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

ENTRANCE EXAMINATION - ACADEMIC SESSION JANUARY 2022

Program: PG Diploma in Cardiac Laboratory Technology

Time: 90 Minutes

Max. Marks: 100

(Select the most appropriate answer)

(There are **no negative** marks for wrong answers)

- 1 Two coils are placed close to each other. The mutual inductance of the pair of coils depend upon:
  - a. the currents in the two coils
  - b. the rates at which currents are changing in the two coils
  - c. relative position and orientation of the two coils
  - d. the materials of the wires of the coils
- 2 A transformer works on the principle of
  - a. Self induction
  - b. Electrical inertia
  - c. Mutual induction
  - d. Magnetic effect of the electrical current
- 3 Waves used by artificial satellites for communication is
  - a. Microwaves
  - b. Infrared waves
  - c. Radio waves
  - d. X-rays
- 4 Two pure inductor coils of self inductance  $L$  each are connected in series, the net inductance is :
  - a.  $L$
  - b.  $2L$
  - c.  $L/2$
  - d.  $L/4$
- 5 In a step up transformer the number of turns in :
  - a. primary are less
  - b. primary are more
  - c. primary and secondary are equal
  - d. primary are infinite
- 6 Depletion layer consists of:
  - a. electrons
  - b. protons
  - c. mobile ions
  - d. immobile ions
- 7 An electronic oscillator is :
  - a. just like an alternator
  - b. an amplifier with feedback
  - c. nothing but an amplifier
  - d. a.c. to d.c. energy converter
- 8 Semi-conductors are formed if the bonds are
  - a. van der Waals
  - b. ionic
  - c. metallic
  - d. covalent



- 9 When we apply reverse bias to a junction diode, it :
- lowers the potential barrier
  - raises the potential barrier
  - greatly increases the minority carrier current
  - greatly increases the majority carrier current
- 10 Semi-conductor devices are
- temperature dependent
  - current dependent
  - voltage dependent
  - none of the above
- 11 Polarisation of light proves that:
- corpuscular nature of light
  - quantum nature of light
  - transverse wave nature of light
  - longitudinal wave nature of light
- 12 Which of the following phenomena can be used to analyse a beam of light into its component wavelength ?
- Reflection
  - Refraction
  - Polarisation
  - Interference
- 13 The wave front due to a source situated at infinity is:
- spherical
  - cylindrical
  - planar
  - none of these
- 14 Which of the following is not an essential condition for interference ?
- The two interfering waves must be propagated in almost the same direction.
  - The wave must have the same period and wavelength
  - The amplitude of the two waves must be equal
  - The two interfering beams of light must originate from the same source
- 15  $n$  incoherent sources of intensity  $I_0$  are superimposed at a point, the intensity of the point is :
- $nI_0$
  - $I_0/n$
  - $n^2I_0$
  - none of these
- 16 Which of following can not travel through vacuum ?
- Electromagnetic wave
  - Sound wave
  - Light wave
  - X-ray
- 17 A longitudinal wave consists of:
- rarefactions and compressions
  - only compressions
  - only rarefactions
  - crest and trough
- 18 If intensity of sound wave is increased nine times, then by what factor the pressure amplitude of the wave is increased ?
- 3
  - 6
  - 9
  - 12
- 19 Which one is not produced by sound waves in air ?
- Polarisation
  - Diffraction
  - Refraction
  - Reflection
- 20 According to Laplace correction, the propagation of sound in gas takes place under
- isothermal condition
  - isobaric condition
  - isochoric condition
  - adiabatic condition



