श्री चित्रा तिरुनाल आयुर्विज्ञान और प्रौद्योगिकीसंस्थान, तिरुवनंतपुरम्-11

SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES & TECHNOLOGY
THIRUVANANTHAPURAM—695 011

ENTRANCE EXAMINATION - ACADEMIC SESSION JANUARY 2018

PROGRAMME: DIPLOMA-OPERATION THEATER TECHNOLOGY

Time:90 Minutes Max.Marks: 100

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

1. The maximum efficiency of a half-wave rectifier is .....
a) 40.6 % b) 81.2 % c) 50 % d) 25 %

2. The resistance of a conductor is inversely proportional to
a) The length b) The resistivity
c) The cross-sectional area d) The pressure

3. A zener diode is destroyed if it.....
a) is forward biased b) is reverse biased
c) carrier more than rated current d) none of the above

4. The mathematical statement of the first law of thermodynamics is
a) $\Delta E = Q - W$ b) $\Delta E = Q + W$
c) $\Delta E = W - Q$ d) $\Delta E = -Q - W$

5. A series resistance is connected in the zener circuit to.....
a) properly reverse bias the zener b) protect the zener
c) properly forward bias the zener d) none of the above

6.Which of the following is the correct acid strength? (A) chloroacetic acid (B) acetic acid (C) benzoic acid
a) A > B > C b) A > C > B c) B > C > A d) B > A > C

7. Which instrument is used to measure sound under water ?
a) Hygrometer b) Hygroscope c) Hypsometer d) Hydrophone

8. Carbon dating is used to determine the age of
a) fossils b) minerals c) trees d) all these

9. Which instrument is used to measure pressure of gases ?
a) Manometer b) Machmeter c) Magnetometer d) Micrometer

10. The fuel used in nuclear reactor is
a) heavy water b) graphite c) cadmium d) uranium

11. What is unit of Electrical Capacity ?
a) Henry b) farad c) volt d) ohm

12. What does LED stand for?
    a) Light Emitting Display
    b) Low Energy Display
    c) Light Emitting Diode
    d) Light Emitting Detector

13. In an ECGmachine Lead I, II, III are called
    a) Augmental limb leads
    b) Unipolar limb leads
    c) Bipolar limb leads
    d) unipolar augmented limb leads

14. What is the range of mercury thermometer ?
    a) 0 degree Celsius to 350 degree Celsius
    b) -10 degree Celsius to 350 degree Celsius
    c) -20 degree Celsius to 350 degree Celsius
    d) -30 degree Celsius to 350 degree Celsius

15. A sum of money amounts to Rs.6690 after 3 years and to Rs.10035 after 6 years on compound interest. Find the sum.
    a) 4460
    b) 4630
    c) 2640
    d) 5000

16. Name the three leads of a common transistor
    a) Collector Bias Omitter
    b) Base Collector Case
    c) Emitter Collector Bias
    d) Collector Base Emitter

17. If $(1 + ax)^n = 1 + 8x + 24x^2 + \ldots\ldots$, then a is equal to
    a) 1
    b) 2
    c) 0
    d) 8

18. The schmitt trigger may be used to?
    a) change voltage to corresponding frequency
    b) Change frequency to voltage
    c) Square slowly varying input
    d) None of above

19. Which are the primary Colours ?
    a) Yellow, Green, Blue
    b) Red, Magenta, Blue
    b) Red, Green, White
    d) Red, Green, Blue

20. SR Flip flop can be converted to T-type flip-flop if ?
    a) S is connected to Q
    b) R is connected to Q
    c) Both S and R are shortend
    d) S and R are connected to Q and Q' respectively

21. Electromagnets are made of soft iron because soft iron has
    a) high susceptibility and low retentivity
    b) low susceptibility and high retentivity
    c) low susceptibility and low retentivity
    d) high susceptibility and high retentivity

22. The maximum value of $\cos 2\theta + \sin \theta$ is
    a) 9/8
    b) 3/4
    c) 5/4
    d) 7/8

23. The Pa (Pascal) is the unit for
    a) Pressure
    b) conductivity
    c) force
    d) time

24. If the sides of a triangle are 7, $4\sqrt{3}$ and $\sqrt{13}$, then the smallest angle of the triangle is
    a) 15°
    b) 30°
    c) 36°
    d) 45°

