115/2015

Maximum : 100 marks

Time : 1 hour and 15 minutes

1. Which system acts as a chemical communication and control system within the human body?

   (A) Nervous system
   (B) Circulatory system
   (C) Respiratory system
   (D) Endocrine system

2. Which is called as a natural pacemaker for heart?

   (A) AV bundle
   (B) AV node
   (C) SA node
   (D) bundle of HIS

3. The normal diastolic and systolic blood pressure range is :

   (A) 95 mm to 140 mm of Hg
   (B) 120 mm to 140 mm of Hg
   (C) 120 mm to 80 mm of Hg
   (D) 80 mm to 120 mm of Hg

4. Noise of an image can be increased by :

   (A) By averaging
   (B) By blurring
   (C) Subtracting one image from other
   (D) None of the above

5. Which of the following is non ionizing imaging modalitiy?

   (A) Computed tomography
   (B) MRI
   (C) PET
   (D) Radiography

6. 50-60 Hz noise in E.C.G machines can be reduced by :

   (A) Right Leg drive
   (B) CMR of instrumentation amplifier
   (C) Notch filter
   (D) All of the above

7. In which imaging modality radioactive isotope is used?

   (A) PET
   (B) Ultrasound
   (C) CT
   (D) MRI

8. The average human heart weights about :

(A) 200 grams (B) 400 grams

(C) 300 grams (D) 100 grams

9. Cardiac output is defined as :

(A) Heart rate × stroke volume (B) Respiration rate × stroke volume

(C) Blood flow rate × stroke volume (D) Heart rate × blood flow rate

10. In an ECG machine Lead I, II and III are called as :

(A) Augmented limb leads (B) Unipolar limb leads

(C) Bipolar limb cads (D) Unipolar augmented limb leads

11. What is the range of frequency response of a diagnostic ECG machine?

(A) 0.05 to 100 Hz (B) 0.05 to 45 Hz

(C) 5 to 100 Hz (D) 5 to 45 Hz

12. The second heart sound is related to :

(A) Atria contraction (B) Aortic and pulmonary valve closure

(C) Termination of ventricular filling (D) Mitral and tricuspid valve closures

13. Which one of the following methods is direct method of measuring blood pressure?

(A) Sphygmomanometer (B) Auscultation technique

(C) Rheographic method (D) Catheter filled system

14. Coulter blood cell counter works on the principle of :

(A) Aperture impedance change (B) Light intensity variation

(C) Mass change (D) Capacitance variation

15. 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

16. How many electrodes are used in 10-20 electrode placement system in EEG machine?

(A) 21 (B) 32

(C) 40 (D) 12

17. A nervous reflex is an involuntary action response caused by stimulation of which part?

(A) Afferent nerve ending
(B) Efferent nerve ending
(C) Neuron
(D) Synapse

18. Hypercapnia means :

(A) Low oxygen level in the blood
(B) High oxygen level in the blood
(C) Poor alveolar ventilation
(D) High alveolar ventilation

19. Example for an aerosol therapy unit :

(A) Spirometer
(B) Nebulizer
(C) Humidifier
(D) Ventilator

20. Pneumotachometer is used to measure :

(A) blood flow
(B) blood pressure
(C) to measure lung volumes
(D) to measure respiration rate

21. An instrument used to measure lung volume quantitatively is :

(A) Impedance pneumograph
(B) Spirometer
(C) Ventilator
(D) Nebulizer

22. Which instrument is used to examine the ECG potentials generated along the three dimensional axes?

(A) Echocardiograph
(B) M-mode Ultrasonograph
(C) Vector cardiograph
(D) Electrocardiograph

