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ROLL NUMBER

**WRITTEN TEST FOR THE POST OF JR. TECH. ASST (ELECTRONICS) - A**

DATE: 12/07/2023

TIME: 11 To 12.30 pm

DURATION: 90 MINUTES

Total Marks: 100

**INSTRUCTIONS TO THE CANDIDATES**

1. Write your Roll Number on the top of the Question Booklet and in the OMR sheet.
2. Each question carries **one (1)** mark.
3. There will be no Negative Marking.
4. Each question carries 4 options i.e., A, B, C & D. Darken completely, the bubble corresponding to the most appropriate answer using **blue or black ball point pen**.
5. Marking more than one option will invalidate the answer.
6. Candidate should sign in the **question paper** and OMR sheet.
7. No clarifications will be given.
8. Candidate should hand over the OMR sheet and **question paper** to the invigilator before leaving the examination hall.

Signature of the Candidate

*Rupa Sreedhar*  
12/7/2023

Question Paper for Junior Technical Assistant (Electronics) 12/7/2023

1) If 60 J of energy are available for every 15 C of charge, what is the voltage?

- A) 4 V
- B) 60 V
- C) 15 V
- D) 0.25 V

2) If 40 C of charge flow past a point in 20 seconds, what is the current?

- A) 2 A
- B) 0.5 A
- C) 20 A
- D) 40 A

3) If the peak of a sine wave is 13 V, the peak-to-peak value is:

- A) 6.5 V
- B) 13 V
- C) 26 V
- D) 0 V

4) What is the safety standard for measuring and monitoring of laboratory equipment?

- A) IEC 61010
- B) IEC 60601
- C) IEC 62353
- D) IEC 60320

5) An RC differentiator acts as a

- A) low-pass filter
- B) high-pass filter

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C) band-pass filter

D) band-stop filter

6) In a certain loaded transformer, the secondary voltage is one-fourth the primary voltage. The secondary current is;

A) one-fourth the primary current

B) double the primary current

C) equal to the primary current

D) four times the primary current

7) Ionization within a P-N junction causes a layer on each side of the barrier called the:

A) junction

B) depletion region

C) barrier voltage

D) forward voltage

8) In "n" type material, majority carriers would be:

A) holes

B) dopants

C) slower

D) electrons

9) Forward bias of a silicon P-N junction will produce a barrier voltage of approximately how many volts?

A) 0.2

B) 0.3

C) 0.7

D) 0.8

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- 10) A CE amplifier when bypassed with a capacitor at the emitter resistance has
- A) increased input resistance and increased voltage gain
  - B) increased input resistance and decreased voltage gain
  - C) decreased input resistance and increased voltage gain
  - D) decreased input resistance and decreased voltage gain
- 11) The software used to drive microprocessor-based systems is called:
- A) assembly language programs
  - B) firmware
  - C) basic interpreter instructions
  - D) flowchart instructions
- 12) A microprocessor unit, a memory unit, and an input/output unit form a:
- A) CPU
  - B) compiler
  - C) microcomputer
  - D) ALU
- 13) A +5 V PCB power source that has been "pulled down" to a +3.4 V level may be due to:
- A) a circuit open
  - B) a faulty regulator
  - C) the half-split method
  - D) a circuit short
- 14) The use of a multimeter with digital circuits allows the measurement of:
- A) pulse width
  - B) power
  - C) voltage or resistance
  - D) pulse trains

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*12/12/2023*

15) When transistors are used in digital circuits they usually operate in the:

- A) active region
- B) saturation and cut-off regions
- C) breakdown region
- D) linear region

16) A current ratio of  $I_C/I_E$  is usually less than 1 and is called:

- A) alpha
- B) theta
- C) beta
- D) omega

17) As the temperature increases, cut in voltage of a normal diode:

- A) remains the same
- B) increases
- C) decreases
- D) increases and decreases

18) Which of the following is true?

- A) CC amplifier has a large current gain
- B) CE amplifier has a large current gain
- C) CB amplifier has low voltage gain
- D) CC amplifier has low current gain

19) What is the full form of CPU?

- A) computer processing unit
- B) computer principle unit
- C) central processing unit

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D) control processing unit

20) A transistor may be used as a switching device or as a:

- A) fixed resistor
- B) tuning device
- C) rectifier
- D) variable resistor

21) The C-B configuration is used to provide which type of gain?

