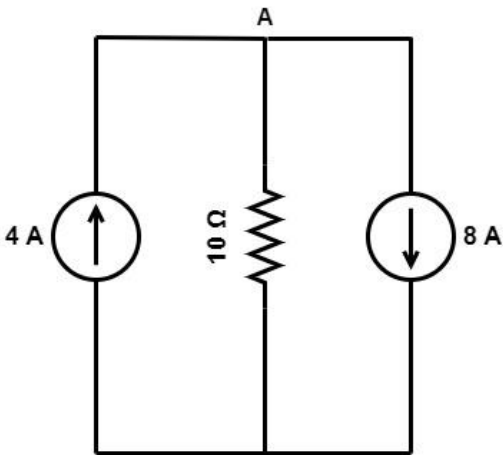


**(Post Name: Technical Assistant , Subject/Field: EC , Date of Exam: 27-04-2023 ,  
Time of Exam: 4:00 PM)**

- Which of the following statement about extrinsic semiconductors is true?  
A) The gap between the conduction band and the valence band is about 1 eV  
B) The conduction band and the valence band overlap.  
C) The gap between the conduction band and the valence band is more than 100 eV  
D) The gap between the conduction band and valence band is more than 1000 eV
- In the Gunn diode, GaAs layer is doped with -----.  
A) P Type  
B) N+ Type  
C) P+ Type  
D) None of the above
- Which statement is correct?  
A) Op amps have high input impedance and low output impedance  
B) Op amps have high input impedance and high output impedance  
C) Op amps have low input impedance and high output impedance  
D) None of the above
- The configuration with the highest output impedance of a transistor amplifier is \_\_\_\_\_.  
A) Common base  
B) Common Collector  
C) Common Emitter  
D) None of the above
- The expression  $Y=XY+YZ+XZ$  shows the \_\_\_\_\_ form of representation.  
A) Sum of Product  
B) Product of Sum  
C) EX-NOR  
D) AND
- Calculate the conversion time of a 12-bit counter type ADC with 500 KHz clock frequent to convert a full scale input?  
A) 8.190 us  
B) 8.190 s  
C) 8190 ms  
D) 8.190 ms
- \_\_\_\_\_ is used to determine race around condition  
A) T flip flop  
B) master-slave JK flip-flop  
C) D flip flop  
D) None of the above
- Which register in a microcontroller contains the memory address of the next instruction to be executed?  
A) PC  
B) SP  
C) DPTR  
D) PSW
- Thevenin's theorem cannot be applied to \_\_\_\_\_.  
A) Linear Circuits  
B) Non-Linear Circuits  
C) Both A and B  
D) Neither A nor B.

10. For the circuit appended below, find the magnitude of the voltage at Node A.



- A) 20V  
B) 30V  
C) 40V  
D) 50 V
11. What happens to the bandwidth of an RLC circuit as the quality factor (Q) increases?  
A) It decreases  
B) It increases  
C) It remains the same  
D) It is not affected by the quality factor
12. Full form of VSB is \_\_\_\_\_.  
A) Vestigial Signal Band  
B) Vestigial Side Band  
C) Vertical Side Band  
D) None of the above
13. Gaussian noise is known as \_\_\_\_\_ noise.  
A) White  
B) Normal  
C) Both A and B  
D) None of the above.
14. The pulse's width and amplitude are maintained constant in  
A) PAM  
B) PPM  
C) PWM  
D) None of the above
15. A device is transmitting data at a 2000 bps rate. When sending a file with 100,000 characters, how long does it take?  
A) 200 Sec  
B) 300 Sec  
C) 400 Sec  
D) 2000 Sec
16. What is the bit rate of a QPSK signal with a baud rate of 800?  
A) 800 bps  
B) 400 bps  
C) 1600bps  
D) 200 bps

