearity
    c) Volatile nature, linearity
    d) **Nonvolatile, non-linearity**

15. _____is considered as a subset of Memristor
    a) ROM
    b) ReRAM
    c) Static RAM
    d) DRAM

16. Hysteresis loop and _____ phase shift between current and voltage, at _____ are the significant features of Memristor.
    a) 0-degree, zero crossing
    b) 90-degree, zero crossing
    c) 45 degree, non-zero crossing
    d) 180 degree, non-zero crossing

17. Memristor shows _____ relationship between voltage and current.
    a) Linear
    b) Nonlinear

c) Exponential
d) logarithmic

18. Currently OLED displays are made by _____.
   a) **Evaporating gases in a vacuum chamber**.
   b) Evaporating liquid in a vacuum chamber.
   c) Evaporating solid in a vacuum chamber.
   d) Anodization.

19. OLED displays are simpler than LCD because they do not require _____ or _____.
   a) Power, filtering.
   c) Backlight, diffusing.
   b) Power, diffusing.
   d) **Backlight, filtering**.

20. In the cover lay of FPC, to reduce conductor damage from frequent bending, the thickness of the cover lay should be _____.
   a) **Same as the thickness of the dielectric layer**.
   b) more than the thickness of the dielectric layer
   c) less than the thickness of the dielectric layer
   d) Independent of the thickness of the dielectric layer

21. Which of following is top most layer of flexible PCB?
   a) Cover lay
   c) Adhesive
   b) Conductor
   d) Base Substrate

22. Which of following carries current in flexible PCB?
   a) Cover lay
   c) Adhesive
   b) Conductor
   d) Base Substrate

23. To reduce conductor damage in flexible PCB thickness of the cover lay should be_____ thickness of dielectric layer.
   a) Same
   c) More
   b) Less
   d) Can't say

24. Among following which battery has highest life cycle?
   a) Ni-cd
   c) Electrolytic
   b) NiMH
   d) **Nuclear**.

25. Cathode of Ni-CD battery is made up of _____ .
   a) Lithium Metal Oxide
   c) Hydrogen
   b) Cadmium hydroxide
   d) **Nickel hydroxide**

26. Anode of Ni-CD battery is made up of _____ .
   a) Lithium Metal Oxide
   c) Hydrogen
   b) Cadmium hydroxide
   d) Nickel hydroxide

27. In which step of SMD mounting pasting of components is done?
   a) Printing
   c) Reflow soldering
   b) Mounting
   d) Testing

28. Out of following which component cannot be soldered using SMD technology?

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a) Resistor

b) Transformer

c) Inductor

d) Transistor

29._____allow number of components placing on both sides of the flexible dielectric film.

a) Single sided flexible circuits

b) Single mounted flexible circuits

c) Double access flexible circuits

d) Sculptured Flex circuits.

30. In OLED anode is _____ .

a) Active

b) Carbonated

c) Vaporized

d) Transparent.

3. Next Generation Telecom Network

Total Marks-16

MCQ Question

(Total number of Question=Marks*3=16*3=48)

Note: Correct answer is marked with **bold.**

1. The E2Eoptical path in an OTN network is specified by layer
   a) ODU
   b) OTU
   c) OCH
   d) OPU

2. In NGN ,the interface not supporting media interaction is
   a) UNI
   b) ANI
   c) NNI
   d) SNI

3. Number of layer in NGN architecture are
   a) 7
   b) 6
   c) 5
   d) 4

4. In NGN communication is possible
   a) Within a city
   b) Within a state
   c) Within a country
   d) Anywhere in world

5. Layers of NGN are
   a) Access ,Transport, Control ,Service Layer
   b) Physical , Data link, Network , Session Layer
   c) Application , Session , Data link , Network, Transport, layer
   d) Network , Application Layer

6. In NGN CDF (Content Delivery Function) is a function of
   a) Transport Stratum
   b) Service Stratum
   c) Transport and Service stratum
   d) Not from above

7. The wavelength range of the XG-PON1 downstream signal and the range of upstream signal on a single-fiber system are
   a) Same
   b) For downs stream signal wavelength is greater than that of upstream signal
   c) For downs stream signal wavelength is lower than that of upstream signal
   d) Depend on application it varies

8. ---------- multiplexing is used in 3G.
   a) FDMA
   b) CDMA
   c) TDMA
   d) Not From Above

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9. MPLS header length is a field of ---- bits.
   a) 32   c) 20
   b) 24   d) 8

