



श्री चित्रा तिरुनाल आयुर्विज्ञान और प्रौद्योगिकीसंस्थान, तिरुवनंतपुरम् -11
SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES & TECHNOLOGY,
THIRUVANANTHAPURAM—695 011

ENTRANCE EXAMINATION : ACADEMIC SESSION JANUARY 2020

PROGRAM: CARDIAC LABORATORY TECHNOLOGY

Time: 90 minutes

Max.Marks: 100

(Select the most appropriate answer)

(There are no negative marks for wrong answers)

1. Scalars are quantities that are described by
 - a) Direction
 - b) Magnitude
 - c) Magnitude and direction
 - d) Motion
2. 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
3. Snell's law describes the relation between the:
 - a) Angle of incidence and angle of transmission
 - b) Angle of incidence and angle of reflection
 - c) Dispersion angle and wavelength in the Fruanhofer zone
 - d) Focusing angle and angle of reflection
4. What is the metric unit of force?
 - a) Joule
 - b) Watt
 - c) Tesla
 - d) Newton
5. High frequency filters are used for:
 - a) Blurring
 - b) Sharpening
 - c) Noise reduction
 - d) Smoothing
6. Unit of pressure:
 - a) Newton second
 - b) Watt
 - c) Newton/Hr
 - d) Pascal

7. Select the rectifier that needs four diodes:
- Half wave rectifier
 - Center –tap full wave rectifier
 - Bridge rectifier
 - None of the above
8. Who gave the Theory of Relativity?
- Albert Einstein
 - Issac Newton
 - Albert Einstein
 - Galileo Galilei
9. What is the unit of viscosity?
- Coulomb
 - Watt per meter per degree Celsius
 - Newton second per square meter
 - Joule per kilogram per Kelvin
10. In an oscilloscope by which method the brightness of the spot is controlled?
- Intensity control
 - Focus control
 - Astigmatism control
 - Position control
11. For a PN junction diode, the current in reverse bias may be
- Few miliamperes
 - Between 0.2 A and 15 A
 - Few amperes
 - Few micro or nano amperes
12. PN junction failure below 5V is caused primarily by
- Avalanche breakdown
 - Zener breakdown
 - Either of (a) and (b) above
 - None of the above
13. Depletion region contains
- Free holes
 - Free electrons
 - Immobile charge carries
 - All of the above
14. A voltage regulator is a circuit which
- Converts the ac voltage to dc voltage
 - Smoothed the ac variation in dc output voltage
 - Maintains constant dc output voltage inspite of the fluctuating ac.
 - None of the above.

15. Breakdown voltage of zener diode is controlled by the
- Impurities
 - Doping
 - Voltage
 - Both a and b
16. Alexander Graham Bell invented
- Telephone
 - Computer
 - Television
 - Radar
17. For silicon atom barrier potential is the
- 0.2V
 - 0.4V
 - 0.7V
 - 0.3V
18. RMS value of V_c (max) is
- 0.1
 - 0.6
 - 0.7
 - 0.8
19. Minority carriers in n-type materials are the
- Electrons
 - Protons
 - Holes
 - Neutrons
20. Laser light which is monochromatic light is also known as
- Chromatic
 - Coherent light
 - Photon
 - Multichromatic
21. Compared to a visible red LED, an infrared LED
- Produces light with longer wavelength
 - Produces light when reverse -biased
 - Produces light with shorter wavelengths
 - Produces only one color of light
22. Current gain for emitter follower is
- I_{IN}/I_E
 - I_E/I_{IN}
 - I_E/I_{OUT}
 - I_{IN}/I_{OUT}

