श्री चित्रा चिरुनाल आयुर्विज्ञान और प्रौद्योचिकीसंस्थान, चिरुवनंिपुरम -11
SREE CHITRA TIRUNAL INSTITUTE FOR MEDICALSCIENCES & TECHNOLOGY, THIRUVANANTHAPURAM—695 011

ENTRANCE EXAMINATION : ACADEMIC SESSION JANUARY 2020

PROGRAM: Operation Theatre Technology

Time: 90 minutes **Max. Marks: 100**

(Select the most appropriate answer)
(There are no negative marks for wrong answers)

1. Which system act as a chemical communication and control system within the human body?
   a) Nervous system
   b) Circulatory system
   c) Respiratory system
   d) Endocrine system

2. Basic principle behind Ultrasound Transducer is:
   a) Piezo electric effect
   b) Zee back effect
   c) Doppler effect
   d) Faradays law

3. Thermistor is made up of:
   a) Oxides or salts of metals
   b) Metal
   c) Two different metals
   d) Two similar metal wires

4. In a normal heart rhythm which electric wave comes first?
   a) P Wave
   b) Q Wave
   c) QRS Wave
   d) Both a and b

5. What does P Wave represent?
   a) Depolarization of ventricle
   b) Depolarization of atria
   c) Repolarization of atria
   d) Ventricular filling

6. What is the unit of pressure?
   a) Pascal
   b) Joule
   c) Watt
   d) Meter

7. The frequency band of Gamma pattern of EEG waveform is
   a) 0.5 -4 HZ
   b) 4-8 Hz
   c) > 30 Hz
   d) 8-13 Hz

8. Pneumotachometer is used to measure:
   a) Blood flow
   b) Blood pressure
   c) To measure lung volume
   d) To measure respiration rate

9. The sensor used in Phonocardiograph is:
   a) Strain gauge
   b) Microphone
   c) Piezo resistive sensor
   d) Load cell

10. What is the metric unit of force?
   a) Joule
   b) Newton
   c) Tesla
   d) Watt

11. The term anesthesia means
   a) Sensation
   b) No sensation
   c) Pain
   d) No pain

12. An emergency procedure for people in cardiac arrest is
   a) C.P.R
   b) Oxygen therapy
   c) Suctioning
   d) Endo tracheal intubation

13. A Capanography monitor is a device that measures level of
   a) Oxygen
   b) Co_2
   c) Electrolytes
   d) E.C.G

14. The process of removing all the microorganism along with their spores is called
   a) Disinfection
   b) Fumigation
   c) Sterilization
   d) Isolation

15. One eV is equal to ---------J.
   a) 6.02×10^{23}
   b) 1.6×10^{23}
   c) 6.25×10^{23}
   d) 1.66×10^{23}

16. How many orbiting electrons diode the germanium atom have?
    a) 4
    b) 14
    c) 32
    d) 41

17. What unit is used to represent the level of a diode forward current I_F?
    a) pA
    b) nA
    c) μA
    d) mA

18. Which of the following device can check the conditions of a semiconductor diode?
    a) Digital display meter (DDM)
    b) Multimeter
    c) Curve tracer
    d) All of the above

19. Which of the following elements is most frequently used for doping pure Ge or Si?
    a) Boron
    b) Gallium
    c) Indium
    d) All of the above

20. In general, LEDs operate at voltage levels from ---- V to ----V.
    a) 1.0, 3.0
    b) 1.7, 3.3
    c) 0.5, 4.0
    d) None of the above

21. In which state is a silicon diode if the voltage drop across it is about 0.7 V?
    a) No bias
    b) Forward bias
    c) Reverse bias
    d) Zener region

22. In zener diode, the zener breakdown takes place
    a) Above 6V
    b) Below 6V
    c) At 6V
    d) None of the above

23. What is level of the voltage between the input terminals of op-amp?
    a) 5V
    b) 18 V
    c) Virtually Zero
    d) 22V

24. The MOSFET stands for
    a) Metal oxidized selenium FET
    b) Metal oxidized surface FET
    c) Metal oxidized semiconductor FET
    d) Metal of surface FET

25. A semiconductor has ------ temperature coefficient of resistance.
    a) Positive
    b) Zero
    c) Negative
    d) None of the above

26. When a pentavalent impurity is added to a pure semiconductor, it becomes
    a) An insulator
    b) An intrinsic semiconductor
    c) p- type semiconductor
    d) n-type semiconductor

27. An n-type semiconductor is
    a) Positively charged
    b) Negatively charged
    c) Electrically neutral
    d) None of the above

28. In a semiconductor, current conduction is due to
    a) Only holes
    b) Only free electrons
    c) Holes and free electrons
    d) None of the above

29. A pn junction acts as a
    a) Controlled switch
    b) Bidirectional switch
    c) Unidirectional switch
    d) None of the above

30. At a room temperature, an intrinsic silicon crystal acts approximately as
    a) A battery
    b) A conductor
    c) An insulator
    d) A piece of copper wire

