Dr. MAHALINGAM
COLLEGE OF ENGINEERING AND TECHNOLOGY
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Dr. MAHALINGAM
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Question Bank

Smart & Wireless Instrumentation

DEPARTMENT OF

ELECTRONICS AND INSTRUMENTATION

ENGINEERING

DEPARTMENT OF ELECTRONICS & INSTRUMENTATION ENGINEERING

SMART & WIRELESS INSTRUMENTATION

QUESTION BANK

S. No	Question	Mark	CO	Level	Answer
1.	To attain linear property in thermistor, _____ ohm resistor is to be connected in parallel with thermisor. a) 3 b) 5 c) 7 d)9	1	1	U	a
2.	The RTD PT 100 (α=0.004) is used to measure room temperature. The temperature inside room is 33.5°C. the output from RTD is 112.8 ohms, the error in measurement is _____. a)1°C b) 1.5°C c)2.0°C d)2.5°C	1	1	U	b
3.	Calculate the value indicated by the RTD PT 100 at 20°C is _____ ohm. a)108 b)110 c)112 d)114	1	1	U	a
4.	_____ is the weight of water vapor in unit weight of the dry gas. a)relative humidity b)Specific humidity c)absolute humidity d)reference humidity	1	1	U	c
5.	_____ coil in planar electromagnetic sensor is used to pick the resultant field. a)pick up coil b)exciting Coil c)secondary coil d)primary coil	1	1	U	a
6.	Planar interdigital sensor is a function of _____ system property. a)self inductance b) mutual inductance c) inductive reactance d) capacitive reactance	1	1	U	d
7.	The breakdown limit in air at atmospheric pressure is about _____ while designing capacitive sensors. a) 2 kV/mm b) 4kV/mm c)5kV/mm d)3kV/mm	1	1	U	d
8.	Initial non-linearity in Capacitor using Change in Area of plates is due to _____. a)eddy current b)edge effects c)error d) self heating	1	1	U	b

S. No	Question	Mark	CO	Level	Answer
9.	_____ defined as the amount of water adsorbed or absorbed by a solid or a liquid.	1	1	U	Moisture
10.	Thermal conductivity humidity sensor measures _____. a)Relative humidity b)Specific humidity c)Absolute humidity d)Atmospheric humidity	1	1	U	c
11.	LDR is also known as _____ .	1	1	U	Photo cell / photoresistor
12.	Among the following which cannot be used as a source for sensing CO2 using NDIR analyzer. a)Globar rod b) Nernst filament c)Cadesence lamp d) Nichrome strip	1	1	U	c
13.	_____ type of thermistor, resistance decreases with increase of Temperature. a)Fixed Resistance b) Variable Resistance c)NTC d)PTC	1	1	U	c
14.	_____ is very important performance factor for any sensor and should be close to 100% of actual value. a)Accuracy b)Precision c)Repeatability d)Sensitivity	1	1	U	a
15.	_____ describes the speed of change in the output on a step-wise change of the measurand. a)Response time b)Dead Time c)Rise Time d)Peak time	1	1	U	a
16.	_____ specifies the ability of a sensor to give same output for repeated applications of same input value. a)Repeatability b)Hysterisis c)Accuracy d)Precision	1	1	U	a
17.	_____ of a transducer is the range of input values for which there is no output.	1	1	U	dead band/dead time/dead space
18.	_____ is the ability of a sensor device to give same output when used to measure a constant input over a period of time.	1	1	U	stability
19.	_____ is used to indicate the change in output that occurs over a period of time.	1	1	U	drift
20.	_____ is the smallest detectable incremental change of input parameter that can be detected in the output signal. a)Repeatability b)Resolution c)Accuracy d)Precision	1	1	U	b

S. No	Question	Mark	CO	Level	Answer
21.	_____ is defined as the ratio of change in output value of a sensor to the per unit change in input value that causes the output change. a)Sensitivity b)Resolution c)Accuracy d)Precision	1	1	U	a
22.	Which of the following material exhibit linearity in Resistance - Temperature Characteristics? A)Nickel b)Copper c) Platinum d) All the above	1	1	U	c
23.	_____ is defined as the ratio of moisture content of the gas to the maximum moisture the gas can contain at that temperature. A)Relative Humidity b) Specific Humidity c) Absolute Humidity d)Atmospheric humidity	1	1	U	a
24.	_____is defined as the weight of the vapour in unit of the mixture. A)Relative Humidity b) Specific Humidity c) Absolute Humidity d)Atmospheric humidity	1	1	U	b
25.	_____ is the weight of water vapor in unit weight of the dry gas. A)Relative Humidity b) Specific Humidity c) Absolute Humidity d)Atmospheric humidity	1	1	U	c
26.	In thermal conductivity humidity sensor one thermistor is sealed by _____ dry gas. a)Hydrogen b)Oxygen c)Nitrogen d)Helium	1	1	U	c
27.	In planar electromagnetic sensor _____ coil carries alternating current and generates high frequency electromagnetic field.	1	1	U	Exciting
28.	_____ type of planar electromagnetic sensor is suitable to detect cracks. A)Mesh type b)Meander type c)Interdigital d)Star type	1	1	U	b
29.	Which of the following is not a source of IR radiation? A)Globar rod b)Nernst Filament c)Nichrome Strip d)Hollow Cathode tube	1	1	U	d
30.	Which of the following act as a source in Carbon-di-oxide sensing? A)Globar rod b)Nernst Filament c)Nichrome Strip d)All of the above	1	1	U	d
31.	Which standard define the protocol of TEDS? A)IEEE 80.11 b)IEEE 820.11 c)IEEE1451.4 d)IEEE 1454.1	1	1	U	c
32.	TEDS consists of _____ type of memory.	1	1	U	non-volatile