23. Carbon dating is used to determine the age of
- Fossils
 - Minerals
 - Tress
 - All these
24. The fuel used in nuclear reactor is
- Heavy water
 - Graphite
 - Cadmium
 - Uranium
25. Which acid present in lemon?
- Marlic acid
 - Citric acid
 - Lactic acid
 - Tartaric acid
26. Critical angle of water when refracted angle is 90° and refractive index for water and air is 1.33 and 1 is
- 48.8°
 - 49.1°
 - 50°
 - 51°
27. Outer concentric shell in fiber optic is called
- Cladding
 - Core
 - Coat
 - Mantle
28. Critical angle for glass is
- 50°
 - 42°
 - 45°
 - 30°
29. An example of a device in which convex lens is used, is
- Mirror
 - Telescope
 - Spectacles
 - Contact lenses
30. A forces which opposes motion when two surfaces are in contact is called
- Thrust
 - Air resistance
 - Gravitational force
 - Frictional force

31. The oxidation number of carbon in the oxalate ion, $C_2O_4^{2-}$ is:
- +3
 - +1
 - +4
 - +2
32. A train is travelling from a station A to another station B at a speed of 60Km/hr. Another train is travelling at a speed of 30Km/hr from station B to A. The relative speed of train A with respect to B is?
- 90 m/s
 - 30 m/s
 - 25 m/s
 - 12 m/s
33. Which is the lightest gas?
- Hydrogen
 - Oxygen
 - Nitrogen
 - Helium
34. The isotope deuterium of hydrogen has
- No neutrons and one proton
 - Neutrons and electrons
 - Protons and neutrons
 - None of these
35. The isotopes used to remove the brain tumors and treatment of cancer is
- U-235
 - Na-24
 - Iodine
 - CO-60
36. In an ECG machine lead I, II, III are called as
- Bipolar limb leads
 - Monopolar leads
 - Chest leads
 - Unipolar limb leads
37. The frequency band of alpha pattern of EEG wave form is.
- 0.5- 4 Hz
 - 6 Hz
 - 8-13 Hz
 - 22 Hz
38. Positron is _____
- β^+ decay
 - α decay
 - β^- decay
 - neutral

39. Which magnetic property of oxygen is used to find oxygen concentration in an oxygen analyzer?
- Diffusion property
 - Para magnetic property
 - Electrical nature
 - Ionizing property
40. Light year is a unit of
- Time
 - Light
 - Distance
 - Intensity of light
41. Normal blood volume in human body is
- 10 litres
 - 3 litres
 - 15 litres
 - 5 litres
42. Which law is also called law of inertia
- Newton first law
 - Newton second law
 - Newton third law
 - All of the above
43. Study of bones is called
- Osteoporosis
 - Osteoclast
 - Otology
 - Osteology
44. The kinetic energy of gamma rays emitted in PET imaging system is
- 200Kev
 - 500Kev
 - 511Kev
 - 250Kev
45. Which instrument is used to examine the ECG potentials generated along the three dimensional axes?
- Vector cardiograph
 - Echocardiograph
 - M-mode Ultrasonography
 - Electrocardiograph
46. P wave of an ECG signal is related to:
- Ventricular depolarization
 - Atrial depolarization
 - Ventricular repolarization
 - Atrial repolarization

47. How many electrodes are used in 10-20 electrode placement system in EEG machine?
- a) 21
 - b) 30
 - c) 20
 - d) 10
48. Extremely pure form of semiconductor is called
- a) Doped semiconductor
 - b) Extrinsic semiconductor
 - c) Intrinsic semiconductor
 - d) None of these
49. Which among the following operates as photo voltaic cell?
- a) LED
 - b) Solar Cell
 - c) LCD
 - d) Thermistor
50. MOSFET consists of a metal oxide semiconductor layer made of
- a) MgO
 - b) SiO₂
 - c) CaO
 - d) Na₂O
51. Which among the following bridges is used for measurement of frequency?
- a) Wheatstone's bridge
 - b) Schering Bridge
 - c) Hay Bridge
 - d) Wien Bridge
52. Reynolds number increases with increase in
- a) Charge
 - b) Potential
 - c) Velocity
 - d) Magnetic Flux
53. Which among the following operates on seebeck effect?
- a) Barometer
 - b) Manometer
 - c) Thermocouple
 - d) Diode
54. Which instrument is used to measure intra ocular pressure?
- a) Spirometer
 - b) Sphygmomanometer
 - c) Piezo electric sensor
 - d) Tonometer