31. The most commonly used transistor arrangement is
    a) Common emitter
    b) Common base
    c) Common collector
    d) None of the above

32. A pyranometer is used for measurement of
    a) Direct radiation only
    b) Diffuse radiation only
    c) Direct as well as diffuse radiation
    d) All of the above

33. Photo voltaic cell or solar cell converts
    a) Thermal energy into electricity
    b) Electromagnetic radiation directly into electricity
    c) Solar radiation into thermal energy
    d) Solar radiation into kinetic energy

34. Which of the following laws is applicable for the behavior of perfect gas
    a) Boyle'slaw
    b) Charle'slaw
    c) Gas- Lussac law
    d) All of the above

35. Otto cycle is a
    a) Constant pressure cycle
    b) Constant volume cycle
    c) Constant temperature cycle
    d) Constant entropy cycle

36. The unit of pressure in S.I unit is
    a) Kg/cm^2
    b) mm of water column
    c) Pascal
    d) Bars

37. Specific heat of air at constant pressure is equal to
    a) 0.17
    b) 0.21
    c) 0.24
    d) 1.0

38. Formula of Charles Law.
    a) Vi/Ti=Vf/Tf
    b) Ti=Vf
    c) Vi=Ti
    d) Vf/Ti=Vi/Tf

39. Which color represents digits 7 in resistor color code?
    a) White
    b) Blue
    c) Violet
    d) Green

40. Transistor is a device which is a
    a) Transferring voltage device
    b) Current operating one
    c) Power operated one
    d) Voltage operated one

41. Convert the binary equivalents of 27_{10}?
    a) 11011_2
    b) 10001_2
    c) 11100_2
    d) 11001_2

42. "Sumof all currents meeting at a point is zero," stated law is
    a) Kirchhoff's first rule
    b) Kirchhoff's third rule
    c) Kirchhoff's fourth rule
    d) Kirchhoff's second rule

43. When condition $R_1/R_2 = R_3/R_4$ is satisfied, current in galvanometer of Wheatstone bridge is
    a) 1
    b) 0
    c) Min
    d) Max

44. RLC Circuits is a _____ order system
    a) Zeroth
    b) First
    c) Second
    d) Third

45. If every particle of fluid has irregular flow, then flow is said to be
    a) Laminar flow
    b) Turbulent flow
    c) Fluid flow
    d) Both a and b

46. The ratio of inertia force to viscous force known as
    a) Grashof number
    b) Reynolds number
    c) Fourier number
    d) Nusselt number

47. The most common device used for measuring air speed is
    a) altimeter
    b) Thermometer
    c) Pressure gauge
    d) pitot tube

48. The randomness of the molecules gives us _____ pressure.
    a) Stagnation
    b) Static
    c) Dynamic
    d) Absolute

49. Spherical shape of droplets of mercury is due to
    a) High density
    b) High surface tension
    c) High adhesion
    d) Low vapour pressure

50. Which of the following is not an application of Bernoulli's equation?
    a) Venturi meter
    b) Orifice meter
    c) Anaemometer
    d) Pitot tube

51. Which of the following is a digital transducer?
    a) Strain gauge
    b) Encoder
    c) Thermistor
    d) LVDT

52. Strain gauge, LDVT and thermocouple are examples of
    a) Active transducer
    b) Passive transducer
    c) Analog transducer
    d) Primary transducer

53. Venturi is associated with
    a) Venous blood pressure
    b) Digital plethysmography
    c) Dialysate flow in artificial kidney
    d) Blood flow in heart lung machine

54. Pressure transducer for measuring blood pressure is
    a) Strain gauge transducer only
    b) Strain gauge or capacitive transducer
    c) Resistive transducer
    d) Fiber optic transducer

55. Photo conductive cell consists of a thin film of
    a) Quartz
    b) Lithium sulphate
    c) Barium titanate
    d) Selenium

56. PH value of venous blood is
    a) 7.30
    b) 7.40
    c) 7.35
    d) 7.45

57. The capacitance microphone is used for the detection of
    a) Heart rate
    b) Blood flow
    c) Heart sound
    d) Foot pressure

58. The shorter wave length of the electron permits the detailed examination of tiny objects due to reduction of _____ effects
    a) Reflection
    b) Diffraction
    c) Refraction
    d) Polarization

59. Stress and strain curves are plotted using
    a) Magnetic tape recording
    b) X- Y recording
    c) Galvanometric
    d) PMMC writing systems

60. 1 Tesla is equal to
    a) 50 NA^{-1} m^{-1}
    b) 100 NA^{-1} m^{-1}
    c) 1 NA^{-1} m^{-1}
    d) 1000 NA^{-1} m^{-1}

61. Ferrites are ____ materials
    a) Paramagnetic
    b) Diamagnetic
    c) Ferromagnetic
    d) None of the above

62. Heat was given to a body, which raises its temperature by 1^0C is
    a) Water equivalent
    b) Temperature gradient
    c) Thermal capacity
    d) Specific heat

63. If boiling point of water is 95^0F, what will be reading Celsius scale?
    a) 7^0C
    b) 65^0C
    c) 63^0C
    d) 35^0C

