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RRB JE 2019
Electronics CBT 2

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(11th-12th Aug) Questions & Solutions

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1. Which one of the following is not true for oersted experiment:
A. The magnetic field lines encircle the current-carrying wire.
B. The magnetic field lines lie in a plane parallel to the wire.
C. If the direction of the current is reversed, the direction of the magnetic field reverses.
D. The strength of the field is directly proportional to the magnitude of the current.

Ans. B

Sol. according to oersted experiment:
The magnetic field lines encircle the current-carrying wire.
The magnetic field lines lie in a plane perpendicular to the wire.
If the direction of the current is reversed, the direction of the magnetic field reverses.
The strength of the field is directly proportional to the magnitude of the current

2. How is mass number of an atom determined?
A. By total number of protons
B. By total number of neutrons
C. By adding number of protons and neutrons
D. By total number of electrons

Ans. C

Sol.

- The **number of protons and neutrons combined** to give us the mass number of an atom.
- As both protons and neutrons are present in the nucleus of an atom, they are together called nucleons.
- Atomic mass is expressed in atomic mass units or amu.

3. Which of following is known as white vitriol?
A. Suphuric acid
B. Ferrous Sulphate
C. Zinc Sulphate
D. Copper Sulphate

Ans. C

Sol. Zinc Sulfate is a white crystalline, water-soluble compound. The hydrated form, zinc sulfate heptahydrate known as "white vitriol" and can be prepared by reacting zinc with aqueous sulfuric acid.
It is used in:-
* Making lithopone
* As a mordant in dyeing
* As a preservative for skins and leather
* In medicine as an astringent and emetic.

4. How many flip-flops are required for counter that will count 0 to 255?
A. 2 B. 4
C. 16 D. 8

Ans. D

Sol. since the counter is counting from 0 to 255 i.e. 256 states 8 flip-flops must be required as $2^8 = 256$.

5. The ability of a material to remain magnetized after removal of the magnetizing force is known as
A. Reluctance B. hysteresis
C. retentivity D. permeability

Ans. C

Sol. Retentivity - A measure of the residual flux density corresponding to the saturation induction of a magnetic material. In other words, it is a material's ability to retain a certain amount of residual magnetic field when the magnetizing force is removed after achieving saturation.

6. Faraday constant :
A. depends on the amount of the electrolyte
B. depends on the current in the electrolyte
C. is a universal constant
D. depends on the amount of charge passed through the electrolyte.

Ans. C

Sol. The Faraday constant, F, is a physical constant equal to the total electric charge carried by one mole of electrons. It is a universal constant.

7. A transformer steps up an a.c. supply from 220 to 2200 V. If the secondary coil of the transformer has 2000 turns, the number of turns is its primary coil will be :
A. 200 B. 100
C. 50 D. 20

Ans. A

Sol. If the secondary coil has greater number of turns than the primary , the voltage is stepped up . This type of arrangement is called Step up Transformer .
Here, Number of turns in primary coil (Np) = ?
Number of turns in Secondary coil (Ns) = 2000
Voltage in primary coil (Ep) = 220 V
Voltage in secondary coil (Es) = 2200 V .
Ep/Es = Np/Ns

$$\frac{E_p}{E_s} = \frac{N_p}{N_s}$$

On substituting values,
Np = 200 turns.

8. If the voltage gain doubles, the decibel voltage gain increases by
A. A factor of 2 B. 3 dB
C. 6 dB D. 10 dB

Ans. C

Sol. $V(in\ dB) = 20\log_{10} V$

So if V is doubled then

$V_1(in\ dB) = 20\log_{10} 2V$

$= 20\log_{10} 2 + 20\log_{10} V$

$\approx 6 + V\ (in\ dB)$

So if the voltage gain doubles, the decibel voltage gain increases by 6 dB

9. In which book is the 'Sanyasi revolt' mentioned?
A. Discovery of India
B. Anandamath
C. Geetanjali
D. None of these

Ans. B

Sol. Under the Sanyasi revolt (1763-1800), people were banned from coming to pilgrimage places.

- From 1763 onwards, the Sanyasi Revolt or uprising had engulfed the area of Bengal, Bihar and Uttar Pradesh.
- Religious people were very upset due to restrictions on pilgrimages.
- This rebellion could be suppressed after a long campaign of Warren Hastings.
- This monstrous revolt has been mentioned by Bankim Chandra Chattopadhyay in his novel Anandmath.

10. The ratio of DC output current and RMS output currents for full wave rectifier is
A. 0.9 B. 0.707
C. 1.414 D. 0.8

Ans. A

Sol. $I_{DC} = \frac{2I_m}{\pi}, I_{RMS} = \frac{I_m}{\sqrt{2}}$

$\therefore \frac{I_{DC}}{I_{RMS}} = \frac{2\sqrt{2}}{\pi} = 0.9$

11. 8255 is used to connect_____ to microprocessor .
A. Programmable peripherals
B. Timers
C. Clock
D. Memory

Ans. A

Sol. 8255 is programmable peripheral interface and is used to connect devices like keyboard, mouse etc with microprocessor.

12. What differentiate a circular linked list from a normal linked list ?
A. You can not have next pointer pointing to a null in circular linked list
B. It is faster to transverse the circular linked list
C. You may or may not have the next pointer point to a null in a circular linked list
D. All of the mentioned

Ans. C

Sol. The next pointer points to null only when list is empty otherwise it points to the head of the list

13. Where is the head office of Central Pollution Control Board located?
A. Noida
B. New Delhi
C. Gandhi Nagar
D. Bangalore

Ans. B

Sol. • The Central Pollution Control Board (CPCB) has its head office in New Delhi.
• It was established in 1974 under the Water (Prevention and Control of Pollution) Act, 1974.
• It is the apex organisation in India in the field of pollution control. The board is led by its Chairperson.

14. The unit for reluctance is
A. Ampere/meter
B. Weber
C. Tesla
D. Ampere-turns /weber

Ans. D

Sol.

$R = \frac{l}{\mu a}\ where\ l = length\ a = area\ of\ cross\ section$

$\mu = premeability$

$R = \frac{F}{\phi}\ (F = magnetomotive\ force\ in\ Ampere turns$

$\phi = magentic\ \ flux in\ webers)$

15. From a 3-bit binary counter design using T flip- flops, determine the number of T flip-flops needed in its circuit implementation.
A. 1 B. 2
C. 3 D. 4

Ans. C
Sol. For a n-bit counter we always require N number of flip-flops so From a 3-bit binary counter design using T flip-flops 3 T flip-flops needed in its circuit implementation.

16. How to reduce the earth capacitance of a transmission line?
A. Using guard ring
B. Using special designed earth capacitances
C. Implementing parallel insulator lines
D. Any of the mentioned
Ans. A
Sol. The guard rings can provide an economical protection to the string and it is very simple method.
This ring is called a grading or guard ring which gives a capacitance which will cancel the charging current of ground capacitance. Guard ring serves two purposes. Equalizing the voltage drop across each insulator unit and protects the insulator against flash over. Guard ring is mainly used as a guardian of insulators.

17. In a spreadsheet, a _____ is a number you will use in a calculation.
A. label B. cell
C. Field D. value
Ans. D
Sol. **Spreadsheets** are useful **at home** and in **business applications**. Spreadsheets make it easy to view and **exhibit data** in a number of manners. **Values** are one of the **primary types** of data used in **spreadsheets**.

18. The starting sequence of IPv4 addressing is fixed at 10 , then this address belongs to _____ class of addressing.
A. Class A B. Class B
C. Class C D. Class D
Ans. C
Sol. IPV4 has following 5 classes of address

Class	Fixed bits (in starting)	Address range
Class A	0	0—127
Class B	10	128—191
Class C	110	192—223
Class D	1110	224 — 239
Class E	1110	240 — 256

19. Which gas is present in highest amount in natural gas?
A. Methane B. Ethane
C. Propane D. Butane
Ans. A
Sol. • The Highest amount of gas present in Natural gas is **Methane.**
• The composition of gases in natural gas is :
Methane = 60-90%
Ethane = 0-20%
Propane = 0-20%
Butane = 0-20%.