55. Example for enzyme electrode is:
- pH sensor
 - p O₂ sensor
 - pCO₂ sensor
 - Glucometer
56. Which one of the following ions exhibits colour in aqueous solution
- Sc³
 - Ni²
 - Ti⁴
 - Zn²
57. Which ore contains both iron and copper?
- Cuprite
 - Chalcocite
 - Chalcopyrite
 - Malachite
58. Conservation of momentum in a collision between particles can be understood from
- Conservation of energy.
 - Newton's first law only.
 - Newton's second law only.
 - both Newton's second and third law
59. A hockey player is moving northward and suddenly turns westward with the same speed to avoid an opponent
- Frictional force along westward.
 - Muscle force along southward.
 - Frictional force along south-west.
 - Muscle force along south-west.
60. An object moves with uniform positive acceleration. Its velocity-time graph will be
- A straight line parallel to the time axis
 - A straight line inclined at an obtuse angle to the time axis
 - A straight line inclined at an acute angle to the time axis
 - None of these.
61. _____ friction is the value of the limiting friction just before slipping occurs.
- Dynamic
 - Static
 - Sliding
 - Rolling
62. What is the principle of fibre optical communication?
- Frequency modulation
 - Population inversion
 - Total internal reflection
 - Doppler Effect

63. Coulomb is the unit of which quantity?
- Field strength
 - Charge
 - Permittivity
 - Force
64. Two charges $1C$ and $-4C$ exists in air. What is the direction of force?
- Away from $1C$
 - Away from $-4C$
 - From $1C$ to $-4C$
 - From $-4C$ to $1C$
65. The Coulomb law is an implication of which law?
- Ampere law
 - Gauss law
 - Biot Savart law
 - Lenz law
66. The random motion of holes and free electrons due to thermal agitation is called
- Diffusion
 - Pressure
 - Ionisation
 - None of the above
67. Convert the Given Decimal Number to Binary Number: 262_{10}
- 100100101_2
 - 100000101_2
 - 100000110_2
 - 110000110_2
68. Which digit is represented by a black band on a resistor?
- 0
 - 100
 - 1000
 - 1
69. A 47 K ohm resistor would have which colors on its first three bands?
- red, white, blue
 - yellow, violet, orange
 - orange, yellow, violet
 - yellow, violet, white
70. For equilibrium of a body on an inclined plane of inclination 45° . The coefficient of static friction will be
- Greater than one
 - Less than one
 - Zero
 - Less than zero

71. Two atoms are said to be isobars if
- They have same atomic number but different mass number.
 - They have same number of electrons but different number of neutrons.
 - They have same number of neutrons but different number of electrons.
 - Sum of the number of protons and neutrons is same but the number of protons is different.
72. A sonometer wire having a length of 50 cm is vibrating in the fundamental mode with a Frequency 100Hz. Which of the following is the type of propagating wave and its speed?
- Longitudinal, 50 m/s
 - Transverse, 50 m/s
 - Longitudinal, 100 m/s
 - Transverse, 100 m/s
73. Consider the following statements:
- If magenta and yellow colored circles intersect, the intersected area will have red color.
 - If cyan and magenta colored circles intersect, the intersected area will have blue color.
- Which of the statements given above is/are correct?
- 1 only
 - 2 only
 - Both 1 and 2
 - Neither 1 nor 2
74. Which components of light are absorbed by chlorophyll?
- Violet and red
 - Indigo and orange
 - Blue and red
 - Violet and yellow
75. What element has the most stable isotopes?
- Iron
 - Hydrogen
 - Oxygen
 - Tin
76. Which of the following has maximum spin?
- Proton
 - Neutron
 - Electron
 - All have equal spin
77. Unit of reluctance:
- Ampere Turns/Weber
 - Weber Turns
 - Henry
 - Weber Turns/Ampere