17. What is entropy in communication theory?  
A) Amplitude of signal  
B) Average amount of Information  
C) Energy of signal  
D) None of the Above
18. What is the most widely used one's complement parity-based error detection technique in data communication?  
A) CRC  
B) Parity checker  
C) Checksum  
D) None of the above
19. GSM (Global System for Mobile Communication) uses  
A) CDMA  
B) TDMA  
C) FDMA  
D) SDMA
20. The signal-to-noise power supplied to the input terminal of amplifier divided by the signal-to-noise power supplied to the output is known as the \_\_\_\_\_.  
A) Noise Factor  
B) SNR  
C) Gain  
D) Both A and B
21. A cognitive radio network (CRN) is split into \_\_\_\_ main networks  
A) Three  
B) Two.  
C) Four  
D) Six.
22. The process of converting electrical energy into electromagnetic waves is known as \_\_\_\_\_.  
A) Electrification  
B) Electromagnetic Radiation.  
C) Modulation  
D) Both B and C
23. A VSWR of 1 indicates:  
A) perfect impedance matching  
B) Poor impedance matching  
C) High input impedance  
D) None of the above
24. The polarization of an electromagnetic wave refers to the direction of its \_\_\_\_\_.  
A) Frequency  
B) Propagation  
C) Electric field  
D) Magnetic field
25. The \_\_\_\_\_ of an antenna refers to the range of frequencies over which it can effectively operate.  
A) directivity  
B) bandwidth  
C) polarization  
D) None of the above
26. Maxwell's First equation is based on \_\_\_\_\_.  
A) Gauss' Law for magnetism  
B) Ampere's Law  
C) Faraday's law  
D) Gauss' Law for electrostatic

27. Which of the following types of media can electromagnetic waves not propagate through?
- |           |                       |
|-----------|-----------------------|
| A) Vacuum | B) Air                |
| C) Water  | D) None of the above. |
28. Which antenna is used for TV broadcasting?
- |                    |                     |
|--------------------|---------------------|
| A) Helical antenna | B) Patch antenna    |
| C) HORN antenna    | D) Yagi-Uda antenna |
29. What is the Radar Range Equation used for?
- |   |
|---|
| A) To determine the range of a target in a radar system |
| B) To determine the frequency range of a radar system   |
| C) To determine the power output of a radar transmitter |
| D) To determine the bandwidth of a radar system         |
30. Which type of polarization is most commonly used in radar systems?
- |                            |                          |
|----------------------------|--------------------------|
| A) Linear polarization     | B) Circular polarization |
| C) Elliptical polarization | D) Unpolarized radiation |
31. What is the function of a duplexer in a radar system?
- |   |
|---|
| A) To generate radar signals                |
| B) To amplify radar signals                 |
| C) To separate transmit and receive signals |
| D) To filter out noise from radar signals   |
32. What is the unit of radar cross section (RCS)?
- |                   |        |
|-------------------|--------|
| A) dB             | B) dBm |
| C) m <sup>2</sup> | D) W   |
33. What is the apogee of an elliptical orbit?
- |   |
|---|
| A) The point at which the satellite is closest to the center of the planet    |
| B) The point at which the satellite is farthest from the center of the planet |
| C) The point at which the satellite crosses the equatorial plane              |
| D) The point at which the satellite crosses the International Date Line       |
34. Which of Kepler's laws relates the period of a planet's orbit to its distance from the Sun?
- |                        |
|------------------------|
| A) Kepler's first law  |
| B) Kepler's second law |
| C) Kepler's third law  |
| D) Kepler's fourth law |
35. What is the typical orbital period and velocity of a satellite in a sun-synchronous orbit?
- |                            |
|----------------------------|
| A) 24 hours and 11.5 km/s  |
| B) 90 minutes and 7.9 km/s |
| C) 12 hours and 4.7 km/s   |
| D) 2 hours and 1.3 km/s    |