10. 8000 frames/sec are transmitted in 125 μsec, in
    a) STM-4   **c) STM-1**
    b) STM-64   d) STM-256

11. The use of EXP (Experimental) bits are
    a) Quality of service
    b) Avoid a packet being stuck in a routing loop
    c) Receiving, transmitting a labeled packet on a data link.
    d) Not from above

12. The protection scheme in an OTN network is defined by
    a) G 709   c) G 798
    b) G 873.1   d) G 872

13. SDH is ----------
    a) Session layer Protocol   c) Service Protocol
    b) Transport layer Protocol d) Application Protocol

14. Data speed in 5G is --------
    a) More than 1Gbps   c) 2 Mbps
    b) 64Kbps   d) 4 Kbps

15. TTL in a MPLS label is
    a) Transistor-Transistor Logic   c) Technology Transfer Layer
    b) Time To Live   d) Not from above

16. What is the min. data speed offered by 3G mobile technology to a Slow Moving user?
    a) 128 kbps   c) 2 mbps
    b) 384 kbps   d) 8Mbps

17. What is the min. speed offered by 3G mobile technology to a Fast moving user?
    a) 128 Kbps   c) 2 Mbps
    b) 384 Kbps   d) 8 Mbps

18. **WCDMA stands for _____ .**
    a) Wide array CDMA   c) Wireless CDMA
    b) Wide band CDMA   d) Wifi CDMA

19. What is multiple access technique used in 3G mobile network?
    a) Time Division   **c) Code Division**
    b) Frequency Division   d) None

20. ANI is _____.
    a) Application Nodal Interface
    b) Application Nodal Interconnect
    c) Application Network Interface
    d) Application Network Interconnect

21. SNI is _____.

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a) Service Nodal Interface   **c) Service Network Interface**

b) Service Nodal Interconnect   d) Service Network Interconnect

22. Out of following which is not layer of NGN architecture?

    a) Data Layer   c) Control Layer

    b) Transport /Core Layer   d) Service Layer

23. UNI means _____ .

    a) Unified Network Interface   **c) User Network Interface**

    b) Unified Network Interconnect   d) User Network Interconnect

24. NNI means _____ .

    a) Network Network Interface   c) Nodal Network Interface

    b) Network Network Interconnect   d) Nodal Network Interconnect

25. Data speed in 2G network was _____.

    a) 24 Kbps   **c) 64 Kbps**

    b) 32 Kbps   d) 128 Kbps

26. 2G network was based on _____

    a) GSM   c) WCDM

    b) CDMA   d) TDMA

27. Downloading Data speed for 4G network is _____ .

    a) 50 Mbps   c) 100 Mbps

    b) 80 Mbps   **d) 200 Mbps**

28. Among following network which provides best features for users?

    a) 2G   c) 4G

    b) 3G   **d) 5G**

29. 5G network uses _____ multiplexing technique.

    a) FDMA   c) WCDMA

    b) TDMA   **d) CDMA**

30. Switching technique used in 5G network is _____ .

    a) Packet   **c) Both**

    b) Circuit   d) None of above

31. Out of following which is not part of Fiber to the Home?

    a) Optical Line Termination (OLT)

    b) Application Network Interface (ANI)

    c) Optical Network Unit (ONU)

    d) Optical Distribution Network (ODN)

32. Out of following which is not any feature of optical transport network?

    a) 400 Gbps support

    b) Transport Strata

    c) Support for 1.25 Gbps tributaries

    d) Support multistage multiplexing

33. Media Gateway performs functionality, which is not its functionality?

    a) Access gateway (AG)   c) Signaling gateway (SG)

    b) Trunk Media gateway (TMG)   **d) Network gateway (NG)**

34. ISM band is _____.

a) Industrial   c) Medical

b) Scientific   **d) All of above**

35. Which one have most complicated infrastructure?
   a) 5G   c) 3G
   b) 4G   d) 2G

36. Implementation year of third generation wireless network _____ .
   a) 2008   **c) 2010**
   b) 2009   d) 2011

37. MPLS header consist of _____ bits label
   a) 10   c) 30
   b) 20   d) 40

38. In Synchronous Digital Hierarchy, STM-4 has data rates _____ .
   a) 122 Mbps   c) 422 Mbps
   b) 222 Mbps   **d) 622 Mbps**

39. Which of the following is not type of passive optical network _____?
   a) BPON   c) GPON
   b) EPON   **d) None of above**