- A) voltage
- B) current
- C) resistance
- D) power

22) A battery has a short-circuit current of 30 A and an open circuit voltage of 24 V. If the battery is connected to an electric bulb of resistance 2 ohm, the power dissipated by the bulb is

- A) 80 W
- B) 1800 W
- C) 146.9 W
- D) 228 W

23) Slew rate of an amplifier is defined as

- A) Minimum rate of change of the output possible in a real operational amplifier
- B) Maximum rate of change of the output possible in a real operational amplifier
- C) Average rate of change of the output possible in a real operational amplifier
- D) Ratio of the maximum and the average rate of change of the output in a real amplifier

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24) The units of the full power bandwidth is

- A) Watt
- B) Joule
- C) Seconds
- D) Hertz

25) Which component is considered to be an "OFF" device?

- A) Transistor
- B) JFET
- C) D-MOSFET
- D) E-MOSFET

26) Which of the following is the smallest unit of data in computer?

- A) Bit
- B) KB
- C) Nibble
- D) Byte

27) Which of the following is the brain of the computer?

- A) CPU
- B) UPS
- C) Memory
- D) Control Unit

28) Which of the following are physical devices of a computer?

- A) Software
- B) Hardware
- C) Package

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D) Program

29) What is the gain of self-oscillating circuits?

A) 0

B) 1

C) 2

D) 3

30) For practical oscillators, which law has to be obeyed?

A) Faraday law

B) Hertz law

C) Fleming law

D) Barkhausen law

31) A transducer's function is to:

A) transmit electrical energy

B) convert energy

C) produce mechanical energy

D) prevent current flow

32) Unwanted signal at the output due either to internal sources or to interference is called:

A) offset

B) noise

C) drift

D) threshold

33) The ability of the sensor to see small differences in reading is called:

A) resolution

B) drift

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- C) offset
- D) linearity

34) Change in signal over long period of time is called:

- a) noise
- b) offset
- c) hysteresis
- d) drift

35) The minimum input of physical parameter that will create a detectable output change is called:

- A) threshold
- B) sensitivity
- C) span
- D) precision

36) Which of the following characterizes an analog quantity?

- A) Discrete levels represent changes in a quantity.
- B) Its values follow a logarithmic response curve.
- C) It can be described with a finite number of steps.
- D) It has a continuous set of values over a given range.

37) Which type of signal is represented by discrete values?

- A) noisy signal
- B) nonlinear
- C) analog
- D) digital

38) Base 10 refers to which number system?

- A) binary coded decimal

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- B) decimal
- C) octal
- D) hexadecimal

39) Convert the binary number 1011010 to hexadecimal:

- A) 5B
- B) 5F
- C) 5A
- D) 5C

40) What is the decimal value of the hexadecimal number 777?

- A) 191
- B) 1911
- C) 19
- D) 19111

41) A single transistor can be used to build which of the following digital logic gates?

- A) AND gates
- B) OR gates
- C) NOT gates
- D) NAND gates

42) The basic logic gate whose output is the complement of the input is the:

- A) OR gate
- B) AND gate
- C) INVERTER gate
- D) Comparator

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43) How many truth table entries are necessary for a four-input circuit?

- A) 4
- B) 8
- C) 12
- D) 16

44) What is the relation between time constant and load resistance for an inductive circuit?

- A) They don't depend on each other
- B) They are directly proportional
- C) They are inversely proportional
- D) Cannot be predicted

45) According to Ohm's Law:

- A)  $R=VI$
- B)  $I=VR$
- C)  $V=IR$
- D)  $VIR=0$

46) The SI Unit of Conductance is:

- A) Volt
- B) Ampere
- C) Ohm
- D) Siemens

47) The standard voltage supply for single phase in India is:

- A) 220 V, 50Hz
- B) 240 V, 60Hz
- C) 300 V, 50Hz

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D) 180 V, 60Hz

48) The frequency range of ECG is \_\_\_\_\_

A) 0.05-150 Hz

B) 500-1500 Hz

C) 5-500 kHz

D) 0.5-150 MHz

49) What is another name for a one-shot multivibrator ?

A) monostable

B) bistable

C) astable

D) tristable

50) Memory that loses its contents when power is lost is:

A) non-volatile

B) volatile

C) random

D) static

51) The SI unit of Power is:

A) Coulomb

B) Volt

C) Ampere

D) Watt

52) One Mega-volt is equal to:

A) 100 KV

B) 1000 KV

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C) 10000 V

D) 100 V

53) How many wavelengths are used by Pulse Oximeter?

A) 1

B) 2

C) 3

D) 4

54) Which of the following determines light intensity in a CRT?