36. What is the function of direct broadcast satellites in satellite communication?  
A) To provide voice and data services to mobile devices  
B) To provide television broadcast services  
C) To provide global navigation services  
D) To provide weather forecasting services
37. Where was the first GSM deployed?  
A) Sweden  
B) Finland  
C) USA  
D) Russia
38. What does VSAT stand for?  
A) Very Small Aperture Terminal  
B) Very Strong Access Terminal  
C) Very Secure Authentication Terminal  
D) Very Simple Audio Terminal
39. The refractive index of the core is \_\_\_\_\_ compared to the cladding in an optical fiber.  
A) Higher  
B) Lower  
C) Same  
D) Cannot be determined
40. Which of the following is a common method for reducing modal dispersion in multimode fibers?  
A) Increasing the length of the fiber  
B) Reducing the refractive index of the core  
C) Using a graded-index core  
D) Increasing the numerical aperture of the fiber
41. \_\_\_\_\_ determines the optical fibers' ability to collect the light rays incident on it.  
A) Numerical Aperture  
B) Frequency  
C) Wavelength  
D) Length of fiber
42. Which of the following is not an example of an optical source?  
A) Laser diode  
B) Light emitting diode (LED)  
C) Photodiode  
D) SLED
43. What is the second name of the proxy server?  
A) Proxy tools  
B) Application proxy  
C) Application-level gateway  
D) All of the these
44. Which layer of the OSI model is responsible for providing reliable, error-free transmission of data?  
A) Application layer  
B) Transport layer  
C) Network layer  
D) Data Link layer

45. What is the size of the UDP header?  
A) 4 bytes    B) 8 bytes  
C) 12 bytes    D) 16 bytes
46. Which protocol is used for retrieving web pages from web servers?  
A) HTTP    B) TCP  
C) FTP    D) SMTP
47. What is the length of an IPv6 address in bits?  
A) 16 bits    B) 32 bits  
C) 64 bits    D) 128 bits
48. Which class of IP addresses is used for multicasting?  
A) Class A    B) Class B  
C) Class C    D) Class D
49. Which wireless network technology is designed to provide wireless broadband access over long distances?  
A) Wi-Fi    B) Bluetooth  
C) WiMAX    D) Ad-hoc networks
50. What is the range of Bluetooth technology?  
A) Up to 10 meters                                    B) Up to 100 meters  
C) Up to 1 kilometer                                    D) Up to 10 kilometers
51. Which of the following is not a type of firewall?  
A) Network-based firewall                            B) Host-based firewall  
C) Application-based firewall                        D) Fiber-based firewall
52. What is the purpose of the home location register (HLR) in a mobile communication system?  
A) To store user location data  
B) To authenticate the user on the mobile network  
C) To encrypt voice and data transmissions  
D) To manage billing and payments
53. What is the purpose of cell splitting in a cellular mobile system?  
A) To increase capacity  
B) To decrease interference  
C) To improve voice quality  
D) To extend coverage area
54. In a cellular network, channel assignment is the process of:  
A) Assigning unique frequencies to each cell  
B) Assigning unique time slots to each cell  
C) Assigning unique codes to each cell  
D) Assigning unique phone numbers to each cell

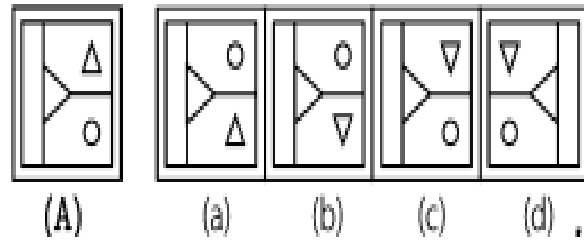
55. What is the maximum number of simultaneous voice calls that can be handled by a single GSM base station?
- A) 4    B) 8  
C) 16    D) 32
56. What is the purpose of a capacitor in an AC circuit?
- A) To store electrical charge  
B) To reduce voltage  
C) To increase voltage  
D) To rectify AC voltage
57. What is the purpose of a transformer in a power supply circuit?
- A) To rectify AC voltage  
B) To convert DC voltage to AC voltage  
C) To step up or step down AC voltage  
D) To provide a constant DC voltage
58. Which of the following statements is true about a closed-loop control system?
- A) The output of the system is not affected by the input  
B) The output of the system is only affected by the input  
C) The output of the system is affected by both the input and the feedback signal  
D) The output of the system is not affected by the feedback signal
59. What is the efficiency of an ideal transformer?
- A) 50%    B) 75%  
C) 100%    D) 25%
60. What is the Laplace transform of a unit step function?
- A)  $1/s$     B)  $s$   
C)  $1/(s+1)$     D)  $e^{-s}$
61. What is the impulse response of an FIR filter?
- A) It is finite and non-zero only for a finite duration  
B) It is infinite and non-zero only for a finite duration  
C) It is finite and non-zero for an infinite duration  
D) It is infinite and non-zero for an infinite duration
62. Which of the following is an application of AI/ML in wireless communication?
- A) Image enhancement  
B) Noise reduction  
C) Signal classification and prediction  
D) Sound Synthesis
63. Which of the following is a disadvantage of supervised learning in signal processing?
- A) It requires a large amount of labeled data  
B) It is prone to over-fitting  
C) It does not generalize well to new data  
D) It is computationally intensive