20. Which of the following is not an advantage of rainwater harvesting?
A. Environment friendly
B. Increase ground water level
C. Mitigate drought effects
D. Contamination
Ans. D
Sol. Rainwater harvesting is a method of collecting rainwater immediately from the surfaces it has fallen directly before it is lost as surface run off. It can help to overcome the inadequacy of surface water, improve groundwater levels and quality, reduces flood hazards and mitigates effects of drought. However, there can be a possibility of contamination without proper cleaning or from poorly constructed containers.

21. Pollution of water is maximally due to___
A. animal activities
B. human activities
C. alien activities
D. all of the above
Ans. B
Sol. The water pollution is caused by the addition of organic and inorganic chemicals as well as the biological materials which change the physical and chemical properties of water. Most of these harmful activities are done by human.

22. Why water drops come down spherical in shape?
A. Due to Surface Tension
B. Air Friction
C. Continuous evaporation
D. None of the above
Ans. A
Sol. • Spherical area has less water surface tension.
• The Surface tension pulls the surface of the drop equally at all points thus produces the spherical shape having the minimum surface area.

23. Comment on the following pointer declaration
int *Ptr , P ;
A. Ptr is a pointer to integer, P is an integer
B. Ptr and P both are pointers to integer
C. Ptr is a pointer, P may or may not be an integer
D. Ptr and P both are not pointers

Ans. A

Sol. Since both are defined by int data type both variable P and pointer Ptr are integer.

24. Who has been appointed as the Governor of Chhattisgarh?
A. Anandiben Patel
B. Anusuiya Uikey
C. Raman Singh
D. Deepak Mishra

Ans. B

Sol. • Rajya Sabha member **Anusuiya Uikey** has been appointed as Governor of **Chhattisgarh**.
• She has replaced **Anandiben Patel**.
• She was previously holding the post of Minister of Women and Child Development in the Madhya Pradesh government.
• She is the **first tribal women** to hold the post of Governor of Chhattisgarh since the formation of state in **2000**.
• She was appointed as Governor of Chhattisgarh on **16th July 2019**.
• She is the **sixth** Governor of Chhattisgarh.

25. _____Provides a means to manage large amount of data efficiently.
A. Data collection
B. Data structure
C. Data organisation
D. Data managing

Ans. B

Sol. In computer science, a data structure is a particular way of organising data in a computer so that it can be used efficiently.

26. If f1 = 1 MHz and f2 = 10 Hz, the ratio f1/f2 represents how many decades?
A. 2 B. 3
C. 4 D. 5

Ans. D

Sol. f1 = 1 MHz and f2 = 10 Hz

Now $\frac{f1}{f2}=\frac{1\times10^{6}}{10}$

$=10^{5}$

So it represents 5 decades.

27. Which of the following is/are the primary transduces
A. Diaphragm
B. Capsule
C. Bellow
D. All of the above

Ans. D

Sol. Diaphragm, Bellow, Jordan tube, capsule are the primary transducers and all are used for the pressure measurement.

28. A small collector current with zero base current is caused by the leakage current of the
A. Emitter diode
B. Collector diode
C. Base diode
D. Transistor

Ans. B

Sol. A small collector current with zero base current is caused by the leakage current of the Collector diode at that time

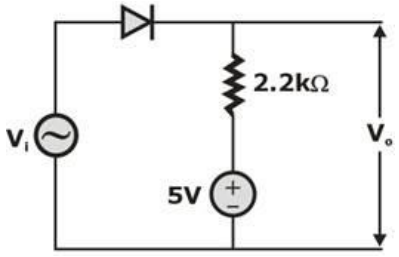
$I_C = I_{CBO} \quad as \quad (I_B = 0)$

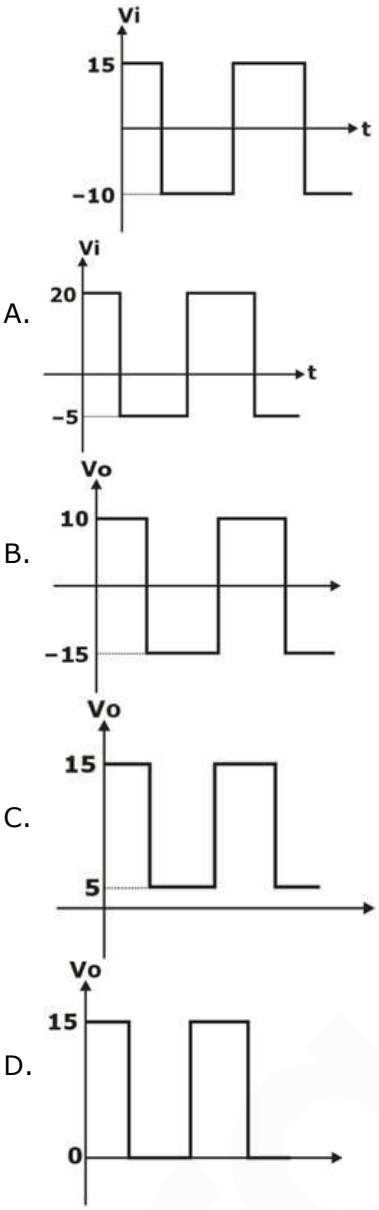
29. Cross-section of RADAR defines
A. Its Power radiating ability
B. Scattering ability of target
C. Energy scattered by unwanted objects
D. Cross section of RADAR radiating energy

Ans. B

Sol. RADAR cross section is ratio of scattered power in a given direction to the power incident on it. Power incident defines energy radiated by Transmitter of RADAR.

30. Determine output waveform for given circuit





Ans. C

Sol. For V_i = is V diode will be short
$\therefore V_o = V_i$
For V_i = — 10V diode will be open
$\therefore V_o$ = 5V
$\therefore$ Option C is correct

31. If the total voltage in the Am wave is 5.196 V and modulation index is 0.4 then the carrier voltage before modulation is _____ V
A. 2.43 V B. 4.345 V
C. 5 V D. 3.45 V

Ans. C

Sol. V_t = 5.196, μ = 0.4

$$V_t = V_c\sqrt{1+\frac{\mu^2}{2}}$$

$$5.196 = V_c\sqrt{1+\frac{(0.4)^2}{2}}$$

$\therefore V_c$ = 5 V

32. The Gulf of Aden connects Arabian Sea to which Sea?
A. Red Sea
B. South China Sea
C. Caspian Sea
D. Andaman

Ans. A

Sol.
- The **Gulf of Aden** connects the **Arabian Sea to the Red Sea**.
- The Gulf of Aden connects the Arabian Sea and the Red Sea through the strait of **Bab-el-Mandeb**.
- The Gulf of Aden connects with the **Indian Ocean** through the **Guardafui Channel**.
- The Arabian Sea is a region of the northern Indian Ocean bounded on the north by **Pakistan and Iran**.

33. Which one of the following is a bad thermal conductor?
A. Aluminum B. Copper
C. Glass D. Silver

Ans. C

Sol.
- **Glass**, wood and plastic are all excellent insulators and bad thermal conductors.
- In glass, there is no flow of free electrons and hence it doesn't conduct heat but it is a good insulator which allows electricity and heat to pass through it by radiation following the law of optics.

34. The 7812 IC produces regulated output voltage of
A. +2 V B. +12 V
C. −2 V D. −12V

Ans. B

Sol. IC 78XX series produces +ve voltage and IC 79XX series produces −ve voltages.
7812 produces +12 voltage

35. Faraday constant F, Avogadro number N and electronic charge e are related with each other by "
A. $F = \frac{N}{e}$
B. $F = \frac{e}{N}$
C. F = Ne
D. F = N e^2

Ans. C

Sol. The Faraday constant is related to Avogadro's constant N_A and the elementary charge of an electron e by the equation:
F = e N_A
where:
$e \approx 1.60217662\times10^{-19}$ C
$N_A \approx 6.02214086\times10^{23}$ mol^{-1}

36. Packet sniffering involves
A. Active receiver
B. Passive receiver
C. Both Active receiver and Passive receiver
D. None of the mentioned
Ans. B
Sol. In packet sniffing the receiver is silent and does not inject new packet but is silent and just copies data packets in the given networks and is a passive receiver.

37. Common gateway interface is used to
A. generate web pages
B. stream videos
C. generate executable files from web content by web server
D. None of the above
Ans. C
Sol. Common gateway interface is used to generate executable files from web content by web server.