64. Negative acceleration is also known as
    a) Retardation
    b) Relaxation
    c) Escalation
    d) All of the above

65. In 1 minute how much energy does a 100 W electric bulb transfers?
    a) 100J
    b) 600J
    c) 3600J
    d) 6000J

66. On an object the work done does not depend upon:
    a) Displacement
    b) Angle between force and displacement
    c) Force applied
    d) Initial velocity of an object

67. A bullet fired from a gun can pierce a target due
    a) Mechanical energy
    b) Heat energy
    c) Kinetic energy
    d) Acceleration

68. According to Faraday'slaw, EMF stands for
    a) Electromagnetic field
    b) Electromagnetic force
    c) Electromagnetic friction
    d) Electromotive force

69. The atomic number of an atom is the number of____in the atom's nucleus.
    a) Electrons
    b) Neutrons
    c) Protons
    d) Valence electrons

70. What family of elements is in the right most column of the Periodic Table?
    a) Alkali metals
    b) Transition metals
    c) Halogens
    d) Noble gases

71. Which of the following is the abbreviation for the element gold?
    a) G
    b) Fe
    c) Au
    d) Go

72. The chemical formula of lead sulphate is
    a) Pb_2SO_4
    b) $Pb\,(SO)_2$
    c) $PbSO_4$
    d) $Pb_2\,(SO_4)_3$

73. When carbon dioxide is passed through lime water,
    a) Calcium hydroxide is formed
    b) White precipated of CaO is formed
    c) Lime water turns milky
    d) Colour of lime water disappears.

74. The reaction of H_2 gas with oxygen gas to form water is an example of
    a) Combination reaction
    b) Redox reaction
    c) Exothermic reaction
    d) All of these reaction

75. Deuterium reacts with oxygen to form
    a) Hard water
    b) Heavy water
    c) Soft water
    d) Water gas

76. Find out the next term in the series 7, 11, 13, 17, 19,⋯..
    a) 21
    b) 25
    c) 23
    d) 30

77. Aperson's salary has increased from Rs. 7200 to Rs.8100. What is the percentage increase in his salary?
    a) 25%
    b) 18%
    c) 16 2/3 %
    d) 12 ½ %

78. A train covers a distance of 200 km with a speed of 10 km/hr. What time is taken by the train to cover this distance?
    a) 20 h
    b) 10 h
    c) 15 h
    d) 30 h

79. What is the purpose of image intensifier in X- ray imaging system?
    a) Enhancement
    b) Reducing the loss of contrast
    c) Reducing the dosage
    d) Visualization of x-ray

80. An instrument used to measure lung volume quantitatively is:
    a) Impedance pneumograph
    b) Spirometer
    c) Ventilator
    d) Nebulizer

81. SPECT includes a____ for imaging.
    a) Gamma Camera
    b) Silver Halide Film
    c) Phosphorus Sheet
    d) Lead Sheet

82. Which of the following medical imaging modality other than ultrasound does not use any form of radiation?
    a) PET Scan
    b) SPECT Scan
    c) CT Scan
    d) MRI

83. When light falls on an object it can be

a) reflected
b) transmitted
c) absorbed
d) all of them

84. Railway tracks have gaps between them to deal with expansion in

a) hot days
b) cold days
c) winters
d) snow fall

85. A very good conductors of heat contains

a) metals
b) non-metals
c) liquids
d) gases

86. Heat loss may help matter to

a) expand
b) contract
c) spread
d) stable

87. Water expansion occurs when

a) freezing
b) heating
c) both a and b
d) boiling

88. When the state of matter changes temperature

a) increases
b) decreases
c) remains same
d) raised

89. A fluid is a substance which can

a) flow
b) evaporate
c) condense
d) gain heat

90. In thermometer element which is used to show temperature is

a) copper
b) zinc
c) mercury
d) platinum

91. Number of vibrations in a second is called

a) pitch
b) frequency
c) amplitude
d) infrasound

92. Sound having frequencies above 20000Hz are called

a) infrasound
b) ultrasound
c) mega sound
d) micro sound

93. Unwanted sounds are called

a) noises
b) pleasant
c) fruitful
d) healthy

94. Distance from one crest to another or one to another wave is called a

a) wavelength
b) frequency
c) amplitude
d) all of them

95. SI unit of frequency is

a) hertz
b) Newton
c) Pascal
d) Ampere

96. Humans can hear sound within range

a) 20Hz - 20000Hz
b) 10Hz-10000Hz
c) 200Hz-20000Hz
d) 30Hz--30000Hz

97. Loudness is measured in units called

a) Hertz
b) decibels
c) Pascal
d) ampere

98. Voice is produced by vibrations of

a) vocal cords
b) trachea
c) lungs
d) heart

99. A substance consisting of a coil of wire with an iron core and is only magnetized when an electric current flows through it is called

a) magnet
b) electromagnet
c) battery
d) coil

100. Materials which do not allow any light to pass through them are called

a) transparent
b) translucent
c) opaque
d) semi-absorbent