A) Current

B) fluorescent screen

C) voltage

D) momentum of electrons

55) Which among the following is an active element?

A) Resistor

B) Op-amp

C) Capacitor

D) Inductor

56) Which of the following technique is most widely used in the single channel data acquisition system?

A) Successive approximation

B) Delta Sigma approximation

C) Flash approximation

D) Counter type approximation

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57) \_\_\_\_\_ is known as fastest switching logic family

- A) CMOS
- B) TTL
- C) DTL
- D) ECL

58) Two resistors  $R_1 = 36 \Omega \pm 5\%$  and  $R_2 = 75 \Omega \pm 5\%$  are connected in series. The total resistance is:

- A)  $111 \pm 0 \Omega$
- B)  $111 \pm 2.778 \Omega$
- C)  $111 \pm 5.55 \Omega$
- D)  $111 \pm 7.23 \Omega$

59) Earth wire or ground wire is made of:

- A) Iron
- B) Aluminium
- C) Carbon
- D) Copper

60) Which of the following is a universal gate?

- A) NAND gate
- B) AND gate
- C) OR gate
- D) NOT gate

61) A voltmeter using thermocouples measures:

- A) RMS value
- B) Peak value
- C) Average value
- D) Peak to peak value

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62) In digital transmission, the modulation technique that requires minimum bandwidth is

A) Delta modulation

B) PCM

C) DPCM

D) PAM

63) Induction wattmeter can be used in

A) AC circuit only

B) DC circuit only

C) Both ac and dc circuit

D) AC 3 phase only

64) Buffer amplifier converts \_\_\_\_\_.

A) low impedance signals to high impedance signals

B) high impedance signals to low impedance signals

C) ac impedance signals to dc impedance signals

D) dc impedance signals to ac impedance signals

65) The filter used to reject the 50Hz noise picked up from power lines or machinery is called:

A) band reject filter

B) band stop filter

C) notch filter

D) all reject filter

66) Which of the following technique is NOT employed in isolation devices?

A) Resistance

B) Optical

C) Inductance

D) Capacitance

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67) Which of the following voltage regulator IC gives a variable positive voltage?

- A) 7812
- B) LM337
- C) 7805
- D) LM317

68) Superposition theorem is valid for:

- A) Only linear circuits
- B) Static circuits
- C) both linear and non-linear circuits
- D) Only non-linear circuits

69) The noise due to random behavior of charge carriers is

- A) Short noise
- B) Partition noise
- C) Industrial noise
- D) Flicker noise

70) How can you define electromyogram (EMG)?

- A) The recorded representation of bioelectric potentials generated by the activity of the brain (Neuronal activity).
- B) The biopotentials generated by the muscles of the heart with time
- C) The recorded representation of bioelectric potentials generated by the muscle activity.
- D) The measure of the variations in the corneal-retinal potential.

71) The capacitance of a passive capacitance transducer depends on the following factors,

EXCEPT

- A) Distance between the two parallel plates

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- B) The area of the two parallel plates
- C) Relative dielectric constant
- D) Mass of the two parallel plates

72) Which of the following is NOT a static property?

- A) repeatability
- B) hysteresis
- C) frequency response
- D) saturation

73) Which of the following is not a dynamic property?

- A) frequency response
- B) saturation
- C) settling time
- D) response time

74) Which of the following has the widest range of temperature measurement?

- A) RTD
- B) Thermocouple
- C) Thermistor
- D) Mercury thermometer

75) The target of the X-ray tube used in mammography is made up of:

- A) calcium
- B) copper
- C) aluminium
- D) molybdenum

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76) What biological measurement is done by the Spirometer?

- A) Blood pressure measurement
- B) Blood Flow measurement
- C) Respiratory volume measurements
- D) Blood sugar measurement

77) The bio-potentials generated by the muscles of the heart with time is called?

- A) Electroretinogram
- B) Electroencephalogram
- C) Electrocardiogram
- D) Electrooculogram

78) Electroencephalogram is obtained from bioelectrical signals from the?

- A) Brain
- B) Heart
- C) Muscles
- D) Retina

79) Which one of the following is NOT a transducer?

- A) Thermocouple
- B) Photovoltaic
- C) Electrooculogram
- D) Moving coil generator

80) MRI stands for:

- A) Mechanical Resonance Imaging
- B) Magnetic Resonance Imaging
- C) Mutually Related Imaging
- D) Magnetic Resultant Imaging

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81) Source of Bioelectric potential is \_\_\_\_\_ in nature.