38. If an op-amp has unity gain bandwidth of 6 MHz then calculate its gain at 10 KHz
A. 60 B. 600
C. 6000 D. 6
Ans. B
Sol. Por an op-amp gain × bandwidth is constant
$\therefore 1 \times 6 \times 1^6 = \text{gain} \times 10 \times 10^3$
$\therefore 600 = \text{gain}$

39. If value of both capacitors is 0.1 μF and value of both resistors is 1.6 kΩ in wein bridge oscillator then value of output frequencies is _____kHz.
A. 1 B. 4
C. 2 D. 0.5
Ans. A
Sol. $f = \frac{1}{2\pi\sqrt{R_1C_1R_2C_2}}$
$= \frac{1}{2\pi \times 0.1 \times 10^{-6} \times 1.6 \times 10^3}$
f = 1 kHz

40. During the boot process, the _____ looks for the system files.
A. CD B. BIOS
C. CPU D. DVD
Ans. B
Sol. BIOS (basic input/output system) is the program a personal computer's microprocessor uses to get the computer system started after you turn it on. It also manages data flow between the computer's operating system and attached devices such as the hard disk, video adapter, keyboard, mouse and printer.

41. A technique of controlling noise pollution by planting green plants or trees is known as –
A. Afforestation
B. Green muffler
C. Decibel meter
D. None of the above
Ans. B
Sol. In this technique, we can control noise pollution by planting green plants, normally 4-5 rows of plants are grown near noisy areas like roadsides and industrial areas so that these trees can create some obstruction for noise to reach to residents.

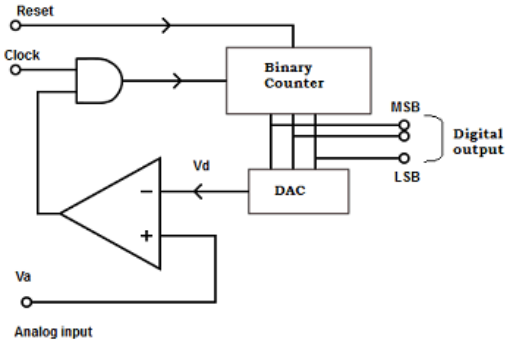
42. Crippling in energy meters occurs due to _____ compensation of the friction.
A. Over
B. Critical
C. Under
D. None of the above
Ans. A
Sol. Crippling in energy meters occurs due to overcompensation of friction as aluminium disk rotates slow and steady even if no current is applied.

43. If an electron is moving with velocity of 104 m/s perpendicular to the magnetic field of intensity 5 tesla. Then force on the electron will be,
A. 8×10^{-15} N
B. 0 N
C. 3.2×10^{-14} N
D. 1.6×10^{-19} N
Ans. A
Sol. $F = q(\bar{V} \times \bar{B})$
$= 1.6 \times 10^{-19} \cdot (V \cdot B \sin\theta)$
$= 1.6 \times 10^{-19} \times 10^4 \times 5 \times \sin 50$
$F = 8 \times 10^{-15}$ N

44. In which year Hima Das was honored with the Arjuna Award by the President of India?
A. 2017 B. 2014
C. 2018 D. 2019
Ans. C
Sol.
- Hima Das was conferred with **Arjuna Award** by the President of India on **25th September 2018**.
- The Arjuna Awards are given by the **Ministry of Youth Affairs and Sports**, Government of India to recognize outstanding achievement in sports.
- It was started in **1961**.
- The award carries a cash prize of **₹500,000**, a bronze statue of **Arjuna** and a scroll.

• **Hima Das** is the first Indian athlete to win a **gold medal** in a track event at the **IAAF World U20 Championships**.

45. At what condition the digital to analog conversion is made?



A. Va > Vd B. Va ≤ Vd
C. Va ≥ Vd D. Va ≠ Vd

Ans. B

Sol. When Va < Vd, the output of the comparator becomes low and the AND gate is disableD. This stops the counting at that time and the digital output of the counter represents the analog input voltage.

46. Which gas is responsible for "Global Warming"?
A. Nitrogen (N_2)
B. ethane
C. Carbon dioxide (CO_2)
D. Sulphur dioxide (SO_2)

Ans. C

Sol. Global warming is caused by the emission of greenhouse gasses. 72% of the totally emitted greenhouse gases are Carbon dioxide (CO_2).18% methane and 9% nitrous oxide (NO_2). Carbon dioxide emissions, therefore, are the most important cause of global warming.

47. Minimum possible peak amplitude of Am signal will be if $A_c = 6$ and $\mu = 0.4$
A. 8.4 B. 2.6
C. 3.6 D. 4.8

Ans. C

Sol. $A_{min} = A_c [1 + \mu]$
$= 6 [1 - 0.4]$
$\therefore A_{min} = 3.6$

48. According to which article of the Constitution, the executive power of the Union will be vested in the President ?
A. Article 51 B. Article 56
C. Article 53 D. Article 50

Ans. C

Sol. **Article 53** of the Constitution says that the executive power of the Union shall be vested in the President and shall use it according to this constitution either by himself or by his subordinate officer.

• **Article 52** of the Constitution stipulates a President for India .

49. Which of the following is not a greenhouse gas?
A. Water vapour B. O_2
C. O_3 D. CO_2

Ans. B

Sol. The primary greenhouse gases in the Earth's atmosphere are water vapor, carbon dioxide, methane, nitrous oxide, and ozone. Hence from the given options O_2 is the only gas which is not a green house gas.

50. The propagation constant of a transmission line with impedance and admittance of 16 and 25 respectively is
A. 4 B. 5
C. 20 D. 1.25

Ans. C

Sol. $\gamma = \sqrt{Z \cdot Y}$
$= \sqrt{16 \times 25}$
$\gamma = 20$ units

51. Which of the following is also known as hydrated lime?
A. Sodium Hydroxide
B. Calcium carbonate
C. Calcium oxide
D. Calcium hydroxide

Ans. D

Sol. • Hydrated Lime, also known as **calcium hydroxide.**
• It is traditionally called slaked lime.
• It is an inorganic compound.
• Its molecular formula is $Ca(OH)_2$.

52. NBFM (Narrowband FM) generator along with frequency multipliers is used for
A. Direct Generation of FM
B. Indirect Generation of FM
C. Indirect Detection of FM
D. Direct Detection of FM

Ans. B

Sol. Square law device along with band pass filter is used for generation of AM And Square law device along with low pass filter is used for detection of AM VCO is used for direct generation of FM while NBFM (Narrowband FM) generator along with frequency multipliers is used for indirect Generation of FM and PLL is used for detection of FM

53. What kind of server converts IP addresses to domain names?

A. DNS B. MNS
C. UTP D. RTP

Ans. A

Sol. The **Domain Name System** (DNS) is a hierarchical distributed **naming system** for computers, services, or any resource connected to the Internet or a private network.

54. In _____ such as references and pointers, size and memory locations can be changed during program execution .
A. Liner data structure
B. Array
C. non-linear data structure
D. dynamic data structure

Ans. D

Sol. Dynamic data structures are ones which can shrink or expand as required during the program execution and their associated memory locations change.e.g. Linked list.

55. When a logic circuit rejects an unwanted signal, this is termed as,
A. logic levels
B. Noise margin
C. power consumption
D. propagation delay

Ans. B

Sol. The ability of a logic circuit to reject an unwanted signal is called as noise margin.

56. If the power gain doubles, the decibel power gain increases by
A. A factor of 2 B. 3 dB
C. 6 dB D. 10 dB

Ans. B

Sol. $P(in\ dB) = 10\log_{10} P$

So if P is doubled then

$P_1(in\ dB) = 10\log_{10} 2P$

$= 10\log_{10} 2 + 10\log_{10} P$

$\approx 3 + P\,(in\ dB)$

So if the power gain doubles, the decibel power gain increases by 3 dB

57. Copyrighted software that can be used for free is _____.
A. Commercial software
B. freeware
C. groupware
D. e-mail

Ans. B

Sol. Freeware is copyrighted computer software which is made available for use free of charge, for an unlimited time.

58. In an pnp transistor the majority carriers in the base are
A. electrons B. holes
C. neither D. both

Ans. A

Sol. In pnp transistor base is made up of n-type semiconductor so majority carrier will be electrons.

59. In a computer network node can be
A. The computer that originates the data
B. The computer that routes the data
C. The computer that terminates the data
D. All of the above

Ans. D

Sol. In a computer network node is basically a computer which can originate, route or terminate the data.

