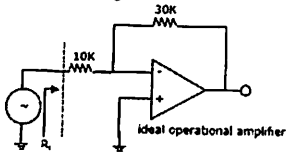
Sree Chitra Tirunal Institute for Medical Sciences & Technology

FCP for Scientific Asst. (Instruments)

Time: 60 Minutes

30.08.2017

1	An example for an active implantable medical device is [A] bioprosthetic heart valve [B] implantable defibrillator [C] Leukodepletion filter [D] aortic stent graft	
2	A fluid flow in which each liquid particle has definite path and their paths do not cross each other is called [A] Laminar flow [B] Turbulent flow [C] rotational flow [D] all of the above	
3	Which of the following biomaterials find application in hydrocephalus shunts [A] Hydroxy apatite [B] SS 316 LVM [C] polydimethyl siloxane [D] PVC	
4	The sensitivity of a pressure transducer is given as 5 μV /V /mm Hg. The transducer is operated with 10V supply voltage. What will be the gain of the amplifier required to get an output level of 5V for 1000 mm Hg? [A] 10 [B] 100 [C] 500 [D] 1000	
5	A dead weight tester is used to measure [A] Pressure [B] Force [C] Speed [D] Time	
6	Most suitable sensor that can be used for measuring temperature in the range of 100°C to 1000°C is [A] Glass thermometer [B] PRT probe [C] Thermocouple [D] All of the above	
7	A Laser Doppler Anemometer can be used for measuring [A] Velocity of sound [B] Fluid velocity [C] Velocity of light [D] Fluid pressure	
8	Which of the following isotopes find application in cancer treatment, food preservation and sterilization of medical devices? [A] U^{235} [B] Po^{212} [C] C^{14} [D] Co^{60}	
9	PID is the synonym for [A] Precision Instrument Design [B] Project Identification Department [C] Proportional Integral Derivative [D] Proportion In Design	
10	International standard dealing with risk management of medical devices [A] ISO 13485 [B] ISO 14450 [D] ISO 17025 [D] ISO 14971	
11	A precision OPAMP has a thermal drift of 0.1μV/°C and is to be used in the temperature range of 15°C to 45°C. If the drift permitted is less than 3mV, the maximum possible gain for the circuit will be [A] 10 [B] 100 [C] 1000 [D] 10,000	
12	Most suitable waveform for cardiac fibrillation could be [A] 50 kHz pulsating dc waveform [B] 2 -8 mA ac current with 75 Hz frequency [C] dc discharge (20 – 50 Joule) [D] 1 Hz, 1V peak to Peak signal	
13	How many cusps does a human natural aortic valve have? [A] 1 [B] 2 [C] 3 [D] 4	
14	Choose the best transducer for measuring fluid pressure [A] Pt-100 [B] Strain Gauge [C] turbine [D] LDR	
15	A patient has a cardiac output of 5 litres/min and a heart rate of 72 beats per minute. What is the stroke volume of the patient? [A] 50 ml [B] 60 ml [C] 70 ml [D] 80 ml	
16	Coronary vessels supply blood to [A] Cerebrum [B] Kidneys [C] Heart [D] Eyes	
17	Which of the following is a neurotransmitter? [A] Acetylcholine [B] Insulin [C] ADH [D] Creatinine	
18	The CMRR of a differential amplifier is 100dB and its gain is 1000. If for an input signal the common mode voltage is 10V and differential voltage is 1mV what is the output voltage? [A] 1V [B]1.1 V [C] 1.2 V [D] 1.3 V	