- 21 If for a material,  $Y$  and  $B$  are Young's modulus and Bulk modulus then :
- $Y < 3B$
  - $Y = 3B$
  - $Y > 3B$
  - $3Y = B$
- 22 The bulk modulus for an incompressible liquid is :
- Zero
  - One
  - Two
  - Infinity
- 23 Surface tension of liquid :
- rises with rise in temperature
  - fall with rise in temperature
  - is independent of temperature
  - none of the above
- 24 In the case of S.H.M., at the time of maximum kinetic energy :
- potential energy must be zero
  - potential energy is minimum
  - potential energy must not be zero
  - potential energy is maximum
- 25 The time period of particle executing S.H.M. is doubled, then
- angular frequency becomes half
  - frequency becomes half
  - frequency becomes double
  - none of the above
- 26 In the case of S.H.M., if the particle is at the mean position, then the particle is in:
- stable equilibrium
  - unstable equilibrium
  - neutral equilibrium
  - none of these
- 27 If the mass of bob of simple pendulum is increased by 50%, the time period of the pendulum:
- does not change
  - increases
  - decreases
  - none of these
- 28 The example of forced vibration is :
- resonance
  - beats
  - interference
  - diffraction
- 29 Coherent sources are characterized by the same
- phase and phase velocity
  - wavelength
  - frequency
  - all of these
- 30 Which of the following pair has same dimensions ?
- Current density and charge density
  - Angular momentum and momentum
  - Spring constant and surface energy
  - Force and torque
- 31 An atmosphere:
- is a unit of pressure
  - is a unit of force
  - gives an idea of the composition of air
  - is the height above which there is no atmosphere



- 32 Which one of the following units measures energy ?
- a. kilo-watt-hour                      c. (pascal) (foot)<sup>2</sup>  
 b. (volt)<sup>2</sup> (sec)<sup>-1</sup> (ohm)<sup>-1</sup>              d. none of the above
- 33 The action and reaction forces referred to Newton's third law of motion
- a. must act upon the same body                      c. need not to be equal in magnitude but must have the same line of action  
 b. must act upon different bodies                      d. must be equal in magnitude but need not have the same line of action
- 34 Pressure is :
- a. a scalar quantity                      c. a tensor quantity  
 b. a vector quantity                      d. either scalar or vector
- 35 Bernoulli's principle is based on the law of conservation of :
- a. mass                      c. energy  
 b. momentum                      d. none of these
- 36 The force of buoyancy on an immersed body is :
- a. due to weight of the body                      c. due to atmospheric pressure  
 b. due to the pressure difference between upper surface and lower surface of the body                      d. both (a) and (c) are correct
- 37 Though air is bad conductor yet a body kept in air losses heat, quickly this is due to :
- a. conduction                      c. radiation  
 b. convection                      d. none of these
- 38 The thermal conductivity of copper is :
- a. less than that of iron                      c. less than that of wood  
 b. less than that of aluminium                      d. more than that of all the three given above
- 39 The mode of transfer of heat which requires no medium, is called as :
- a. radiation                      c. combustion  
 b. conduction                      d. convection
- 40 When a gas is allowed to expand suddenly into a vacuum chamber, then
- a. heat supplied is zero                      c. volume does not change  
 b. temperature remains constant                      d. both (a) and (b) are correct
- 41 Molar heat capacity is directly related to :
- a. temperature                      c. molecular structure  
 b. heat energy                      d. mass
- 42 Electrolysis is
- a. reversible process                      c. either reversible or irreversible  
 b. irreversible process                      d. neither reversible or irreversible