60. Which of the following Bird Sanctuary is located in Gujarat?
A. Nal Sarovar Bird Sanctuary
B. Harike Bird Sanctuary
C. Kanjirankulam Bird Sanctuary
D. Great Indian Bustard Sanctuary

Ans. A

Sol. • **Nal Sarovar Bird Sanctuary is situated in Ahmedabad, Gujarat**.
• It is the largest wetland bird sanctuary in Gujarat, and one of the largest in India.
• Nalsarovar was declared as a Ramsar site on 24th September 2012.
• Since 2005 it is the only lake that has been declared as Ramsar site in India.

61. What is the purpose of DMA facility in microprocessor based system?
A. To increase the speed of data transfer between processor and I/O devices
B. To increase the speed of data transfer between the processor and the memory
C. To increase the speed of data transfer between the memory and the I/O device.
D. To improve reliability of the system

Ans. C

Sol. DMA (direct memory access) facility gives the direct access of memory to I/O devices without interrupting the processor.

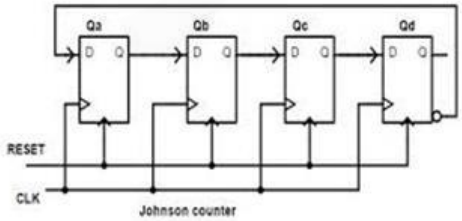
62. _____ of electrolyte indicates the state of charge of the battery
A. colour
B. mass
C. viscosity
D. specific gravity
Ans. D
Sol. Specific gravity is used to indicate the status of charge of the battery.

63. Baron Jons Jacob Berzelius discovered which of following?
A. Catalysis B. Ions
C. Valency D. Oxidation
Ans. A
Sol.

- **Catalysis** was discovered by **Baron Jöns Jacob Berzelius**.
- Berzelius himself discovered and isolated several newelements, including **cerium (1803)** and **thorium (1828)**.
- He developed classical analytical techniques, and investigated isomerism and catalysis, phenomena that owe their names to him.
- Catalysis is a term which used for the **reactions/ processes** which occur in the presence of certain substances that increase the rate of the reaction without being consumed.

64. There are _____ flip-flops for a 3-bit binary counter.
A. 2 B. 3
C. 4 D. 5
Ans. B
Sol. There are 'n' flip-flops for an n-bit binary counter so there are 3 flip-flops for a 3-bit binary counter.

65. A ring counter where the output is inverted and tied back to the input.
A. shift counter
B. decade counter
C. BCD counter
D. Johnson counter
Ans. D
Sol. In Johnson ring counter the output is inverted and tied back to the input.



66. The gases present in the atmosphere that cause greenhouse effect are__
A. Carbon dioxide, oxygen, nitrogen
B. Carbon dioxide, sulphur dioxide, methane
C. Nitrous oxide, oxygen, water vapours
D. Methane, water vapours, carbon dioxide
Ans. D
Sol. The gases present in the atmosphere that cause the greenhouse effect are methane, water vapors, carbon dioxide. Greenhouse gasses are those gases which absorb and emits radiant energy within the thermal infrared range.

67. The output voltage of a thermocouple
A. remains constant with temperature
B. decreases with applied voltage
C. increases with temperature
D. increases with applied voltage
Ans. C
Sol. Thermocouple coverts temperature to its equivalent voltage with positive temperature coefficient, so the output voltage of a thermocouple increases with temperature.

68. In impedance relay, current element torque should be
A. Equal to voltage element torque
B. Greater than voltage element torque
C. Less than voltage element torque
D. None of these
Ans. A
Sol. Current element torque should be equal to the voltage element torque for the relay to be in stable position.

69. Where is the tradition of Birha, Rasiya and Hori folk songs?
A. Rajasthan
B. Madhya Pradesh
C. Uttar Pradesh
D. Gujarat
Ans. C
Sol. **Birha, Rassia and Hori** are the popular Folk song genre of Uttar Pradesh.
• **Birha** genre is mood based and the basic theme revolves around the separation of lover and his beloved.
• **Rasiya** is the form of folk music that is mostly sung in this region on Holi. The Lathmar or 'Stick Beating' Holi of Braj is very famous for its numerous Rasiya.
• **Hori** is a genre of semi-classical singing, which is popular in Uttar Pradesh and Bihar. It comes under the category of season songs.

70. Which session of the Indian National Congress approved Gandhi Irwin Pact?
A. Lahore Session
B. Calcutta Session
C. Kanpur Session
D. Karachi Session

Ans. D

Sol. The Gandhi Irwin Pact was endorsed by the Congress in the Karachi Session of 1931, that was held from March 26-31. Gandhi was nominated to represent Congress in the Second Round Table Conference. Just a week back, Bhagat Singh, Sukhdev and Rajguru had been executed. So, there was anger in the public whose point was that why Gandhi did accept to sign the pact.

71. What is the capital of Cyprus?
A. Asgabat B. Phnom Penh
C. Ankara D. Nicosia

Ans. D

Sol. * Capital of Cyprus is **Nicosia.**
* Cyprus is an island in the Eastern Basin of the Mediterranean Sea.
* It is the third largest island in the Mediterranean and world's 80th largest island by area.

72. At the lower or upper cutoff frequency, the voltage gain is _____ A_{mid}
A. 0.35 B. 0.5
C. 0.707 D. 0.995

Ans. C

Sol. At the upper cutoff frequency, the voltage gain is 0.707Amid these points are known as half power pints and difference between upper cutoff frequency and lower cutoff frequency is the bandwidth.

73.

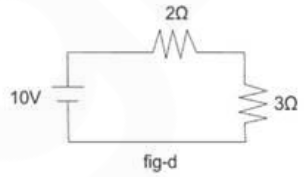


fig-d

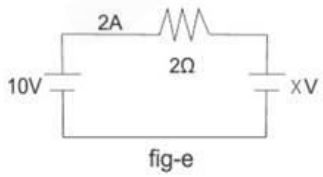


fig-e

If fig-d is converted to fig-e then find the value of battery X?
A. 8 B. 10
C. 12 D. 6

Ans. D

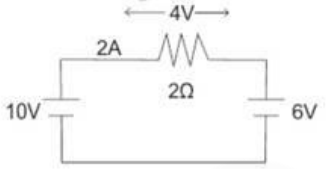
Sol. As per voltage division rule voltage across 3Ω and 2Ω resistance are

$$V_{3\Omega} = \frac{10 \times 3}{3+2} = 6\ V$$

$$V_{2\Omega} = \frac{10 \times 2}{3+2} = 4\ V$$

$$Current\ through\ the\ circuit,\ I = \frac{10}{3+2} = 2\ A$$

So voltage across 3 ohm resistance is 6 volt so it can be replaced by a battery of 6V.



74. How many states of India share border with Myanmar?
A. 5 B. 3
C. 2 D. 4

Ans. D

Sol. • The **four** northeast Indian states share border with Myanmar.
• These states share **1,643 km** border with Myanmar.
• These 4 states are Arunachal Pradesh, Nagaland (215 Km), Mizoram (510 Km) and Manipur (398 Km).
• **Arunachal Pradesh** (520 Km) shares longest border with Myanmar.
• Myanmar shares its border with India, China, Bangladesh, Thailand and Laos.

75. Wastes should always be___
A. recycled and reused
B. should be dumped in environment
C. should be stored in house
D. should be dumped in neighbors house

Ans. A

Sol. We have to return our organic waste where it belongs the soil rather than sending banana peels, grass clipping etc. to the municipal dump, and start a compost pile instead. If you recycle your yard and garden waste, you will reduce the amount of energy used to send this waste to the dump.

76. 8086 microprocessor is operated as _____ microprocessor
A. 8 bit B. 16 bit
C. 8 bit or 16 bit D. None of these

Ans. C

Sol. 8086 microprocessor can be operated as 8 bit as will as 16 bit microprocessor both.

77. Who among the following has invented Java?
A. James Gosling
B. Dannis Retchie
C. Bill Gates
D. Steve Jobs

Ans. A

Sol. **James Arthur Gosling** is a Canadian computer scientist best known as the father of the **Java programming** language.

78. The duty cycle of the most significant bit (MSB) from a 4-bit BCD counter is _____
A. 20% B. 50%
C. 10% D. 80%

Ans. A

Sol. There are 10 states, out of which MSB is high only for (1000, 1001) 2 times. Hence duty cycle is 2/10*100 = 20%. Since the duty cycle is the ratio of on-time to the total time.