19	Measurement resolution of a 12 bit analog to digital converter working with a reference voltage of 10 volts will be [A] 2.5 mV [B] 25 mV [C] 1 mV [D] 10 mV	
20	During relative humidity measurement, if the dry bulb and wet bulb temperatures are found to be identical. It can be safely concluded that [A] thermometers need calibration [B] RH is close to 100% [C] RH is close to 50% [D] RH cannot be estimated from this	
21	Of the component among the following, which is not intended to be removed during hemodialysis? [A] Albumin [B] Urea [C] Creatinine [D] Uric Acid	
22	Main limitation of Ethylene oxide gas sterilisation is [A] very high operating temperature [B] radiation effects [C] occupies large space [D]not suitable for materials with moisture	
23	The input resistance R_i of the amplifier shown in the figure is  [A] 7.5 k [B] 10 k [C] 30 k [D] 40 k	
24	A fluid column in a tube of 6cm diameter has density of 13.5 g/cc and a height of 76cm. What is the pressure at the bottom of the column? (1 bar) [A] 0.1 Bar [B] 1 Bar [C] 6 Bar [D] 10 Bar	
25	A pulse duplicator is a system is employed [A] for the study of fatigue life of heart valves [B] for assessing the structural failures [C] for hydrodynamic evaluation of artificial heart valves [D] employed for design verification of pacemakers	
26	Nominal surface area of human lung is [A] 1 m^2 [B] 10 m^2 [C] 50 m^2 [D] 500 m^2	
27	International standard ISO 10993 relates to [A] electrical testing of instruments [B] environmental management [C] medical device design [D] biological characterization of materials	
28	Conduct of animal experiments require clearance from [A] CPCSEA [B] ICMR [C] DCGI [D] CDSCO	
29	Primary reason for increased blood damage in bubble oxygenators is [A] shear [B] temperature [C] surface contamination [D] hyper oxygenation	
30	A PMMC voltmeter is connected across a series combination of a dc voltage source V_1=2 V and an ac voltage source $V_2(t)$= 3sin(4t) V. The meter will read [A] 2 V [B] 5 V [C] $(2+\sqrt{3}/2)$ V [D] 0 V	
31	Which of the following heart valves are open during ventricular systole? [A] Aortic and pulmonary [B] Mitral and tricuspid [C] Aortic and mitral [D] Mitral and pulmonary	
32	A digital circuit employs a 3 bit ADC. The signal voltage range is ±4 Volts. The quantization error will be [A] ±0.5 Volts [B] ±1 Volts [C] ±2 Volts [D] ±4 Volts	
33	Materials most widely used in large diameter vascular grafts are [A] PET and PTFE [B] PP and PC [C] PBMA and PLA/PGA [D] All of these	
34	The Boolean function $x^1y^1z^1 + xy^1z^1 + x^1yz^1 + xyz^1$ is equivalent to [A] x^1y [B] yz^1 [C] $x^1y^1z^1$ [D] z^1	
35	International standard pertaining to the evaluation of tubular vascular prosthesis is [A] ISO 7198 [B] ISO 10993 [C] ISO 5840 [D] ISO 17025	

36	Vertical standard which deals with the design verification of cardiac valve prosthesis is [A] ISO 7198 [B] ISO 10993 [C] ISO 5840 [D] ISO 17025	
37	The range of flow rates selected during the steady forward flow characterization of artificial heart valves is [A] 0 to 100 LPM [B] 5 to 30 LPM [C] 2 to 7 LPM [D] 120 ml per cycle	
38	The water porosity of textile vascular grafts is normally expressed as [A] ml/min/cm^2 at 120 mm Hg [B] m^2 per unit area [C] ml/min at 120 mm Hg [D] Percentage	
39	Textile vascular graft are crimped to enhance their [A] water porosity [B] mechanical strength [C] Suture retention strength [D] resistance to kinking	
40	Which of the properties of a textile material would you consider as most important while choosing it for fabrication of vascular grafts? [A] Thermal capacity [B] Dielectric strength [C] Burst strength [C] Coefficient of linear expansion	
41	The pressure drop across an open artificial heart valve should be [A] minimum for best performance. [B] maximum for best performance. [C] is not a measure of valve performance. [D] matched for the patient's requirements.	
42	Biological heart valves can be made of [A] Collagen sheets [B] Bovine pericardium [C] Catgut [D] Any of these	
43	A silicone PN junction at 20°C has 10pA reverse saturation current. The reverse saturation current at 40 °C would be [A] 10 pA [B] 20 pA [C] 30 pA [d] 40 pA	
44	Choose the inslulator from the list ? [A] Germanium [B] Silicon [C] Sapphire [D] Gallium arsenide	
45	Electrical resistance material nichrome is an alloy of [A] copper and constantan [B] Iron, zinc, nickel and chromium [C] iron and constantan [D] Nickel and chromium	
46	A standard PLC will have ---------- built in SCADA controller [A] 0 [B] 1 [C] 2 [D] 4	
47	The gauge factor of a 1kΩ strain gauge is 10. When the gauge is subjected to 0.1% strain, the corresponding resistance variation could be [A] 0.1Ω [B] 1 Ω [C] 10Ω [D] 100Ω	
48	The resistivity of distilled water at 25 °C temperature would be about [A] 100 MΩ.cm [B] 10 MΩ.cm [C] 1MΩ.cm [D] 0.1MΩ.cm	
49	The number of air changes recommended for a clean room meant for medical device manufacture is [A] ~1 per hour [B] 10-15 per hour [C] 25-40 per hour [D] > 100 per hour	
50	In Isopropyl alcohol extraction of medical textiles, the extraction temperature would be about [A] 61°C [B] 82°C [C] 121 °C [D] 132°C	

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ANSWER KEY

1		B
2		A
3		C
4		D
5		A
6		C
7		B
8		D
9		C
10		D
11		C
12		B
13		C
14		B
15		C
16		C
17		A
18		B
19		A
20		B
21		A
22		D
23		A
24		B
25		C
26		B
27		D
28		A
29		A

30		A
31		A
32		B
33		A
34		D
35		A
36		C
37		B
38		A
39		D
40		C
41		A
42		B
43		D
44		C
45		D
46		A
47		B
48		C
49		B
50		B