78. Which one of the following processes will produce permanent hard water?
- Addition of Na_2SO_4 to water
 - Saturation of water with CaCO_3
 - Saturation of water with MgCO_3
 - Saturation of water with CaSO_4
79. Unit of luminous intensity is
- Lumen
 - Lux
 - Lumen/ m^2
 - Candela
80. The presence of parallel alignment of magnetic dipole moment is given by which materials?
- Diamagnetic
 - Ferromagnetic
 - Paramagnetic
 - Ferromagnetic
81. Piezoelectric effect is analogous to which phenomenon?
- Electrostriction
 - Magnetostriction
 - Anisotropy
 - Magnetization
82. Name the process in which the membrane of a vesicle can fuse with the plasma membrane and extrude its contents to the surroundings medium?
- Exocytosis
 - Endocytosis
 - Osmosis
 - Diffusion
83. The jelly like substance present inside the cell is known as:
- Cytoplasm
 - Ectoplasm
 - Nucleoplasm
 - None of the above
84. Blue green Algae are:
- Prokaryotes
 - Eukaryotes
 - Both a) and b)
 - Neither a) nor b)
85. Fat soluble Vitamins are:
- Vitamin A
 - Vitamin D
 - Vitamin E
 - All of the above

86. Niacin is the chemical name of which Vitamin?
- Vitamin B3
 - Vitamin B1
 - Vitamin B2
 - Vitamin C
87. Arthritis is
- Degeneration of skeletal muscles
 - Decrease in blood calcium level
 - Inflammation of joints
 - Rapid contraction of muscles
88. Due to contraction of eyeball, a long-sighted eye can see only
- farther objects which is corrected by using convex lens
 - farther objects which is corrected by using concave lens
 - nearer objects which is corrected by using convex lens
 - nearer objects which is corrected by using concave lens
89. Malaria in human body is caused by which one of the following organisms?
- Bacteria
 - Virus
 - Mosquito
 - Protozoan
90. Which type of blood vessels carries blood away from the heart?
- Veins
 - Arteries
 - Capillaries
 - Arteries, veins and capillaries
91. The branch of science deals with blood, blood forming tissues and its disorders is called
- Hemopoiesis
 - Cardiovascular system
 - Plasmology
 - Hematology
92. Which of the following is NOT a plasma protein?
- Albumin
 - Globulin
 - Fibrinogen
 - Fibronectin
93. Mitral valve is present
- Between right atrium and right ventricle
 - Between left atrium and left ventricle
 - Inside aorta
 - Inside pulmonary artery

94. Primary pacemaker of heart is
- SA node
 - Purkinje fibres
 - Bundle of His
 - AV node
95. Which of the following membrane is responsible for the protection of the heart?
- Epicardium
 - Endocardium
 - Myocardium
 - Pericardium
96. ECG records electrical changes in which of the following layers of the heart, mark the correct
- Epicardium
 - Pericardium
 - Endocardium
 - Myocardium
97. Smallest cardiac veins directly drain into the
- chambers of heart
 - atria systole
 - atria diastole
 - lymphatic systole
98. Two arteries near origin of aorta where coronary circulation begins are
- bronchial coronary artery
 - left and right coronary artery
 - upper and lower coronary artery
 - lymphatic coronary artery
99. Diastolic pressure is due to
- Contraction of atria
 - Contraction of ventricle
 - Relaxation of atria
 - Relaxation of ventricle
100. Cardiac output is defined as:
- Heart rate x stroke volume
 - Respiration rate x stroke volume
 - Blood flow rate x stroke volume
 - Heart rate x blood flow rate