- A) Electronic
- B) Electric
- C) Ionic
- D) Mechanical

82) In a 12 lead ECG system, how many bipolar limb leads are used?

- A) 3
- B) 12
- C) 4
- D) 6

83) Which of the following feedback type is employed with DC amplifiers?

- A) negative
- B) can be any positive or negative doesn't matter
- C) depends on the application
- D) positive

84) PET stands for:

- A) Pulse Emission Tomography
- B) Positron Elimination Tomography
- C) Positive Elimination Tomography
- D) Positron Emission Tomography

85) Which equipment can cause radiation hazard?

- A) CT scan
- B) Electroencephalography
- C) Ultrasonography

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D) MRI

86) Which of the following instrument used to test the pressure in eye?

A) Retinoscope

B) Tonometer

C) Autorefractor

D) Manual Keratometer

87) Which endoscope is used for the examination of the ears?

A) Otoscope

B) Sigmoidoscope

C) Arthroscope

D) Photoscope

88) From the options given below select the one which is NOT a type of isolation amplifier?

A) transformer type isolation amplifiers

B) resistive coupled isolation amplifiers

C) optically isolated isolation amplifiers

D) capacitive coupled isolation amplifiers

89) The strength of the magnetic field in MRI is measured in \_\_\_\_.

A) Microvolt

B) Tesla

C) Volts

D) Newton

90) In medical recorders, the signal of interest is of the order of \_\_\_\_\_

A) Nanovolts

B) Microvolts

C) Megavolts

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D) Volts

91) Surgical diathermy machine uses:

- A) high frequency direct current
- B) high frequency alternating current
- C) low frequency alternating current
- D) low frequency direct current

92) The principle of laser is:

- A) stimulated emission
- B) induced emission
- C) mutual emission
- D) positron emission

93) In medical devices, the amplifiers that are used for the amplification purpose of the input signal must have \_\_\_\_\_.

- a) frequency response has no role to play in it
- b) high frequency response
- c) average frequency response
- d) low frequency response

94) Which of the following statement is true for an instrumentation amplifier?

- A) the input resistance of both the inputs is very high and does not change as the gain is varied
- B) the input resistance of both the inputs is very low and does not change as the gain is varied
- C) the input resistance of both the inputs is very high and does change as the gain is varied
- D) the input resistance of both the inputs is very low and does change as the gain is varied

95) Which of the following is NOT the property of the instrumentation amplifier?

- A) extremely high input impedance

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B) low bias and offset currents

C) high slew rate

D) very low CMRR

96) Which of the following component is not a part of the passive filter?

A) resistor

B) operational amplifier

C) capacitor

D) inductor

97) The ability of the amplifier to reject common voltages on its two input leads is known as:

A) common mode rejection rate

B) coupled mode rejection rate

C) common mode rejection ratio

D) coupled mode rejection ratio

98) \_\_\_\_\_ are commonly used for providing protection against leakage currents.

A) Isolation amplifiers

B) Differential amplifiers

C) Instrumentation amplifiers

D) Inverting amplifiers

99) What is the working principle behind Home blood glucose sensor?

A) electro-physiological

B) electrochemical

C) chemical

D) physio-chemical

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100) Dynode is present in:

- A) photo diode
- B) photo multiplier tube
- C) photo transistor
- D) photo-SCR

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**Answer Key for Junior Technical Assistant (Electronics) 12/7/2023**

Question number	Answer key	Question number	Answer key
1	A	51	D
2	A	52	B
3	C	53	B
4	A	54	D
5	B	55	B
6	D	56	A
7	B	57	D
8	D	58	C
9	C	59	D
10	C	60	A
11	A	61	A
12	C	62	A
13	D	63	A
14	C	64	B
15	B	65	C
16	A	66	A
17	C	67	D
18	B	68	A
19	C	69	A
20	D	70	C
21	A	71	D
22	C	72	C
23	B	73	B
24	D	74	B
25	D	75	D
26	A	76	C
27	A	77	C
28	B	78	A
29	B	79	C
30	D	80	B
31	B	81	C
32	B	82	A
33	A	83	A
34	D	84	D
35	B	85	A
36	D	86	B
37	D	87	A
38	B	88	B
39	C	89	B
40	B	90	B
41	C	91	B
42	C	92	A
43	D	93	D
44	C	94	A
45	C	95	D
46	D	96	B
47	A	97	C
48	A	98	A
49	A	99	B
50	B	100	B

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