25. If r1 = r2 =r3, then the triangle is
a) right angled b) isosceles c) equilateral d) obtuse angled

26. Metals are good conductors of electricity because
a) the atoms are lightly packed b) they have high melting point
c) they contain free electrons d) none of the above

27. Which terminal of a PNP transistor is connected to positive supply?
a) collector b) emitter c) base d)collector & emitter

28. A stick partially immersed in water looks bend , it is a phenomenon of
a) Reflection b) Parallax view c) Radiation d) Refraction

29. If two resistors are placed in series, is the final resistance:
a) Higher b) Lower c) The same d) Cannot predict

30. A car travels 50 miles an hour, and a plane travels 10 miles a minute. How far will the car travel when the plane travels 500 miles?
a) 50.4 miles b) 37.5 miles c) 41 .6 miles d) 39.7 miles

31. If a circle of constant radius 3 k passes through the origin and meets the axes at A and B, the locus of the centroid of triangle OAB is the circle
a) $x^2 + y^2 = 4k^2$ b) $x^2 + y^2 = 9k^2$ c) $x^2 + y^2 = k^2$ d) $x^2 + y^2 = 3k^2$

32. The equation $x^2 + 4xy + 4y^2 + 5x + 6y + 1 = 0$ represents
a) a pair of straight lines b) a circle c) a parabola d) an ellipse

33. The sum of the three angles in an equilateral triangle is
a) 180° b) 60° c) 360° d) 30°

34. Optical fiber works on the
a) Refraction b) Total internal reflection
c) Interference d) Polarization

35 Device used to measure potential difference between two points in volts is known as
a) ohmmeter b) odometer c) ammeter d) voltmeter

36. If A is of order m × n and B is of order n × p, then AB is of order
a) m × p b) p × m c) n × p d) n × n

37. If A is a square matrix, then $A + A^T$ is
a) unit matrix b) null matrix c) symmetric matrix d) skew symmetric matrix

38. If the product $AB \neq 0$, then
a) $A=0, B \neq 0$ b) A=0 and B=0
c) either A=0 or B=0 d) neither A nor B need to be equal to zero

39. An open pipe has fundamental frequency f. If one of its ends is closed, the fundamental frequency is
a) 2f b) f/2 c) f d) 4f

40. The heart sound is recorded by
a) Electro cardiograph
b) Endoscope
c) Phonocardiography
d) Angiocardiography.

41. The number of chambers in human heart is
a) 1 b) 2 c) 3 d) 4

42. The phase to phase voltage in a normal three phase line is
a) 200V DC b) 200V AC c) 440V AC d) 440V DC

43. The phase difference between velocity and displacement of a particle executing SHM is
a) 0 b) $\pi/2$ c) $\pi/4$ d) $\pi/6$

44. One watt-hour is equivalent to
a) 3.6×10^3 J b) 6.3×10^3 J c) 6.3×10^7 J d) 3.6×10^7 J

45. If an elevator is moving vertically up with acceleration a, the force exerted on the floor by a passenger of mass M is
a) Ma b) Mg c) M(g+a) d) M(g-a)

46. Melting point of ice
a) 100^0C b) 100^0F c) 0^0C d) 0^0F

47. P wave of an ecg signal is related to
a) Atrial depolarisation
b) ventricular depolarization
c) ventricular repolarization
d) Atrial repolarization

48. The potential difference required to pass a current 0.2 A in a wire of resistance 20W is ____.
a) 100 V b) 4V c) 0.01V d) 40V

49. When a charged particle moves at right angle to a magnetic field quantity that changes is
a) momentum b) speed c) energy d) moment of inertia

50. A reduction of 20% in the price of rice enables a purchaser to obtain 2.5 kg more for Rs. 160/- . Find the original price per Kg of Rice.
a) Rs. 12 b) Rs. 15 c) Rs. 16 d) Rs. 18