40. Government regulating agency who keeps authority on all networks in India is ____.
   a) BRAI   c) SRAI
   b) TRAI   d) HRAI

41. Data speed in 5G is --------
   a) More than 1Gbps   c) 2 Mbps
   b) 64Kbps   d) 4 Kbps

42. TTL in a MPLS label is
   a) Transistor-Transistor Logic   c) Technology Transfer Layer
   b) Time To Live   d) Not from above

43. What is the min. data speed offered by 3G mobile technology to a Slow Moving user?
   a) 128 kbps   c) 2 mbps
   b) 384 kbps   d) 8Mbps

44. What is the min. speed offered by 3G mobile technology to a Fast moving user?
   a) 128 Kbps   c) 2 Mbps
   b) 384 Kbps   d) 8 Mbps

45. **WCDMA stands for _____ .**
   a) Wide array CDMA   c) Wireless CDMA
   b) Wide band CDMA   d) Wifi CDMA

46. Switching technique used in 5G network is _____ .
   a) Packet   **c) Both**
   b) Circuit   d) None of above

47. Out of following which is not part of Fiber to the Home?
   a) Optical Line Termination (OLT)
   b) Application Network Interface (ANI)

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    c) Optical Network Unit (ONU)

    d) Optical Distribution Network (ODN)

48. Out of following which is not any feature of optical transport network?

    a) 400 Gbps support

    b) Transport Strata

    c) Support for 1.25 Gbps tributaries

    d) Support multistage multiplexing

4. Digital Factory

Total Marks-16

MCQ Question

(Total number of Question=Marks*3=16*3=48)

Note: Correct answer is marked with **bold.**

1. Identify which is not an element of IoT?
    a) People.
    b) Process.
    c) Security.
    d) Things.
2. Internet of things is natural extension of _____.
    a) Smart Factory
    b) Computer
    c) SCADA
    d) I3.0
3. Which of the following is first and most commonly used smart, interactive IoT device?
    a) Smart Watch
    b) ATM
    c) Health Tracker
    d) Video Game.
4. IOT is evolved from _____ communication
    a) B2B
    b) M2B
    c) M2H
    d) M2M
5. _____ are smart devices that uses embedded processors, sensor and communication hardware to collect and send data which is acquired from environment
    a) Computers
    b) Network
    c) Things
    d) Protocols
6. _____ is the physical device or software program that serves as the connection point between the cloud and controllers
    a) SCADA
    b) PLC
    c) Actuator
    d) IOT Gateway
7. Sequence of devices in IoT architecture from bottom layer to top layer is_____.
    a) Sensosrs->things->IoTgatway->Edge IT-> Data Center/ Cloud
    b) Things ->Sensosrs ->IoTgatway->Edge IT-> Data Center/ Cloud
    c) Things ->Sensosrs -> Edge IT->IoTgatway-> Data Center/ Cloud
    d) Data Center/ Cloud-> Edge IT ->IoTgatway->Sensosrs->Things
8. Which IEEE standard refers to WiFi for IoT devices?
    a) 802.5.
    b) 802.3
    c) 802.11.
    d) None of these

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9. _____ is the direct contact between two smart objects when they share information instantaneously without intermediaries
   a) **Device to device**
   b) Device to gateway
   c) Gateway to data systems
   d) Between data systems

10. Top layer in IOT architecture is _____
    a) Sensors connectivity and network layer
    b) **Application layer**
    c) Management Service
    d) Gateway and network

11. Agriculture IoT stick is smart gadget work on principle of _____
    a) **Plug & sense**
    b) Plug and play
    c) Plug and work
    d) Plug and socket

12. Vehicle communication, driverless car, connected cars are the example of IoT in _____.
    a) Agriculture
    b) Electronics
    c) **Automotive**
    d) Discrete Manufacturing

13. Real time driver monitor system to detect monitor fatigue level of driver using IoT in automotive includes _____
    a) **Sensors to detect eye blinks, gas, impact sensors and alcohol detecting sensors**
    b) Sensors for GPS
    c) Fluid level sensors
    d) RFID tags

14. Movement of materials from suppliers to shop floor and throughout the assembly line can be tracked with the help of _____
    a) GSM
    b) GPS
    c) Gyroscope
    d) **RFID**

15. Nut and Bolt manufacturing is an example of discrete manufacturing with _____
    a) High complexity and low volume
    b) **Low complexity and high volume**
    c) Low complexity low volume
    d) High complexity high volume