79. Time period of monostable 555 multivariate is
A. T = 3RC B. T = 0.33 RC
C. T = RC D. T = 1.1 RC

Ans. D

Sol. The time period of monostable multivariate is

$$T = RC\ln\left(\frac{1}{3}\right)$$

T = 1.1 RC

80. The difference in energy used by, a 250 W TV set in 1 h and 1200 W toaster in 10 minutes ?
A. 50 Wh B. 60Wh
C. 70Wh D. 25 Wh

Ans. A

Sol. Energy used by 250 W TV set in 1 h = 250 W × 1h = 250 Wh
Energy used by 1200 W toaster in 10 min. (i.e., 1/6 h) = 1200 W ×(1/6) h = 200 Wh
Thus, a 250 W TV set uses more power in 1h than a 1200 W toaster in 10 minutes.

81. A process that uses an electric current to reduce dissolved metal cations so that they form a thin coherent metal coating on an electrode is called:
A. electroplating
B. ionization
C. oxidation
D. none of these

Ans. A

Sol. process that uses an electric current to reduce dissolved metal cations so that they form a thin coherent metal coating on an electrode is called electroplating. Electroplating is primarily used to change the surface properties of an object (such as abrasion and wear resistance, corrosion protection, lubricity, aesthetic qualities), but may also be used to build up thickness on undersized parts or to form objects by electroforming.

82. What is the other name used for Terylene polyester fibre?
A. Dacron B. Teflon
C. Nylon D. Rayon

Ans. A

Sol. * **Dacron** or **Terylene** is the best known example of polyesters.
* The fibre was first created in 1941 by chemist J R Whinfield.
* Dacron fibre is elastic in nature and crease resistant and is used in blending with cotton and wool fibre and also as glass reinforcing materials in safety helmets.

83. The efficiency of a cell is 50 Ah. If will give 0.5 amp current upto :
A. 50 h B. 100 h
C. 25 h D. 0.5 h

Ans. B

Sol. Efficiency = 50 Ah
That means it will give 50A for 1 hour
So, it will give 0.5 A current for

$$= \frac{50}{1} \times \frac{1}{05}$$

$$= \frac{500}{5}$$

= 100 h

84. In microwave communication line height of transmitter and receiver are 25 m and 64 m respectively then the range of this line operates satisfactory is _____ km
A. 59 B. 60
C. 53 D. 57

Ans. C

Sol. R (range) = 4.12 $\left(\sqrt{h_t} + \sqrt{h_r}\right)$ km

Where h_t and h_r in meters

R (range) = 4.12 $\left(\sqrt{25} + \sqrt{64}\right)$ km

= 53.56 km

85. A transformer is used :
A. to transform electric energy into mechanical energy
B. to transform ac into dc
C. to obtain suitable ac voltage
D. for both (B) and (C)

Ans. D

Sol. A transformer is used to bring voltage up or down in an AC electrical circuit. A transformer can be used to convert AC power to DC power. There are transformers all over every house, they are inside the black plastic case which you plug into the wall to recharge your cell phone or other devices.

All transformers have one basic function: increasing or decreasing alternating current within the electrical system. By regulating the flow of current, the transformer allows for increased energy efficiency, which regulates and ultimately lowers electricity bills.

86. _____is a phenomenon in which a temperature difference between two dissimilar electrical conductors produces a voltage difference between the two substances.
A. seebeck effect
B. peltier effect
C. Faraday's effect
D. ohm's law

Ans. A

Sol. The Seebeck effect is a phenomenon in which a temperature difference between two dissimilar electrical conductors or semiconductors produces a voltage difference between the two substances.

87. The IPV4 address is given as 168.0.0.1 the address belongs to
A. Class A B. Class B
C. Class C D. Class D

Ans. C

Sol. IPV4 has following 5 classes of address

Class	Fixed bits (in starting)	Address range
Class A	0	0—127
Class B	10	128—191
Class C	110	192—223
Class D	1110	224 — 239
Class E	1110	240 — 256

88. At the initial stage of ROM _____ is used.
A. RAM
B. encoder
C. decoder
D. None of the above

Ans. C

Sol. At the initial stage of ROM decoder is used. ROM is made up of decoder and number of OR gates.

89. The communication satellites have bandwidth of _____ MHz.
A. 500 B. 300
C. 470 D. None

Ans. A

Sol. The communication satellite has Bandwidth of 500 MHz. It has 12 channels of 36 MHz each and rest is guard band and frequency reserved for synchronization and control signals.

90. The ending address of 8 KB ROM is $B72E_H$:
Then the starting address of it will be _____.
A. 972 F_H B. D72 D_H
C. 970 F_H D. None of these

Ans. A

Sol. 8 KB has range from 0000H to 1FFFH

A_{15}	A_{14}	A_{13}	A_{12}	A_{10}	A_9	A_2	A_1	A_0
0	0	0	0	0	0	0	0	0
0	0	0	1	1	1	1	1	1

Range is $1FFF_H$
Ending address = $B72E_H$ — $1FFF_H$
= $972F_H$

91. Two resistances with values R_1 = 200 Ω ± 2% and R_2 = 100 Ω ± 1% resultant resistance will be
A. 300 ± 1%
B. 300 ± 1.66 %
C. 300 ± 3%
D. 300 ± 1.5 %

Ans. B

Sol. Overall R = R_1 + R_2 = 200 + 100 = 300 Ω

and $\delta R_1 = 200 \times \frac{2}{100} = 4\Omega$

$\delta R_2 = 100 \times \frac{1}{100} = 1\Omega$

∴ δ R = 5 Ω

$\therefore \%Er = \frac{\delta R}{R} \times 100$

$\frac{5}{300} \times 100$

∴ % E_r = 1.66 %

∴ Resultant resistance will be 300 ± 1.66 %

92. Calculate the CMRR of an OP-AMP having common mode gain of 10 and differential gain of 100,000
A. 1000 dB B. 80 dB
C. 100 dB D. 40 dB

Ans. B

Sol. $CMRR = \frac{\text{commondiffentialmode join}}{\text{commonmode join}}$

$= \frac{100000}{10}$

CMRR = 10^4

∴ CMRR = 20 $\log_{10} 10^4$

∴ CMRR = 80 dB

93. The process of removal of environmental pollutants by humans is known as:
A. Bioremediation
B. Autonomy
C. Pasteurization
D. None of the above

Ans. A

Sol. The term 'Bioremediation' is used for the procedure in which the treatment of pollutants or waste has occurred. This treatment is done through the use of microorganisms which further break down the undesirable substances. In this process, the contaminated soils are also clean up.

94. A hot plate of an electric oven connected to a 220 V line has two resistance coils A and B, each of 24 Ω resistance, which may be used separately, in series , or in parallel. What are the currents in the three cases ?
A. 9.2 A, 4.6A,18.3A
B. 9.5 A, 4.8A,17.3A
C. 8.2 A, 7.6A,21.3A
D. 7.2 A, 5.6A,13.3A

Ans. A

Sol. Here, potential difference, V = 220 V
Resistance of each coil, r = 24Ω
(i) When each of the coils A or B is connected separately, current through each foil, i.e.

$$I = \frac{V}{r} = \frac{220\,V}{24\Omega} = 9.2A$$

(ii) When coils A and B are connected in series, equivalent resistance in the circuit,
R_s = r + r + r = 48Ω
Current through are series combination , ie.,

$$I_s = \frac{V}{R_s} = \frac{220V}{48\Omega} = 4.6A$$

(iii) When the coils A and B are connected in parallel, equivalent resistance in the circuit,

$$R_p = \frac{r}{2} = \frac{24\Omega}{2} = 12\Omega$$

Current through the parallel combination, ie.e,

$$I_p = \frac{V}{R_p} = \frac{220V}{12\Omega} = 18.3A$$

95. How many outputs does a full adder have?
A. 1 B. 2
C. 4 D. 8

Ans. B

Sol. Whether it is half adder or full adder they always have only two outputs sum and carry.

96. Pin type insulator are mostly subjected to which type of mechanical stress?
A. Compressive stress
B. Tensile stress
C. Both tensile and compressive stress
D. Twisting stress

Ans. D

Sol. The conductor is placed in the governor at the top of the insulator and is tied down. So the weight of wire acts on the top of the insulator in downward direction causing compressive stress on insulator. No tensile stress is acted on the pin type insulator.