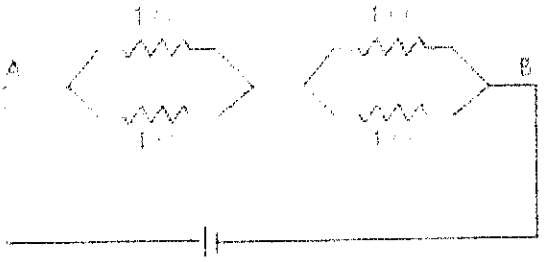
51. Which of the following statements does not represent ohm's law?
a) current / potential difference = constant
b) potential difference / current = constant
c) potential difference = current x resistance
d) current = resistance x potential difference

52. The Blood is carried away from the heart through
a) Cells b) Veins c) Arteries d) Nerves

53. The Bio-electric generator of heart is situated at
a) Aortic valve b) SA node c) AV node d) the brain

54. Which one of these thermometers is portable as well as simple to use?
a) Constant-volume gas thermometer
b) resistance thermometer
c) Thermocouple
d) Mercury-in-glass thermometer

55. The resistance across AB is



a) 4Ω b) 1Ω c) 2Ω d) 0.5Ω

56. The current in a wire _____.
- a) depends only on the potential difference applied
- b) depends only on the resistance of the wire
- c) depends on both resistance and potential difference
- d) does not depend on resistance and potential difference.

57. A crystal diode has forward resistance of the order of .....
- a) kΩ b) Ω c) MΩ d) none of the above

58. What is the respiratory system?
- a) The body's breathing system
- b) The body's system of nerves
- c) The body's food-processing system
- d) The body's blood-transporting system

59. A man goes 10 meters due east and then 24 meters due north. Find the distance from the starting point.
- a) 26 meters b) 24 meters c) 28 meters d) 21 meters

60. Ophthalmoscope is an instrument which is used to
- a) inspect the eye
- b) inspect the stomach
- c) inspect the thorax
- d) inspect the abdominal cavity

61. Electric shock occurs when electric current flows through the body because:
- a) a person becomes part of an electric circuit
- b) a fatal shock occurs
- c) there is no earth leakage
- d) a person is not wearing rubber-soled shoes

62. Sensitivity of a thermometer refers to
- a) how quickly thermometer can register change in temperature
- b) amount of change in thermometric property for a unit change in temperature
- c) min and max temperatures that thermometer can measure
- d) None of above

63. The average value of systolic and diastolic pressure of normal adult are
- a) 80 to 120 mm Hg
- b) 120 to 80 mm Hg
- c) 70 to 140 mm Hg
- d) 140 to 60 mm Hg

64. The term "duty of care" refers to the:
a) tasks that workers must undertake
b) responsibilities of employers to workers' families
c) safety responsibilities of health and safety representatives
d) safety responsibilities of employers and workers and others

65. In physics, a common instrument to measure diameter of a circle is known as
a) Rule
b) Measuring tape
c) Calipers
d) Inch tape

66. The unit of electric Current is
a) Coulomb
b) Volt
c) Ampere
d) Farad

67. To prevent transmission of disease:
a) hands must be washed before contact with each client
b) gloves must be worn and rinsed between handling clients
c) masks and protective eyewear should always be worn
d) all of the above

68. A conductor has Zero resistance at
a) Zero degree Centigrade
b) - 273 degree Centigrade
c) Zero degree Fahrenheit
d) - 273 degree Fahrenheit

69. SI unit for length is
a) centimeter
b) inches
c) meter
d) yards

70. Calculate the universal gas constant R, if one mol of gas at S.T.P occupies 22.4 liters.
a) 7.31 J/mol/K
b) 8.31 J/mol/K
c) 10 J/mol/K
d) 15 J/mol/K

71. Calculate the r.m.s velocity of a gas at 300K given its molecular mass= 32 and R= 8.3 J/mol/K.
a) 834 m/s
b) 348m/s
c) 448 m/s
d) 483m/s

72. Temperature of the human body is 98.4°F. Find the corresponding temperatures on the Celsius scale.
a) 309.9°C
b) 39.9°C
c) 36.9°C
d) 40°C

73. Which of the following is dimensionally correct?
a) Pressure = Energy/ unit area
b) Pressure = Energy/ unit volume
c) Pressure = Force/unit volume
d) Pressure = momentum/unit volume/unit time