16. The first revolution is about _____
    a) **Water and steam to mechanize production**
    b) Mass production Electronics & IT
    c) Electric power
    d) Mass Production

17. Electrical power and locomotives are the inventions of _____
    a) First revolution
    b) **Second revolution**
    c) Third Revolution
    d) Fourth revolution

18. What is an industrial revolution?
    a) Significant change that affects a single industry only

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b) **New technologies and novel ways of perceiving the world that trigger a profound change in economic and social structures**

c) An event that happened in a previous century and doesn't affect modern society

d) A series of technological advances that may or may not have a profound effect on societies

19. Which series of events best describes the transformations of the first three industrial revolutions?

a) **Mechanization of production; introduction of mass production; the digital Revolution**

b) Mechanization of production; invention of steamships and railroads; the digital revolution

c) Discovery of electricity; the growth of mass production; the digital revolution

d) Mechanization of production; the agrarian revolution; the digital revolution

20. Steps to turn big data become smart data. Please choose the correct one.

a) Data > Knowledge > Information > Wisdom > Decisions

b) **Data > Information > Knowledge > Wisdom > Decisions**

c) Data > Information >> Decisions > Wisdom > Knowledge

d) Data > Information > Wisdom > Knowledge > Decisions

21. Out of following, which is not advantage of IoT?

a) Save time and money.

b) Enhance employee productivity.

c) Make better business decisions.

d) **Generate less revenue.**

22. The first layer in IoT architecture layers is _____.

a) **Sensor connectivity**   c) Service management

b) Gateway   d) Application

23. The gateway between IoT server and IoT thing is _____.

a) **Edge gateway**   c) Thing gateway

b) Server gateway   d) Service Gateway

24. The data from analog sensor is _____ .

a) Directly given to server   c) **Converted to digital**

b) Collected on cloud   d) Rejected

25. Data collected is analyzed and action taken on it at _____ side.

a) Things   c) **Cloud**

b) Gateway   d) DAS

26. Out of following uses server to route data packet to cloud?

a) Sensor- Server-Cloud Data Route

b) Sensor - Edge gateway - Cloud Gateway

c) **Sensor- Server-Cloud Data Route**

d) None of above

27. Driver less car is an perfect example of IoT in _____ sector.

a) Agriculture   b) Manufacturing

c) Smart home **d) Automotive**

28. In which industry standard use of steam engine is done?

   a) I1.0 c) I3.0

   b) I2.0 d) I4.0

29. The majuor disadvantage of I4.0 is _____ .

   a) Use of IoT c) Ease of maintenance

   b) Cyber security is needed d) Reduced labor cost

30. The data transportation in IoT is administered by _____.

   a) Perception layer **c) Network transport layer**

   b) Network access layer d) Presentation layer

5. Smart City

Total Marks-12

MCQ Question

(Total number of Question=Marks*3=12*3=36)

Note: Correct answer is marked with **bold.**

1. A smart city is _____
   a) A city with all facilities.
   b) A city run by accountants
   c) **Somewhere that makes smart use of new technology**
   d) There is no agreed definition for a smart city
2. The vital component is often considered in discourse around smart cities is _____
   a) The role of the accountant
   b) The role of central government
   c) The role of local government
   d) **The role of technology**
3. Smart metering causes _____
   a) **Increase in precision of billing**
   b) Decrease in precision of billing
   c) Increase in approximation of billing
   d) Increase in random estimation of billing
4. Ventilation is the process of _____
   a) Cooling air in a space
   b) Increase in humidity in a space
   c) **Exchanging /replacing air in a space**
   d) Purifying air in a space
5. HVAC provides _____
   a) **Air conditioning and purification**
   b) Light automation
   c) Security system
   d) Alarm systems
6. Smart waste deals with _____
   a) **Garbage collection and disposal**
   b) Reusing and reducing garbage
   c) Recycling waste
   d) Dumping trash in landfills.
7. Smart bins indicate status of bin using _____
   a) **Level sensors**
   b) Temperature sensors
   c) Garbage Sensors
   d) Gas sensors

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8. Smart bins can be monitored using _____
   a) Its own private network implemented by municipality
   b) Manual inspection by a person
   c) Trained Dogs
   d) Housing society

9. M2M Communication is a communication between _____
   a) Machine to Machine
   b) Motor to Machine
   c) machine to motor
   d) motor to motor

10. Function of device domain in M2M network _____
    a) Collection and transmission of sensor data.
    b) Interpretation of sensor data
    c) Processing of sensor data.
    d) Analysis of sensor data