97. The non-inverting and inverting inputs bf an op-amp haj voltages 1.5 mv respectively. If the op-amp has common mode gain of 10 and differential mode join of 10,000 then output voltage will be_____
A. 5.0125 mv B. 25.0125 mv
C. 25.0125v D. 5.0125 V

Ans. D

Sol. $V_s = V_{CM} \times A_{CM} + A_{dm} \times V_{dm}$

$$= \left(\frac{V_1 + V_2}{2}\right) A_{cm} + (V_1 - V_2) \times V_{dm}$$

$$= \left(\frac{2.5}{2} \times 10 + 0.9 \times 10000\right) \times 10^{-3}$$

∴ V_o = 5.0125V

98. Oracle is an example of _____ application software.
A. Database
B. word processing
C. project management
D. presentation graphics
E. Desktop

Ans. A

Sol. A **database** is a collection of information that is organized so that it can easily be accessed, managed, and updated. Databases can be classified according to types of content, bibliographic, full-text, numeric and images.
Oracle Database is a multi-model database management system produced and marketed by Oracle Corporation.

99. The Power of a three phase three wire balanced system was measured by two wattmeter method, the reading of one wattmeter was found to be double that of other, what is the power factor.
A. 0.866 B. 1.414
C. 0.717 D. 1.732

Ans. A

Sol.

$$\phi = tan^{-1}\left(\frac{\sqrt{3}(P_1 - P_2)}{P_1 + P_2}\right)$$

$$= tan^{-1}\left(\frac{\sqrt{3}(2P - P)}{2P + P}\right)$$

φ = 30°
∴ Power factor = cos φ
= 0.866

100. The apparent weight of a man in a lift is less than the real weight when_____
A. The lift is going down with an acceleration
B. The lift is going up with uniform speed
C. The lift is going down with uniform speed
D. The lift is going up with an acceleration

Ans. A

Sol.

- The apparent weight of a man in a lift is less than the real weight **when the lift is going down with an acceleration.**
- The lift falls freely under gravity. The man also falls freely under gravity that's why the man feels that he has lost his weight.

101. Calculate the numerical aperture of an optical fibre which has core and cladding refractive indices 1.6 and 1.5 respectively
A. 0.5567 B. 0.245
C. 55.69 D. 0.6478

Ans. A

Sol. $N_A = \sqrt{n_1^2 - n_2^2}$

$= \sqrt{(1.6)^2 - (1.5)^2}$

$= \sqrt{(1.6+1.5)(1.6-1.5)}$

$N_A = 0.5567$

102. Which of the following factors adversely affect the characteristics of the surface water?
A. Vegetation
B. Soil type
C. Degree of weathering
D. All of the above

Ans. D

Sol. Factors that adversely affect the characteristics of surface water is the extent of surface pollution that in turn depends on the hydrological characteristics, vegetation, soil type, and degree of weathering of rocks. Various physical, chemical and biological characteristics of waste emitted in the surface water are also critical factors. Techniques for the treatment of domestic wastewater and disposal systems also play a crucial role in determining the characteristics of surface water.

103. The antenna current of an AM transmitter is 8 A when only carrier is sent, but it increases to 8.93 A when the carrier is modulated. Then percentage of modulation is
A. 43.00 B. 57.00
C. 70.14 D. 80.15

Ans. C

Sol. Given, I_c = 8A, I_t = 8.93 A

Now, $I_t = I_c \times \sqrt{1+\frac{\mu^2}{2}}$

$\therefore 8.93 = 8 \times \sqrt{1+\frac{\mu^2}{2}}$

$\therefore \mu = 0.7014$

Or $\mu = 70.14\%$

104. If x(t) has Fourier transform X(f) then the Inverse Fourier transform of X(f + f_o)will be
A. $x(t) \cdot e^{-j2nfot}$
B. $x(t) \cdot e^{j2nfot}$
C. $x(t- t_o)$
D. $x(t+ t_o)$

Ans. A

Sol. By the frequency shifting property of Fourier transform

If $x(t) \xrightarrow{FT} X(f)$

$x(t)e^{-j2\pi f_o t} \xrightarrow{FT} X(f+f_o)$

105. Inter 8085 is a how many bit microprocessor?
A. 4 bit B. 8 bit
C. 16 bit D. 32 bit

Ans. B

Sol. As intel 8085 has 8 – bit data line, it is 8 – bit microprocessor.

106. Hardness of river water is because it contains.
A. Sodium Chloride
B. Salts of Calcium and Magnesium
C. Both A and B
D. None of These

Ans. B

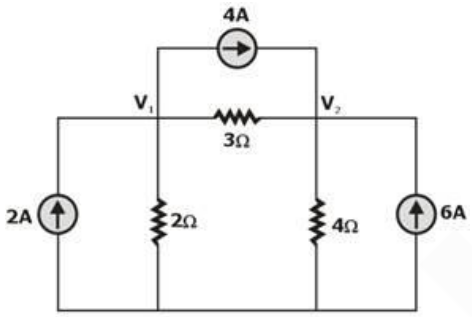
Sol. **River water** is **harder** than rain water because it contains **salts of Calcium and Magnesium.** As the river water seeps through the ground, it is naturally purified and picks up minerals from the rocks it seeps through. Typical minerals are **sulfur, lime, magnesium** and **calcium.** After it soaks up enough of these minerals to have a concentration of at least **one grain per gallon**, or GPG, the water is said to be **hard.**

107. The process of transmitting the message signal by changing one of its characteristics so that it can be received properly at the receiver is known as
A. modulation
B. Demodulation
C. multiplexing
D. Demultiplexing

Ans. A

Sol. The process of transmitting the message signal by changing one of its characteristics so that it can be received properly at the receiver is known as modulation.

108.



Calculate V_1 and V_2 respectively in the circuit shown above
A. 20.44V, 5.77V
B. 10.22V, 11.54V
C. 5.77V, 20.44V
D. 11.54V, 10.22V

Ans. C

Sol. Applying KCL

$$\therefore 2 = \frac{V_1}{2} + \frac{V_1 - V_2}{3} + 4$$

$\therefore -12 = 5V_1 - 2V_2$ …(i)

Applying KCL

$$6 + 4 = \frac{V_2}{4} + \frac{V_2 - V_1}{3}$$

$\therefore 120 = 7V_2 - 4V_1$ …(ii)

From (i) and (ii)

$V_1 = 5.77V$ and $V_2 = 20.44V$

109. Which theorem assists in replacement of an impedance branch over the network by the other network comprising different circuit components, without affecting the V-I relations throughout the entire network?
A. Superposition Theorem
B. Compensation Theorem
C. Substitution Theorem
D. Maximum Power Transfer Theorem

Ans. C

Sol. Substitution Theorem assists in replacement of an impedance branch over the network by the other network comprising different circuit components, without affecting the V-I relations throughout the entire network.

110. The _____ layer is responsible for process to process delivery of data from host to host .
A. transport
B. data link
C. physical
D. none of the above

Ans. C

Sol. The transport layer is responsible for moving data process to process from one host to the other.
The network layer is responsible for moving packets from one end to other.
Processes are programs running on the computer.

111. If a metal has resistance of 900 Ω at 20°C and has temperature coefficient of resistance of 0.003/°C then calculate it's resistance at 100°C?
A. 312 B. 336
C. 363 D. 372

Ans. D

Sol. $T_o = 20°C$ R $T_o = 300\Omega$
$T_1 = 100°C$ $RT_1 = ?$
$\alpha = 0.003°C$
$R_{T1} = R_{To} (1 + \alpha (T_1 - T_o))$
$= 300 (1 + 0.003 \times 80)$
$R_{T1} = 372\Omega$

112. In voltage regulator which diode can be used as constant voltage source
A. Tunnel diode B. PIN diode
C. Normal diode D. Zener diode

Ans. D

Sol. When Zener diode is operated under breakdown region voltage across it remains constants so it can be used as constant voltage source.