23. Electomagnetic blood flow meter works on the principle of :

(A) Faraday's law
(B) Beers law
(C) Piezo electric effect
(D) Seeback effect

24. Plethysmography is determination of blood flow in a limb by measurement of ———— changes.

(A) Resistance
(B) Pressure
(C) Volume
(D) Impedance

25. The sensor used in Phonocardiograph is :

(A) Strain gauge
(B) Microphone
(C) Piezo resistive sensor
(D) Load cell

26. Defibrillator is used at which critical condition?

(A) SA node failure

(B) Asynchronous contraction and relaxation of heart

(C) Heart blockage

(D) Any problem in the electrical conduction pathway of the heart

27. Heart lung machine has to be maintained at which temperature condition?

(A) Hyperthermic

(B) Hypothermic

(C) At body temperature

(D) 5 $^{\circ}C$ above body temperature

28. An example for polarizable electrode is :

(A) Ag/AgCl electrode

(B) Hg/Hg_2Cl_2 electrode

(C) Platinum electrode

(D) Calomel electrode

29. P wave of an ECG signal is related to :

(A) Atrial depolarization

(B) Ventricular depolarization

(C) Ventricular repolarization

(D) Atrial repolarization

30. The difference between the observed half cell potential and the equilibrium zero current half cell potential of an electrode is called as :

(A) Ohmic overpotential

(B) Overpotential

(C) Concentration overpotential

(D) Activation Overpotential

31. Which type of electrode is used for monitoring fetal heart beat during labor time?

(A) Micro electrode

(B) Needle electrode

(C) Helical electrode

(D) Suction electrode

32. Lead III of an ECG machine corresponds to the potential difference between :

(A) LA to RA

(B) LL to RA

(C) LL to LA

(D) LA to RL

33. Which instrument is used to measure intra ocular pressure?

(A) Spirometer

(B) Sphygmomanometer

(C) Piezo electric sensor

(D) Tonometer

34. Normal blood volume in human body is :

(A) 7 Liters
(B) 4 Liters
(C) 6 Liters
(D) 5 Liters

35. What condition has to be maintained to monitor transcutaneous arterial oxygen saturation level?

(A) Hyperemia
(B) Hypothermia
(C) Hyperthermia
(D) Hypoxia

36. Example for an enzyme electrode is :

(A) pH sensor
(B) pO_2 Sensor
(C) pCO_2 Sensor
(D) Glucose sensor

37. The kinetic energy of gamma ray emitted in PET imaging system is :

(A) 211 keV
(B) 511 keV
(C) 311 keV
(D) 411 keV

38. The normal breadth rate of human is :

(A) 10 – 16
(B) 12 – 50
(C) 12 – 20
(D) 60 – 100

39. The aliasing will occur if :

(A) $Fs=2F_{MAX}$
(B) $F_S < 2F_{MAX}$
(C) $F_S > 2F_{MAX}$
(D) $F_S < F_{MAX}$

40. Snell's law describes the relation between the :

(A) Angle of incidence and angle of transmission
(B) Dispersion angle and wavelength in the Fruanhofer zone
(C) Angle of incidence and angle of reflection
(D) Focusing angle and angle of reflection

41. Example for derivative filter is :

(A) Weiner filter
(B) Median operator
(C) Inverse filter
(D) Prewitt operator

42. High frequency filters are used for :

(A) Blurring
(B) Sharpening
(C) Noise reduction
(D) Smoothing

43. A chip containing more than 1000 gates will be designated as :

(A) LSI
(B) MSI
(C) VLSI
(D) GSI

44. A forward upward movement of the foot at the ankle joint is :

(A) Plantar flexion
(B) Dorsi flexion
(C) Inversion
(D) Eversion.

45. Select the rectifier that needs four diodes :

(A) Half wave rectifier
(B) Center-tap full wave rectifier
(C) Bridge rectifier
(D) None of the above

46. In an radio frequency signal generator which type of oscillator is used :

(A) LC phase shift oscillator
(B) RC phase shift oscillator
(C) Wien oscillator and RC phase shift oscillator
(D) Wien oscillator and LC phase shift oscillator

47. Which is not an example of LC oscillator circuit?

(A) Colpitts oscillator
(B) Hartley oscillator
(C) Wien oscillator
(D) Crystal oscillator

48. The type of analyzer used for troubleshooting digital devices is :

(A) Wave analyzer
(B) Spectrum analyzer
(C) Logic analyzer
(D) Distortion analyzer