74. First aid treatment for burns include:
a) placing the burnt area under cool running water
b) removing clothing from the burn area
c) applying any soothing cream or ointment if available
d) all of the above

75. An instrument used to measure lung volume quantitatively
a) impedancepneumograph
b) Spirometer
c) ventilator
d) nebulizer

76. To operate properly, a transistor's base-emitter junction must be forward biased with reverse bias applied to which junction?
a) base-emitter
b) emitter-base
c) collector-emitter
d) collector-base

77. A material that contains an abundance of free carrier is called
a) Insulator b) Semi-insulator c) Conductor d) Semiconductor

78. An electron in the conduction band
a) is bound to its parent atom
b) is located near the top of the crystal
c) has no charge
d) has a higher energy than an electron in the valence band

79. Sound is produced due to
a) friction b) circulation c) vibration d) refraction

80. Which instrument is used to determine the intensity of colours?
a) Cathetometer b) Chronometer c) Colorimeter d) Commutator

81. What is displacement ?
a) Longest distance covered by a body in a random direction.
b) Shortest distance covered by a body in a random direction.
c) Shortest distance covered by a body in a definite direction.
d) Longest distance covered by a body in a definite direction.

82. Cardiac output is defined as
a) Heart rate x stroke volume b) Respiration rate x stroke volume
c) Blood flow rate x stroke volume d) Heat rate x blood flow rate

83. What is clinical governance?
a) Working according to the Code of Conduct
b) Ensuring that you keep your CPD hours up to date
c) Working using the latest textbook and online information
d) A process of reflection, analysis and improvement of practice

84. When transistors are used in digital circuits they usually operate in the:
a) linear region b) breakdown region
c) saturation and cutoff regions d) active region

85. The EEG signal is originated from the
a) Brain Cells b) Motor units c) Sino arterial node d) Acetylcholine

86. Cathode ray consists of
a) high energy electrons b) low energy electrons
c) high energy protons d) low energy protons

87. The range of frequency and voltage related to EEG are
a) 0 to 1000kHz and 0.1mV to few mV b) DC to 10kHz and 10μV to 1000μV
c) 0.5 Hz to 100 Hz and 10μV to 100μV d) 20 Hz to 100 Hz and 0 to few mV

88. Which of the following has the highest wavelength?
a) γ- rays b) x- rays c) UV rays d) IR rays

89. An electron has the lowest energy when it is
a) at infinite distance from the nucleus b) in the ground state
c) in the excited state d) remaining stationary

90. EMG deals with the study of
a) Brain activity
b) myocardial activity
c) muscular activity
d) central nervous system

91. Among the following imaging systems, which has more noninvasive character?
a) Ultrasonic imaging system
b) CT imaging system
c) Nuclear imaging system
d) PET system

92. In op-amp, signal applied at inverting terminal appears at output terminal with a phase
a) 0
b) 90
c) 180
d) 5

93. Which law states, "The rate of loss of heat by a body is directly proportional to the difference in temperature between the body and the surroundings."
a) Doppler's Effect
b) Newton's law of cooling
c) Kirchhoff's Law
d) Stefan's Law

94. When a negative ion is formed, the effective nuclear charge
a) increases
b) decreases
c) remains same
d) cannot be predicted

95. The most electronegative element is
a) chlorine
b) oxygen
c) fluorine
d) nitrogen

96. The knee voltage of a crystal diode is approximately equal to .....
a) applied voltage
b) breakdown voltage
c) forward voltage
d) barrier potential

97. What is refractive index?
a)it is defined as the ratio of speed of light in the medium to the speed of light in vacuum.
b) it is defined as the ratio of speed of light in vacuum to the speed of light in the medium .
c) it is defined as the product of speed of light in medium and in vacuum.
d) None of the above

98. An ionic bond is formed by
a) mutual sharing of electrons
b) transfer of electrons
c) donation and sharing of electrons
d) none of these

99. A resistor has a colour band sequence: brown, black, green and gold. Its value is
a) 1 kΩ$\pm$10%
b) 1000 kΩ$\pm$ 5%
c)10 kΩ$\pm$ 5%
d) 1MΩ $\pm$10%

100. Input resistance of op-amp is
a) very high
b) very low
c) zero
d) one