113. If a Piezoelectric crystal has thickness of 5 mm, voltage sensitivity of 0.05 Vm/N. If Pressure of 0.8×10^6 N/m^2 is applied on it then calculate the voltage developed across it ?
A. 200V B. 50V
C. 100V D. 400V

Ans. A

Sol. Given :- $t = 5$ mm $= 5 \times 10^{-3}$ m
$g = 0.05$ Vm/N & $P = 0.8 \times 10^6$ N/m^2
$\therefore V = P g t$
$= 0.8 \times 10^6 \times 0.05 \times 5 \times 100^{-3}$
$\therefore V = 200V$

114. Self-bias produces
A. Positive feedback
B. Negative feedback
C. Forward feedback
D. Reverse feedback
Ans. B
Sol. Self-bias produces negative feedback because of which the gain of the FET decreases but only single supply is sufficient.

115. In what context was "Nari Tu Narayani" used by Nirmala Sitharaman in Budget 2019-20?
A. Maternity Benefits
B. Women Empowerment
C. Self Help Groups
D. Mahila Shakti Kendras
Ans. B
Sol. * **Union Finance Minister Nirmala Sitharaman** quotes "Nari Tu Narayani" in her maiden budget speech in the context of women empowerment.
* Nirmala Sitharaman is a member of Rajya Sabha.
* She is currently serving as the Minister of Finance and Minister of Corporate Affairs. She is the second female Finance Minister after Indira Gandhi.

116. Artificial Intelligence is associated with which generation?
A. First
B. Fifth
C. Third
D. Any of the above
Ans. B
Sol. This **fifth generation** is based on parallel processing hardware and **Artificial Intelligence** software. **Note:-** AI is an emerging branch in computer science, which interprets means and method of making computers think like human beings.

117. What are the advantages of arrays ?
A. Easier to store elements of the same data type.
B. Used to implement stack and queue.
C. Convenient way to present matrices as 2D array.
D. All of the above
Ans. D
Sol. Arrays are simple to implement when it comes to matrices of fixed size and type or to implement other data structures like stack and queue.

118. Ideally the output voltage of an op-amp is zero when there is no input signal, now ever is practical circuits a small output voltage appears this voltage is known as
A. output offset voltage
B. pinch off voltage
C. input offset voltage
D. saturation voltage
Ans. A
Sol. Ideally the output voltage of an op-amp is zero when there is no input signal, now ever is practical circuits a small output voltage appears this voltage is known as output offset voltage.

119. The data link layer take the packets from _____ and capsular them into frames.
A. physical layer
B. transport layer
C. Network layer
D. Application layer
Ans. B
Sol. The data link layer take the packets from transport layer and capsular them into frames. There frames are then transferred to physical layer where the frames are converted to bits.

120. Reducing all DC sources to zero is one of the steps in getting the
A. DC equivalent circuit
B. AC equivalent circuit
C. Complete Amplifier circuit
D. voltage Divider bias circuit
Ans. B
Sol. In AC equivalent circuit all dc sources are reduced to zero and all capacitors are replaced by short circuit.

121. India Africa Field Training Exercise (IAFTX)- 2019 was conducted in which state of India?
A. West Bengal B. Goa
C. Maharashtra D. Kerala
Ans. C
Sol. • **Indian Africa Field Training Exercise** (IAFTX) was held at **Aundh Military Station and College of Military Engineering, Pune, Maharashtra**.
• It was held from 18th March to 27th March 2019.
• The exercise was conducted with an aim to synergise United Nations peacekeeping operations.

122. If a strain gauge has gauge factor of 3 and strain of 200 $\times 10^{-6}$ then find the change in resistance if it has resistance of 10 kΩ ?
A. 6 kΩ B. 0.6 kΩ
C. 6 Ω D. 60 Ω

Ans. C

Sol. GF = 3, $\Delta L/L = 200 \times 10^{-6}$ and R = 10 kΩ
We know that

$$\frac{\Delta R}{R} = GF \times \frac{\Delta L}{L}$$

$$\therefore \Delta R = R \times GF \times \frac{\Delta L}{L}$$

$= 10 \times 10^3 \times 3 \times 200 \times 10^{-6}$
$\therefore \Delta R = 6\Omega$

123. Who is selected for the prestigious 'Sangita Kalanidhi' award 2019?
A. M.S. Sheela
B. Rajkumar Bharathi
C. S. Sowmya
D. Seetha Narayanan

Ans. C

Sol. • **Dr. S Sowmya** will be conferred the prestigious 'Sangita Kalanidhi' award during the 'Margazhi Music Festival' early next year (2020).
• She will preside over the **93rd annual** conference of The Music Academy to be held from **December 15th, 2019** to **January 1st, 2020**.
• She is known for her intellectual approach to music.
• She is also part of the Academic Council of the Tamil Nadu Music and Fine Arts University.
• Sangita Kalanidhi Award is an annual award presented by **Madras Music Academy** (MMA).
• It is considered as the highest accolade in field of **Carnatic music**.
• It comprises of **gold medal** and a **birudu patra** (citation).

124. Which multiple access technique is used by IEEE 302-11
A. CSMA/CA B. ALOHA
C. CDMA D. GSM

Ans. A

Sol. IEEE 802-11 is part of the IEEE 802 set of LAN protocols which uses CSMA/CA (carrier sense multiple access/collision avoidance) for multiple access.

125. A Wheatstone bridge is balanced if
A. the ratio of resistors on one side of the bridge is one while the ratio of resistors on the other side is infinity
B. the ratio of resistors on one side of the bridge is greater than the ratio of resistors on the other side
C. the ratio of resistors on one side of the bridge equals the ratio of resistors on the other side
D. the bridge uses identical resistors

Ans. C

Sol. A Wheatstone bridge is balanced if the ratio of resistors on one side of the bridge equals the ratio of resistors on the other side.

126. In which type of thermometer two different types of metal wires are joined together at two junctions?
A. Resistance Thermometer
B. Bimetal Thermometer
C. Thermistor Thermometer
D. Thermocouple Thermometer

Ans. D

Sol. In **Thermocouple Thermometer,** two different types of metal wires are joined together at **two junctions**. A **temperature difference**between the **junctions** actually makes the metals to produce a **small electric current** which moves the **metal needle** across the scale.

127. Noise can be recorded in –
A. Ammeter B. Hygrometer
C. Barometer D. Decibel meter

Ans. D

Sol. Noise is 'unpleasant and unwanted sound'. It can be recorded in Decibel meter. Different Decibel (dB) units for various activities.

128. Consider the following program
XRA A
ADI O8H
The contents of accumulator after execution of this instruction will be:
A. 08_H B. 00_H
C. 07_H D. None of these

Ans. A

Sol. XRA A à contents of accumulator will be zero

$$\begin{array}{lll} A & : & 00H \\ +Data & : & 08H \\ \hline A & : & 08H \end{array}$$

129. Who was the first person to measure the speed of light?
A. Hippolyte Fizeau
B. Albert A. Michelson
C. James Bradley
D. Ole Romer

Ans. D

Sol. **Ole Romer** was a Danish astronomer who in **1676** made the first

quantitative measurements of the **speed of light**. **Romer** also invented the **modern thermometer** showing the temperature between two fixed points, namely the points at which water respectively boils and freezes.

130. In angle modulation _____of the carrier is varied according to the amplitude of the message signal.
A. Frequency B. Phase
C. any of A or B D. Amplitude
Ans. C
Sol. In angle modulation either frequency or phase of the carrier is varied according to the amplitude of the message signal.

131. The working of a rocket is based on the principle of
A. Conservation of momentum
B. Conservation of mass
C. Conservation of energy
D. Conservation of angular momentum
Ans. A
Sol.

- Rocket engines are reaction engines, obtaining thrust in accordance with **Newton's second law (Conservation of momentum)**.
- Rocket thrust results from the high speed ejection of material and does not require any "push against". Conservation of momentum dictates that if material is ejected backward, the forward momentum of the remaining rocket must increase since an isolated system cannot change its net momentum. The hot gases acquire momentum in the backward direction & the rocket acquires an equal amount of momentum in the forward direction.
- Hence option A is the right answer.

132. Verification of a login name and password is known as_____.
A. configuration
B. accessibility
C. authentication
D. logging in
Ans. C
Sol. **Authentication** is a process in which the **credentials** provided are compared to those on file in a **database** of authorized users' information on a local **operating system** or within an **authentication** server.

133. The output of the phase detector is called
A. Phase voltage
B. Error voltage
C. Free running voltage
D. None of these
Ans. B
Sol. The phase detector compares the input frequency with the feedback frequency and produces output de voltage called as error voltage.