49. What is the resolution of the wire wound Potentiometer with 500 turns on 50 mm length?

(A) $.1\mu m$
(B) $10\mu m$
(C) $100\mu m$
(D) 10 mm

50. In an oscilloscope by which method the brightness of the spot is controlled?

(A) Intensity control
(B) Focus control
(C) Astigmatism control
(D) Position control

51. Thermister is made of :

(A) Oxides or salts of metals
(B) Metal
(C) Two different metals
(D) Two similar metal wires

52. Piezo-electric transducers are :

(A) Passive transducers
(B) Inverse transducers
(C) Digital transducers
(D) Pulse transducers

53. Ionization principle is used to measure the concentration of :

(A) Oxygen
(B) Nitrogen
(C) Carbon dioxide
(D) Carbon monoxide

54. What is the purpose of tank circuit in Oscillators?

(A) Amplifying
(B) Attenuating
(C) Tuning
(D) Providing feedback

55. Which oscillator is used in AF generator?

(A) Colpitts oscillator
(B) Hartley oscillator
(C) Crystal oscillator
(D) Wien oscillator

56. Basic principle behind Ultrasound Transducer is :

(A) Piezo electric effect
(B) Zeeback Effect
(C) Doppler effect
(D) Faradays law

57. These type of amplifiers have no direct contact with power supply :

(A) Chopper Amplifier
(B) Isolation amplifier
(C) Differential amplifier
(D) Instrumentation amplifier

58. Cardiac output is not measured using this principle :

(A) Oscillometric principle
(B) Ficks principle
(C) Dye dilution method
(D) Thermal dilution method

59. One of the types of oxygenator is :

(A) Film type
(B) Nebulizer
(C) Bourdon type
(D) Impedance type

60. Prosthesis means :

(A) Respiratory assist device
(B) Assist device for surgery
(C) An artificial device that replaces a missing body part
(D) An externally applied device used to modify the structural and functional characteristics

61. Haptic sensor means :

(A) Sensing and manipulation through audio
(B) Sensing and manipulation through imaging
(C) Sensing and manipulation through vision
(D) Sensing and manipulation through touch

62. What is the most commonly used microwave frequency used for therapeutic heating?

(A) 20 MHz
(B) 2450 MHz
(C) 200 MHz
(D) 2450 Hz

63. Which of the following is a gamma emitting Imaging System?

(A) CT
(B) PET
(C) SPECT
(D) PET and SPECT

64. As the frequency of ultrasound transducer increases the resolution ———— and depth of penetration :

(A) Increases, decreases
(B) Decreases, increases
(C) Increases, increases
(D) Decreases, decreases

65. Echocardiograph is which type of ultrasound scanner?

(A) A-mode
(B) M-mode
(C) B-mode
(D) C-Mode

66. 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

67. Positron is :

(A) β^+ decay
(B) β^- decay
(C) γ emission
(D) electron emission

68. Which magnetic property of oxygen is used to find oxygen concentration in an oxygen analyzer?

(A) Ferromagnetic nature
(B) Diamagnetic nature
(C) Paramagnetic nature
(D) None

69. Silver chloride electrode is used as a reference electrode due to its :

(A) Large half cell potential
(B) Stable half cell potential
(C) Stable action potential
(D) Stable resting potential

70. Increasing the dynamic range of the gray levels in the image betting processing is done in :

(A) Gray level slicing
(B) Bit plane sliding
(C) Dynamic range compression
(D) Contrast stretching

71. A digital image is a ———— light intensity function.

(A) 1D
(B) 2D
(C) 3D
(D) 4D

72. If two pixels locating at coordinates p(4,5) and q(8,5) what is the Euclidean distance between them?

(A) 4
(B) 2
(C) 6
(D) 8

73. Which of the sign magnitude number is equivalent to decimal +49?

(A) 0001 1110
(B) 1000 0111
(C) 1001 1100
(D) 0011 0001

74. The Boolean expression $(A+B')(A'+B+C')(A'+B'+C')$ when simplified, becomes :

(A) $B(A+C)+ABC$ (B) $A(B+C)$

(C) $A'B'C'$ (D) ABC

75. If the output of the system at any instant of time depends only on present and past input but not on future is called :