- 43 The process in which the heat is not transferred from one state to another, is
- |                       |                      |
|-----------------------|----------------------|
| a. isothermal process | c. isobaric process  |
| b. adiabatic process  | d. isochoric process |
- 44 Candela is a unit of :
- |                       |                       |
|-----------------------|-----------------------|
| a. acoustic intensity | ∅. luminous intensity |
| b. electric intensity | d. magnetic intensity |
- 45 No current flows between two charged bodies connected if they have same :
- |              |                  |
|--------------|------------------|
| a. capacity  | ∅. charge        |
| b. potential | d. none of these |
- 46 In comparison with the electrostatic force between two electrons, the electrostatic force between two protons is
- |            |            |
|------------|------------|
| a. greater | c. smaller |
| b. same    | d. zero    |
- 47 Coulomb's law is applicable to :
- |                      |                  |
|----------------------|------------------|
| a. point charges     | c. like charges  |
| b. spherical charges | -d. all of these |
- 48 The dielectric constant K of an insulator can be :
- |         |       |
|---------|-------|
| a. -1   | c. -2 |
| b. zero | d. 6  |
- 49 In the direction of electric field, electric potential:
- |              |                     |
|--------------|---------------------|
| a. decreases | c. remains constant |
| b. increases | d. none of these    |
- 50 In order to increase the capacity of parallel plate condenser one should introduce between the plates, a sheet of
- |         |                    |
|---------|--------------------|
| a. mica | ∅. copper          |
| b. tin  | d. stainless steel |
- 51 Water is not used as a dielectric between the plates of a capacitor because its :
- |                                       |                                      |
|---------------------------------------|--------------------------------------|
| ∅. a. dielectric constant is very low | c. dielectric constant is very high  |
| b. dielectric strength is very low    | d. dielectric strength is very large |
- 52 What is the angle of reflection, if the ray of light is incident normally on a plane mirror ?
- |        |                          |
|--------|--------------------------|
| a. 0°  | c. will not be reflected |
| b. 90° | d. None of these         |
- 53 Image formed by convex mirror is :
- |               |             |
|---------------|-------------|
| ∅. a. virtual | c. enlarged |
| b. real       | d. inverted |
- 54 Kinetic theory of gases provides a base for :
- |                    |                                 |
|--------------------|---------------------------------|
| ∅. a. Charles' law | c. Charles' law and Boyle's law |
| b. Boyle's law     | d. none of the above            |



- 55 Unsaturated vapour obeys  
 a. Ideal gas law c. Boyle's law  
 b. van der Waal's law d. Gay-Lussac law
- 56 To convert a galvanometer into an ammeter, we should connect:  
 a. a low resistance in series with it c. a low resistance in parallel with it  
 b. a high resistance in series with it d. a high resistance in parallel with it
- 57 To convert a galvanometer into voltmeter, one should connect:  
 a. a low resistance in series with it c. a low resistance in parallel with it  
 b. a high resistance in series with it d. a high resistance in parallel with it
- 58 Which of the following arrangements is correct on the basis of conductivity of materials ?  
 a. silver > copper > aluminium > tungsten c. copper > silver > tungsten > water  
 b. silver > aluminium > copper > water d. water > silver > tungsten > water
- 59 Through an electrolyte an electrical current is due to drift of  
 a. free electrons c. free electrons and holes  
 b. positive and negative ions d. protons
- 60 The universal property among all substances is  
 a. paramagnetism c. non-magnetism  
 b. ferromagnetism d. diamagnetism
- 61 The term  $\cos\phi$  in an AC circuit is called  
 a. form factor c. power factor  
 b. phase factor d. quality factor
- 62 When the pressure of water is increased, the boiling temperature of water as compared to  $100^{\circ}\text{C}$  will be :  
 a. lower c. higher  
 b. the same d. on the critical temperature
- 63 Give the SI unit of resistivity  
 a. ohm/metre<sup>2</sup> c. ohm metre  
 b. ohm metre<sup>2</sup> d. ohm/metre
- 64 Identify the factor which does not depend on the resistance of a conductor  
 a. Nature of material c. Length  
 b. Area of cross-section d. Viscosity
- 65 What is the loss of strength of a signal during its propagation called?  
 a. Attenuation c. Bandwidth  
 b. Amplification d. Noise
- 66 Name the process of recovering the original information signal from the modulated wave at the receiver end  
 a. Attenuation c. Modulation  
 b. Demodulation d. Bandwidth