11. Subnet in M2M is used for generating the communication link between the M2M devices and the M2M_____.
    a) Gateways
    b) Devices.
    c) Server.
    d) Router

12. All nodes communicate with each other using some intermediate gateways in a _____
    a) Fully distributed networks
    b) Client-server networks
    e)
    c) Cooperative networks
    d) Multi point network

13. The brain of IOT system is _____
    a) Sensor
    b) Processors
    c) Gateways
    d) Applications.

14. One of this is not a networking device:
    a) Router
    b) Switch
    c) Bridge
    d) Traffic Analyzer

15. Limitation of Wireless Sensor Network (WSN) IS _____ .
    a) Restricted bandwidth
    b) Infinite storage capacity
    c) High processing speed
    d) Large range

16. One of this is not a sensor:
    a) Gyroscope
    b) Camera
    c) Oscillator
    d) Barrometer

17. _____ helps in navigation systems:
    a) GPS
    b) Light sensor
    c) barometer
    d) accelerometer

18. One out of these is not LPWAN technologies:
    a) SigFox
    b) WiFi
    c) NB-IoT
    d) LoRa

19. Frequency band used by Z-WAVE IS :
    a) 60 GHz
    b) 2.4 GHz
    c) Sub 1 GHz
    d) 5 GHz

20. Transaction and data integration across multiple sources is

   a) Orchestration   c) Data mining

   b) Data routing   d) Data analyzing

21. What is another term for a smart home?
    a) Future home   c) Sci-fi home
    b) Home automation   d) Robotic home

22. When was smart home technology first introduced?
    a) 1975   c) 1999
    b) 1982   d) 2004

23. Which of these devices can be used to remotely control your security system?
    a) Smart phone   c) Computer
    b) Tablate   d) All of above

24. What is the #1 product that users wish to control with home automation?
    a) Central Heating   **c) Lights**
    b) Washer/Dryer   d) Kitchen Appliances

25. What is the name of the British technology innovator who invented the phrase 'Internet of Things (IoT)'?
    a) Kevin Spacey   c) Steve Jobs
    b) Ashton Kutcher   d) Kevin Ashton

26. The Internet of Things (IoT) is defined as everyday objects that are interconnected over the Internet that _____ and _____ data.
    a) send and receive
    b) transmit and forward
    c) send packets and receive acknowledgement
    d) message and respond

27. Which device below can be considered a smart device?
    a) Printer   c) Digital Camera
    b) Amazon's Alexa Echo   d) Chrome Browser

28. Where are smart cities developing the fastest?
    a) North America   c) South Asia
    b) Europe   d) Gulf Region

29. Identify challenges to developing smart cities:
    a) Security and privacy   c) Education
    b) Infrastructure   **d) All of the above**

30. Sensors are a key in fitting out an Internet of Things network. What can such a network monitor?
    a) Vehicular and pedestrian traffic
    b) Congestion hot spots and offer alternative routing
    c) Air quality
    d) All of the above

31. The IoT platforms are mainly divided into how many types
    a) 3 types   **c) 4 types**
    b) 5 types   d) 2 types

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32. In order to promote _____ the government should employ more management.
    a) **eGovermnent related**
    b) Enterprise-based
    c) Company based
    d) Business oriented platform

33. The _____ may become an important facilitator and stimulate for the modern economy.
    a) eGovermnent related
    b) Enterprise-based
    c) Company based
    d) **Business oriented platform**

34. ITS stands for _____
    a) Internet Travel Services
    b) Internet Transportation Security
    c) Intelligent Transportation Security
    d) **Intelligent Transportation Services**

35. The autonomous _____ based IoT platforms are used for internal management of the corresponding enterprise.
    a) eGovermnent related
    b) Enterprise-based
    c) Company based
    d) Business oriented platform

36. An IoT _____ center is envisaged as an important part of the generic IoT platform to unify the organization.
    a) Individual Information
    b) Individual Integration
    c) **Integrated Information**
    d) Individual and Integrated Information

37. The core element of architecture of smart city is _____
    a) Mobile Unified Service
    b) Urban Application Platform
    c) Management center
    d) **Integrated Information Provider**

38. Which approach is used in smart city architecture?
    a) **Top down approach**
    b) Bottom up approach
    c) Top down and Bottom Up
    d) Neither Top down nor bottom up

39. IoT promotes the creation of IoT terminal industry _____
    a) Devices
    b) Network
    c) **Clusters**
    d) Things