

Sree Chitra Tirunal Institute for Medical Sciences & Technology
FCP for Scientific Assistant (Instruments)
Choose most appropriate answer from the options and write against each question

Time: 60 Minutes

Marks: 50

Date: 08/07/2015

1	Which of the following is the national apex body for metrology in India? [A] NABL [B] NPL [C] QCI [D] NABH	
2	In a traceability chain, which is in the apex position [A] Transfer standards [B] International reference standards [C] Verification standards [D] Working standard	
3	A 3 ½ digit panel meter can have a maximum reading of [A] 9999 [B] 3500 [C] 1000 [D] 1999	
4	The sensitivity of a pressure transducer is given as 5 $\mu\text{V/V/mm Hg}$. 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	Uncertainty contributions from repeatability measurements belongs to [A] Systematic [B] Random [C] Bias [D] Offset	
8	A normal probability distribution function has a ----- shape. [A] Rectangular [B] Triangular [C] Bell [D] U-	
9	The standard deviation for 10 sets of measurements is given as 0.12 g. What will its uncertainty contribution? [A] 0.012 g [B] 1.20g [C] 0.04 g [D] 0.24 g	
10	For calibration with TAR 2:1, the accuracy requirement of reference equipment is [A] 2 times better than that of UUC [B] 4 times better than that of UUC [C] 0.5 times better than UUC [D] same as that of UUC	
11	A precision OPAMP has a thermal drift of 0.1 $\mu\text{V}/^\circ\text{C}$ 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	The number of significant digits in a value 0.005 is [A] 3 [B] 2 [C] 1 [D] 0	
13	A calibration certificate reports a result as 50 ml/min \pm 0.24 ml/min with K factor = 2. What will be its standard uncertainty in ml/min? [A] 25 [B] 100 [C] 0.12 [D] 0.48	
14	Choose the best transducer for measuring fluid pressure [A] Pt-100 [B] Strain Gauge [C] turbine [D] any of the above	
15	When a calibrator for electrical parameters is used to calibrate an ammeter, it must have capability to [A] Measure voltage [B] Measure current [C] Source voltage [D] Source current	
16	Electrical parameter whose unit is included in the list of SI base units is [A] Voltage – Volt [B] Current - Ampere [C] Resistance - Ohms [D] Inductance - Henry	
17	PT-100 sensor have a resistance of [A] 100 Ω at 100°C [B] 0 Ω at 100°C [C] 100 Ω at 0°C [D] 25 Ω at 0°C	

Mani
5/7/15

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	Temperature at which gas, liquid and solid states of water co-exists is called [A] Fusion point [B] Triple point [C] Freeze point [D] Dew point	
22	Bubble flow meters are used to measure [A] liquid flow [B] gas flow [C] blood flow [D] powder flow	
23	Venturi meter make use of drop in for measuring flow [A] pressure [B] temperature [C] density [D] viscosity	
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? [A] 0.1 Bar [B] 1 Bar [C] 6 Bar [D] 10 Bar	
25	Most widely used reference material for verification of wavelength in a spectrophotometer is [A] Normal saline [B] PBS [C] Fent's solution [D] Holmium oxide	
26	In a volume calibration laboratory, environment temperature is always kept at $(25 \pm 5)^\circ\text{C}$. To minimize the evaporation losses which is the best RH setting? [A] $\geq 50\%$ [B] $< 50\%$ [C] 0% [D] 100%	

27	When off-center error for a balance is observed as minimum, the balance can be loaded at [A] Centre of the weighing pan [B] Anywhere in the weighing pan [C] 50% of the rated load [D] 10% of rated load	
28	OIML R111 is the recommended guideline related to [A] Balance calibrations [B] Mass Metrology [C] Volume calibrations [D] any of the above	
29	Which among the following is the most accurate mass set? [A] Class E1 [B] Class E2 [C] Class A [D] Class M2	
30	A PMMC voltmeter is connected across a series combination of a dc voltage source $V_1 = 2\text{ V}$ and an ac voltage source $V_2(t) = 3\sin(4t)\text{ V}$. The meter will read [A] 2 V [B] 5 V [C] $(2 + \sqrt{3}/2)\text{ V}$ [D] 0 V	
31	Organization responsible for publication of International Standards for electrical measurement techniques [A] IUPAC [B] ATCC [C] USP [D] IEC	
32	A digital circuit employs a 3 bit ADC. The signal voltage range is $\pm 4\text{ Volts}$. The quantization error will be [A] $\pm 0.5\text{ Volts}$ [B] $\pm 1\text{ Volts}$ [C] $\pm 2\text{ Volts}$ [D] $\pm 4\text{ Volts}$	
33	Seebeck effect is the principle of temperature measurement using [A] thermistor [B] thermocouples [C] PRTs [D] SPRTs	
34	An LVDT cannot be used for measuring [A] Pressure [B] Force [C] Displacement [D] Flow	
35	Dry bulb and wet bulb temperature measurement is used in the measurement of [A] Light [B] Vaporization rate [C] RH [D] Pressure	

Mom
8/2/15

36	Hygrometers can be calibrated using [A] Saturated salt solutions [B] Unsaturated salt solutions [C] Saturated hydrocarbon solutions [D] Unsaturated hydrocarbon solutions	
37	Specific humidity is the [A] Mass of water vapor per unit mass of dry air in an air water vapor mixture [B] Ratio of humidity of air to the humidity of saturated air [C] Humidity at a specific temperature [D] water droplet content at boiling point	
38	Which one of the following is a variable area flow meter [A] Optical flow meters [B] Hot wire anemometer [C] Woltmann meter [D] rotameter	
39	For combining different uncertainty contributions in a measurement, each uncertainty elements shall be converted to [A] Combined standard uncertainty [B] Standard uncertainty [C] Expanded uncertainty [D] any of the above	
40	In hair tension hygrometers, length of hair and humidity are related as [A] directly proportional [B] inversely proportional [C] non-linearly proportional [D] has no relation between them	
41	Conventional ultrasonic flow meters measures flow based on [A] Doppler shift [B] transit time measurement [C] Either A or B [D] none of these	
42	In electromagnetic blood flow meters acts as conductor [A] blood vessel [B] multi-strand fine copper wires [C] water [D] silver coatings	

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	Principle behind Beer lamberts law is [A] transmittance concentration [B] absorbance concentration [C] reflection concentration [D] signal power spectrum concentration	
45	In the calibration of TGA (Thermo gravimetric analysis system), Curie point Reference Material is used in calibration of [A] Balance [B] Temperature [C] Mass [D] acceleration	
46	Which of the following is NOT a trace element analysis method? [A] ICP-AES [B] AAS [C] TEM [D] GC-MS	
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	A laboratory having formal recognition that it is competent to carry out specific tests / calibrations is called [A] Calibration laboratory [B] Accredited laboratory [C] Reference laboratory [D] Apex laboratory	
50	Segments for which SCTIMST has accreditation from NABL are [A] Mechanical & Thermal [B] Clinical & Thermal [C] Clinical & Optical [D] Thermal & Chemical	

On 6/11/15