(A) Causal (B) Non Causal

(C) Time invariant (D) Time variant

76. If $N=8$, the no. of stages required in computing DFT-FFT using DIT algorithm is :

(A) 2 (B) 3

(C) 4 (D) 8

77. For representing 256 gray level how many no of bits required :

(A) 5 bits (B) 6 bits

(C) 7 bits (D) 8 bits

78. Which color model is used in color printers?

(A) RGB (B) CMY

(C) HSI (D) YIQ

79. The total external data memory that can be interfaced to the 8051 is :

(A) 32 K (B) 128 K

(C) 64 K (D) 256 K

80. The minimum number of bits required to store the hexadecimal number FF is :

(A) 2 (B) 4

(C) 16 (D) 8

81. The present Sri Lankan foreign Minister :

(A) Chitrangane Wagisware (B) Mangala Samaraveera

(C) Maitripala Sirisena (D) John Amaratunga

82. The Boko Haram militants are operating in :

(A) Nigeria (B) Egypt

(C) Iraq (D) Keniya

83. Who is the author of "The Secret of Nagas"?

(A) R.K. Narayan
(B) AmishTripati
(C) Arundhathi Roy
(D) Manohar Malgonkar

84. The world Cup Cricket final that was decided on Duckworth — Lewis method :

(A) 1987
(B) 2011
(C) 1999
(D) 2007

85. Soochipara Eco- tourism destination is situated in which district?

(A) Kannur
(B) Palakkad
(C) Idukki
(D) Wayanad

86. The 27th Kerala Science Congress was held at :

(A) Wayanad
(B) Thiruvananthapuram
(C) Ernakulam
(D) Alappuzha

87. The original name of Brahmananda Sivayogi :

(A) Muthukutty
(B) Sidharthan
(C) Govindankutty Menon
(D) Nanu Asan

88. 'Abrayakutty' was written by :

(A) Kandathil Vargeese Mappilai
(B) Ponkunnam Varkey
(C) Kardinal Joseph Parekattil
(D) Rosamma Punnus

89. Vallathol Narayana Menon got Padma Bhushan Award in the year :

(A) 1957
(B) 1954
(C) 1958
(D) 1956

90. Which among the following is Not written by Lalithambika Antharjanam?

(A) Kalathinte Edukal
(B) Agnisakshi
(C) Kudumbini
(D) Agnipushpangal

91. Who was the provisional President of Constituent Assembly?

(A) Dr. Rajendra Prasad
(B) Jawahar Lal Nehru
(C) Dr. Sachchidananda Sinha
(D) Dr. B.R. Ambedkar

92. Article 280 of our Constitution deals with :

(A) Fundamental Duties
(B) Finance commission
(C) Co-operative Federation
(D) Fundamental Rights

93. What is the full form of PDS?

(A) People's Distribution System
(B) People' s Diet System
(C) Public Distribution System
(D) Public Diet System

94. The journal started by Vakkom Moulavi in 1906 :

(A) Al- Islam
(B) Muslim
(C) Tasanif - i- Ahamadiya
(D) Al-Manar

95. Who was the first editor of 'Swadeshabhimani'?

(A) C.P. Govindapillai
(B) Ramakrishnapillai
(C) C. Kesavan
(D) K.P. Kesavamenon

96. Who founded Sree Narayanaguru Sevashram at Kanchipuram?

(A) Kumara Guru
(B) Swami Brahmananda
(C) Swami Prakasananda
(D) Govindananda Swamikal

97. Who is the author of' Manninuvendi?

(A) EMS Namboothiripad
(B) P. Krishnapillai
(C) E.K. Nayanar
(D) A.K. Gopalan

98. In 1930 K. Kelappan led salt Sathyagraha march from :

(A) Kozhikode to Payyannur
(B) Kozhikode to Kappad
(C) Kappad to Payyannur
(D) Kondotty to Beypore

99. Name the social reformer who remained 25 years in Sreemoolam Prajasabha :

(A) Dr. Palpu
(B) K. Ayyappan
(C) Ayyankali
(D) SreeNarayanaguru

100. The birth place of Chattambi Swamikal :

(A) Kannamoola
(B) Panmana
(C) Chempazhanthi
(D) Chaganassery