- 67 The ability of the sensor to see small differences in reading is called  
 a. resolution c. offset  
 b. drift d. linearity
- 68 Recording electrical activities associated with heart is known as  
 \_\_\_\_\_  
 a. EEG c. EMG  
 b. EOG d. ECG
- 69 MRI stands for \_\_\_\_\_  
 a. Mechanical Resonance Imaging c. Mutually Related Imaging  
 b. Magnetic Resonance Imaging d. Magnetic Resultant Imaging
- 70 From equipment point of view, the respiratory system in the human body is a \_\_\_\_\_ system.  
 a. hydraulic c. mechanical  
 b. pneumatic d. electrical
- 71 The Devices which convert one form of energy into another  
 a. transducers c. impulses  
 b. electrodes d. opamp
- 72 Electrodes to measure EEG are placed on  
 a. forehead c. cheek  
 b. scalp d. ears
- 73 Electric field and magnetic field do not cause deflection in  
 a. alpha-rays c. gamma-rays  
 b. beta-rays d. positron
- 74 Radioactivity can be effected by  
 a. temperature c. radiation  
 b. pressure d. all of these
- 75 Frequencies in the UHF range normally propagate by means of  
 a. ground waves e. surface waves  
 b. sky waves d. space waves
- 76 sequence of a basic communication system consists of  
 (A) transmitter (B) information source (C) user of information (D) channel  
 (E) receiver  
 Choose the correct sequence in which these are arranged in a basic communication system.  
 a. ABCDE c. BDACE  
 b. BADEC d. BEADC
- 77 The mass of an electron in motion depends upon  
 a. direction of motion c. initial mass of  $e^-$   
 b. its velocity d. its shell number
- 78 As the orbit number increases, the distance between two consecutive orbits in an atom or ion having single electron:  
 a. increases c. remains the same  
 b. decreases d. first increases and then becomes constant



- 79 Which of the following is incorrect regarding Rutherford's atomic model ?
- |  |   |
|--|---|
| a. Atom contains nucleus                                       | c. Nucleus contains about 90% mass of the atom            |
| b. Size of nucleus is very small in comparison to that of atom | d. Electrons revolve round the nucleus with uniform speed |
- 80 The mirage in desert is caused because :
- |   |   |
|---|---|
| a. the refractive index of atmosphere does not change with height | c. light is reflected by the sand particles |
| b. there is effect of height on refractive index                  | d. none of the above                        |
- 81 When a ray of light falls on a prism, light gets dispersed because:
- |                        |  |
|------------------------|--|
| a. it is made of glass | c. refractive index of the prism material is different for different colours |
| b. it is triangular    | d. light is of seven colours   |
- 82 The spectrum of molecular form of the substance is called :
- |                  |                        |
|------------------|------------------------|
| a. band spectrum | c. absorption spectrum |
| b. line spectrum | d. continuous spectrum |
- 83 The temperature at which Centigrade thermometer and Kelvin thermometer gives the same reading, is :
- |         |                 |
|---------|-----------------|
| a. 4°   | c. not possible |
| b. 273° | d. 0°           |
- 84 Planck's constant
- |                                    |                                     |
|------------------------------------|-------------------------------------|
| a. is universal constant           | c. depends upon wavelength of light |
| b. depends upon frequency of light | d. depends upon medium              |
- 85 X-ray is used to
- |                                       |                                     |
|---------------------------------------|-------------------------------------|
| a. investigate the structure of solid | c. to activate the radioactivity    |
| b. to charge a body                   | d. to change the structure of solid |
- 86 Cathode rays are made up of electrons. Anode rays are made up of:
- |                               |                                    |
|-------------------------------|------------------------------------|
| a. protons only               | c. positive residue of atoms       |
| b. protons and positrons only | d. all positive particles of atoms |
- 87 Cathode rays are made to pass between the plates of a charged capacitor. It attracts
- |                           |                            |
|---------------------------|----------------------------|
| a. towards positive plate | c. (a) and (b) are correct |
| b. towards negative plate | d. (a) and (b) are wrong   |
- 88 Matter waves are :
- |                          |   |
|--------------------------|---|
| a. electromagnetic waves | c. either mechanical or electromagnetic waves   |
| b. mechanical waves      | d. neither mechanical nor electromagnetic waves |
- 89 The electric field 'E' and magnetic field 'B' in electromagnetic waves are:
- |                                |                                |
|--------------------------------|--------------------------------|
| a. parallel to each other      | c. perpendicular to each other |
| b. inclined at an angle of 45° | d. opposite to each other      |