64. Which of the following is an example of an optimum filter in signal processing?  
A) High-pass filter                      B) Low-pass filter  
C) Band-pass filter                      D) Wiener filter
65. Which of the following is an example of unsupervised learning applied to signal processing?  
A) Image classification                      B) Speech recognition  
C) Anomaly detection                      D) Text translation
66. The Z-transform is used to analyze signals in which domain?  
A) Time domain                      B) Frequency domain  
C) Laplace domain                      D) None of the above
67. What is the time complexity of DFT?  
A)  $O(N)$                       B)  $O(N^2)$   
C)  $O(\log N)$                       D)  $O(N \log N)$
68. How does a radar system work?  
A) By emitting sound waves and detecting their echoes  
B) By emitting light waves and detecting their reflections  
C) By emitting radio waves and detecting their reflections  
D) By emitting infrared waves and detecting their absorption
69. What is the term used to describe the degree to which a measurement tool measures what it is supposed to measure?  
A) Reliability                      B) Validity  
C) Sensitivity                      D) Specificity
70. What is the term used to describe the closeness of a measurement to its true value?  
A) Precision                      B) Sensitivity  
C) Specificity                      D) Accuracy
71. Which of the following is a measure of precision?  
A) Standard deviation                      B) Mean  
C) Median                      D) Mode
72. Which of the following digital instruments is commonly used to measure voltage, current, and resistance in electronic circuits?  
A) Oscilloscope                      B) Multimeter  
C) Signal generator                      D) Transducer
73. Which of the following is the core component of an operating system that manages system resources and provides services to applications?  
A) Kernel                      B) Shell  
C) Compiler                      D) Debugger



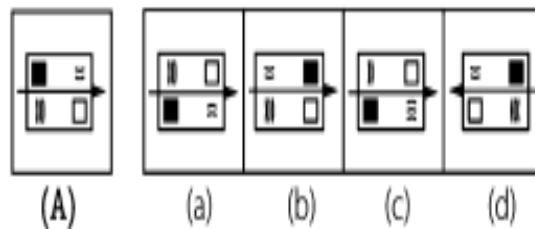
74. Which of the following I/O techniques involves a direct transfer of data between the I/O device and memory, without involving the CPU?
- Programmed I/O
  - Interrupt-driven I/O
  - Direct memory access (DMA)
  - Input/output control (IOC)
75. What is virtual memory?
- A type of memory that can be accessed directly by the CPU
  - A type of memory that is used for long-term storage of data
  - A technique that allows programs to use more memory than physically available in the system
  - A type of memory that is used for storing data temporarily
76. What is an instruction set in computer organization?
- A set of instructions that the CPU can execute
  - A set of instructions that the operating system can execute
  - A set of instructions that the user can execute
  - None of the above
77. What is a function in programming languages?
- A statement that performs a specific task
  - A named location in memory that stores a value
  - A type of data that can be used to perform arithmetic operations
  - A named block of code that can be executed when called.
78. The vector  $(y^2 - z^2 + 3yz - 2x)\hat{i} + (3xz + 2xy)\hat{j} + (3xy - 2xz + 2z)\hat{k}$  is:
- solenoidal but not irrotational.
  - irrotational but not solenoidal.
  - both solenoidal and irrotational.
  - neither solenoidal nor irrotational.
79. The Newton-Raphson method is used to find the root of the equation  $x^2 - 3 = 0$ . If the iterations are started from -1, the iteration will
- converge to -1.
  - converge to  $\sqrt{3}$ .
  - converge to  $-\sqrt{3}$ .
  - not converge.
80. The z-transform and region of convergence of the function  $u(n) = 2^n, n < 0$  is:
- $\frac{z}{z-2}$  and  $ROC$  is  $|z| < 2$
  - $\frac{z}{z-2}$  and  $ROC$  is  $|z| \geq 2$
  - $\frac{z}{2-z}$  and  $ROC$  is  $|z| < 2$
  - $\frac{z}{2-z}$  and  $ROC$  is  $|z| \geq 2$