134. If a memory chip is volatile, it will _____.
A. Explode if exposed to high temperatures
B. Lose its contents if power is turned off
C. Be used for data storage only
D. Be used to both read and write data
Ans. B
Sol. Random-access memory (RAM) is normally associated with **volatile** types of memory, where the stored information is **lost** if **power** is removed.

135. Which of the following is disadvantage of FM?
A. Demodulation is complex
B. Used for short distance communication
C. More bandwidth is required
D. All of the above
Ans. D
Sol. The disadvantages of FM are demodulation is complex as it involves phase locked look and it has very complex internal circuit. FM covers short distance because of which it is used in regional communication and not used for broadcasting. It has large bandwidth requirement as
$BW = 2(1+\beta)f_m$

136. A pattern displayed by oscilloscopes which has a steady characteristic is called
A. Lissajous
B. Nyquist pattern
C. Barkhausen's criterion
D. Fermat's pattern
Ans. A
Sol. Lissajous pattern displayed by oscilloscopes which has a steady characteristic and it can be used for the measurement of frequency and phase difference between two signals if they have same frequency.

137. If for an BJT I_B = 10 μA and α = 0.99 the value of I_C will be _____ mA
A. 1 B. 0.99
C. 1.02 D. 2
Ans. B
Sol. α = 0.99

$$\therefore B = \frac{\alpha}{1-\alpha} = \frac{0.99}{1-0.99} = 99$$

& $I_C = BI_B$
= 99 × 10 μA
I_C = 0.99 mA

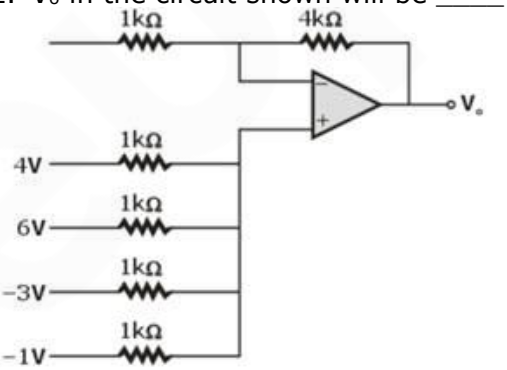
138. What are the ores of Lead (Pb)?
A. Zincite (ZnO) and Zinc blende (ZnS)
B. Cinnabar (HgS)
C. Galena (PbS) and Cerrusite ($pbCO_3$)
D. Haematite (Fe_2O_3) and Magnetite (Fe_2O_4)
Ans. C
Sol. **Galena (PbS)** and **Cerrusite ($pbCO_3$)** are the ores of Lead (Pb). **Lead** is the most abundant of the transition metal elements (**Greenwood and Earnshaw 1984**).
Lead is a chalcophile metallic element forming several important minerals ,including **galena PbS, anglesite PbSO4, Cerrusite PbCO3** and **minimum Pb3O4**.
Lead is a chemical element with symbol **Pb** (from the Latin Plumbum) and atomic number **82**. It is a heavy metal that is denser than most common materials.

139. How is an encoder different from a decoder?
A. The output of an encoder is a binary code for 1-of-N input
B. The output of a decoder is a binary code for 1-of-N input
C. The output of an encoder is a binary code for N-of-1 output
D. The output of a decoder is a binary code for N-of-1 output
Ans. A
Sol. An encoder is a combinational circuit encoding the information of 2n input lines to n output lines, thus producing the binary equivalent of the input. It performs the opposite operation of a decoder which results in 2n outputs from n inputs. Thus, an encoder different from a decoder because of the output of an encoder is a binary code for 1-of-N input.

140. When a JFET is cut off, the depletion layers are
A. Far apart B. Close together
C. Touching D. Conducting
Ans. C
Sol. When a JFET is cut off, the depletion layers are touching and that's why they do not allow any current through the channel and at this time JFET is said to be in cut off.

141. What is the purpose of providing a Draft folder in an email system?
A. to save unsent emails
B. to store spam emails
C. to save a copy of sent emails
D. to store deleted emails
Ans. A
Sol. A **draft** is simply an **email message** you haven't **yet sent**. It's not the same thing as an email waiting to be sent. This act places the message into the **Drafts folder**.

142. V_o in the circuit shown will be _____V



A. 8.5 B. 7.5
C. 1.5 D. 2.5
Ans. B
Sol. Voltage at non-inverting terminal is V_a

$$\therefore V_a = \frac{4+6+(-3)+(-1)}{4}$$

$\therefore V_a$ = 1.5V

$$\therefore V_0 = \left(1+\frac{R_f}{R_1}\right) \times V_a$$

and

$$= \left(1+\frac{4}{1}\right) \times 1.5$$

V_o = 7.5 V

143. The group of bits 11001 is serially shifted (right-most bit first) into a 5-bit parallel output shift register with an initial state 01110. After three clock pulses, the register contains _____
A. 01110 B. 00001
C. 00101 D. 00110
Ans. C
Sol. LSB bit is inverted and feed back to MSB:
01110->initial state
10111-> data after first clock pulse
01011-> data after second clock pulse
00101-> data after third clock pulse

144. Who wrote "Mind without fear" ?
A. Ira Trivedi
B. Twinkle Khanna
C. Khuswant Singh
D. Rajat Gupta

Ans. D

Sol. • **Rajat Kumar Gupta** is an Indian-American businessman who was the first foreign-born managing director (chief executive) of management consultancy firm McKinsey & Company from 1994 to 2003.
• Gupta's memoir, Mind Without Fear, was published by Juggernaut Books and released in March 2019.

145. If the capacitance of a coil is 360 pF, now if the frequency is doubled the capacitance is reduced to 22 pF then calculate the self-capacitance of the coil?
A. 18 PF B. 12 PF
C. 24 PF D. 48 PF

Ans. C

Sol. $F_2 = 2f_1$
$\therefore n = 2$
$C_1 = 360$ PF and $C_2 = 72$ PF

$$C_d = \frac{C_1 - n^2 C_2}{n^2 - 1}$$
$$= \frac{360 - 4(72)}{3}$$

$\therefore D_d = 24$ pF

146. How many AND gates are required for a 1-to-8 multiplexer?
A. 2 B. 6
C. 8 D. 5

Ans. C

Sol. The number of AND gates required will be equal to the number of outputs in a demultiplexer, which are 8.

147. The voltage and current equation of a circuit in which all elements are connected in series are as
V(t) = 5 sin(wt + 10°) and I(t) = 4sin(wt + 60°)
Then circuit will be consisting of
A. resistor only
B. capacitors and resistors
C. Inductor, capacitor and resistors
D. Both B and C are possible

Ans. D

Sol. $$Z = \frac{V(t)}{I(t)} = \frac{5/\sqrt{2} < 10^\circ}{4/\sqrt{2} < 60^\circ} = 1.25 < -50^\circ$$

Since current is leading the voltage but not by 90° circuit must have capacitor and resistor but it may be possible that inductor and capacitor both are present but effect of capacitor is more.

148. The input impedance of the base increases when
A. Beta increases
B. Supply voltage increases
C. Beta decreases
D. AC collector resistance increases

Ans. A

Sol. The input impedance of the base increases when Beta increases
As $r_\pi = \frac{\beta}{g_m}$

149. Transformer is an electric device is based on which of the following law?
A. Faraday's law of induction
B. Law of thermodynamic
C. Gauss's law
D. Coulomb's law

Ans. A

Sol. A **transformer** is an electrical device that transfers electrical energy between two or more **circuits**through **electromagnetic induction**. A varying current in one coil of the transformer produces a varying magnetic field, which in turn induces a voltagein a second coil. Power can be transferred between the two coils through the magnetic field, without a metallic connection between the two circuits. **Faraday's law of induction** discovered in **1831** described this effect.

150. The type of RADAR in which transmission and reception both are done using same antenna is called_____
A. Monostatic RADAR
B. Bistatic RADAR
C. Monopole RADAR
D. Dipole RADAR

Ans. A

Sol. A RADAR transmits signal and receives reflected signal from the target. If single antenna is deployed for this purpose, the RADAR is monostatic RADAR.
A bistatic radar consists of separately located (by a considerable distance) transmitting and receiving sites. Therefore, a monostatic Doppler radar can be upgraded easily with a bistatic receiver system or (by use of the same frequency) two monostatic radars are working like a bistatic radar. A bistatic radar makes use of the forward scattering of the transmitted energy.

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