- 90 Who developed Electrocardiogram?
- |                |                     |
|----------------|---------------------|
| a. Wilhelm his | c. Hubert mann      |
| b. Steward     | d. Willem einthoven |
- 91 What does the P wave in ECG represent?
- |                                     |  |
|-------------------------------------|--|
| a. Depolarization of the atria      | c. Represents the repolarization of the ventricles |
| b. Depolarization of the ventricles | d. Depolarization of the atria and ventricles      |
- 92 Primary pacemaker of heart is
- |                    |                  |
|--------------------|------------------|
| a. SA node         | c. Bundle of His |
| b. Purkinje fibres | d. AV node       |
- 93 A change in observed frequency of a wave when source or detector moves relative to transmitting medium is called
- |                   |                    |
|-------------------|--------------------|
| a. Doppler effect | c. Newton's effect |
| b. Thermal effect | d. Elastic effect  |
- 94 Normal Human Blood Pressure is \_\_\_\_\_ mmHg
- |           |            |
|-----------|------------|
| a. 120/80 | c. 100/50  |
| b. 150/70 | d. 200/100 |
- 95 Instrument used to measure blood pressure
- |                     |                  |
|---------------------|------------------|
| a. Pulse oximeter   | c. Thermometer   |
| b. Sphygmomanometer | d. None of these |
- 96 Normal blood volume in human body is
- |              |              |
|--------------|--------------|
| a. 10 litres | c. 15 litres |
| b. 3 litres  | d. 5 litres  |
- 97 Which type of blood vessels carries blood away from the heart?
- |             |                                    |
|-------------|------------------------------------|
| a. Veins    | c. Capillaries                     |
| b. Arteries | d. Arteries, veins and capillaries |
- 98 Mitral valve is present
- |   |                            |
|---|----------------------------|
| a. Between right atrium and right ventricle | c. Inside aorta            |
| b. Between left atrium and left ventricle   | d. Inside pulmonary artery |
- 99 Cardiac output is defined as:
- |                                     |                                    |
|-------------------------------------|------------------------------------|
| a. Heart rate x stroke volume       | c. Blood flow rate x stroke volume |
| b. Respiration rate x stroke volume | d. Heart rate x blood flow rate    |
- 100 The frequency range of ECG is \_\_\_\_\_
- |                |                |
|----------------|----------------|
| a. 0.05-150 HZ | c. 5-500 kHz   |
| b. 500-1500 Hz | d. 0.5-150 MHz |



PGDCLT ANSWER KEY


1	c
2	c
3	a
4	b
5	a
6	d
7	b
8	d
9	b
10	a
11	c
12	b
13	c
14	c
15	a
16	b
17	a
18	a
19	a
20	d
21	a

22	d
23	b
24	b
25	b
26	a
27	a
28	a
29	d
30	c
31	a
32	a
33	b
34	a
35	c
36	b
37	b
38	d
39	a
40	b
41	c
42	a

43	b
44	c
45	b
46	b
47	a
48	d
49	a
50	a
51	b
52	a
53	a
54	c
55	a
56	c
57	b
58	a
59	b
60	d
61	c
62	c
63	c

64	d
65	a
66	b
67	a
68	d
69	b
70	b
71	a
72	b
73	c
74	c
75	d
76	b
77	b
78	a
79	c
80	b
81	c
82	a
83	c
84	a

85	a
86	c
87	a
88	d
89	c
90	d
91	a
92	a
93	a
94	a
95	b
96	d
97	b
98	b
99	a
100	a

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 Initial