81. Find the water Image of the object given in the question figure denoted by (A) out of the figure given in the answer figures (a), (b), (c) & (d)



- A) (a)                                  B) (b)  
C) (c)                                  D) (d)

82. Find the water Image of the object given in the question figure denoted by (A) out of the figure given in the answer figures (a), (b), (c) & (d)



- A) (a)                                  B) (b)  
C) (c)                                  D) (d)

83. Six faces of the dice are A, B, C, D, E and F. A is adjacent to B. B is adjacent to D but not C. E is adjacent to D and F. What is the side opposite to A?

- A) C                                      B) D  
C) E                                      D) F

84. Television : Telecast :: Radio : ?

- A) Broadcast                              B) News  
C) Music                                    D) Dawn

85. A man is engaged for planting trees for 10 hours. He plants 10 trees in an hour. He takes rest for 30 minutes after every hour. How many trees does he plant in 10 hours?

- A) 45                                      B) 50  
C) 70                                      D) 100

86. A man starts from a point, walks 2 km towards north, turns towards his right and walks 2 km, turns right again and walks. What is the direction now he is facing

- A) North                                    B) South  
C) East                                      D) West

87. Eight friends A, B, C, D, E, F, G and H are sitting around a round table in the same order at equal distances. Their positions are in clockwise direction. If G, who is sitting in the North exchanges seat with C and B exchanges seat with F. Now who is sitting to the right of F?

- |      |      |
|------|------|
| A) A | B) B |
| C) E | D) G |

88. Answer the question on the basis of following information

Neelu, Pavitra, Sinthia, Pallavi and Madhvi are five friends. Each of them have 6 balls. Neelu gives three balls to Pallavi, who further gives two balls each to Pavitra and Madhvi. Sinthia gives 4 balls to Neelu who in turn gives 3 balls each to Pavitra and Madhvi. Pavitra gives 5 balls to Sinthia and Madhvi gives 4 balls to Pallavi.

How many balls are with Sinthia?

- |      |      |
|------|------|
| A) 9 | B) 6 |
| C) 8 | D) 7 |

89. Answer the question on the basis of the information given below:

In a code language

'few organic farming techniques' is written as 'li gs da cr'

'fertilizer products few available' is written as 'fo pz nb gs'

'organic waste into fertilizer' is written as 'nb cr pt mk'

'disposal of farming waste' is written as 'hu mk li yu'

If in the given coding language 'waste management techniques' is changed to 'ax da mk', then what will be the code for 'farming fertilizer management'?

- |             |             |
|-------------|-------------|
| A) ax nb cr | B) li ax pt |
| C) nb li ax | D) gs li nb |

90. In the following question, there are two statements followed by two conclusions numbered 1 and 2. You have to take the given two statements to be true even if they seem to be at variance from commonly known facts. Read the conclusion and then decide which of the given conclusions logically follows from the two given statements, disregarding commonly known facts.

Statements: Many scooters are trucks. All trucks are trains.

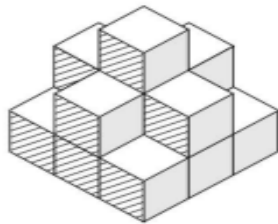
Conclusions:

I. Some scooters are trains.

II. No truck is a scooter.

- A) Only Conclusion I follows      B) Only Conclusion II follows  
C) Neither I nor II follows      D) Both I and II follows

- 91 How many cubes are in this diagram given below?



- A) 8      B) 9  
C) 12      D) 15

92. For the following questions select the letter/word which will come at?

Eagle : Swoops :: Duck : ?

- A) Floats      B) Swims  
C) Waddles      D) Flies