S. No	Question	Mark	CO	Level	Answer
33.	FDR method of soil moisture measurement generates _____ signal that is propagated through the unit and into the soil. A)RADAR b)Laser c)Electromagnetic d)Electric Pulse	1	1	U	c
34.	Electrodes in gypsum block measures _____ electrical parameter to calculate moisture. A)Capacitance b)Inductance c)Resistance d)All the above	1	1	U	c
35.	Neuton probe collides with _____ atom to measure moisture. A)Oxygen b)Hydrogen c)Nitrogen d)Pottasium	1	1	U	b
36.	CO2 molecule absorb wavelength of _____ um. A)4.26 b)4.36 c)4.46 d)4.56	1	1	U	a
37.	Which of the following detector cannot be used as a detector in NDIR spectrometer? a)Bolometer b)Golay Cell c)Fresnel Lens d)Photoresistor	1	1	U	d
38.	_____ type of filter commonly used in NDIR spectrometer.	1	1	U	Absorption
39.	CO2 molecule absorbs the wavelength in _____ band of electromagnetic spectrum. A)Visible b)IR c)UV d)far UV	1	1	U	b
40.	_____ is most suitable IR source for NDIR spectrometer.	1	1	U	Globar rod / Nernst Filament / Nichrome Strip
41.	Thermocouples are not suitable to measure smaller temperature differences with high accuracy. TRUE/FALSE	1	1	U	TRUE
42.	In the _____ type sensor the eddy currents dismisses the geometry/alignment effects. a)Meander b)Mesh c)Interdigital d)Star type	1	1	U	b
43.	In planar electromagnetic sensor the induced electromagnetic field in the testing system will generate _____ on the system under test.	1	1	U	eddy current
44.	Thermal conductivity humidity sensor consists of _____ type thermistor.	1	1	U	NTC
45.	_____ change in the Capacitive Humidity Sensor is directly proportional to the relative humidity of the surrounding environment.	1	1	U	Dielectric medium

S. No	Question	Mark	CO	Level	Answer
46.	_____ thermistor are normally used for measuring temperature in motor and transformer windings.	1	1	U	PTC
47.	Input signal to smart sensor is fed from a)Power supply b)Transducer c)Voltmeter d)All the above	1	1	U	a
48.	TEDS stands for	1	1	U	Transducer Electronic Data Sheet
49.	Hygrometer is used to measure	1	1	U	Humidity
50.	Write a short note on PTC thermistor.	2	1	U	
51.	Write a short note on NTC thermistor.	2	1	U	
52.	Write a short note on LDR.	2	1	U	
53.	Write a short note on photodiode.	2	1	U	
54.	What are all the parameters considered to classify the sensors.	2	1	U	
55.	List the static characteristics of a sensor.	2	1	U	
56.	Mention the features of smart Sensor.	2	1	U	
57.	Define Range and Span	2	1	U	
58.	Define Error.	2	1	U	
59.	Define Accuracy and Precision.	2	1	U	
60.	Define sensitivity.	2	1	U	
61.	Define Resolution.	2	1	U	
62.	Define Stability.	2	1	U	
63.	Define dead time.	2	1	U	
64.	Define repeatability.	2	1	U	
65.	Define Response time.	2	1	U	
66.	Write a short note on RTD.	2	1	U	
67.	List the applications of planar interdigital sensor.	2	1	U	
68.	List the applications of photoresistor.	2	1	U	
69.	Write a short note on photoresistor.	2	1	U	

S. No	Question	Mark	CO	Level	Answer
70.	List the applications of photodiode.	2	1	U	
71.	Explain the principle of Carbon-di-oxide sensing technology.	2	1	U	
72.	List the advantages of TEDS.	2	1	U	
73.	Write a short note on FDR soil moisture sensor	2	1	U	
74.	Write a short note on TDR soil moisture sensor	2	1	U	
75.	Write a short note on gypsum block soil moisture sensor	2	1	U	
76.	Write a short note on neutron probes soil moisture sensor	2	1	U	
77.	Classify the types of Sensor.				
78.	Classify the sensors based on application and discuss the parameters considered during selection of sensors.	15	1	U	
79.	Discuss the parameters considered during selection of sensors.	15	1	U	
80.	Classify the capacitive sensors based on the working principle with a suitable diagram.	15	1	U	
81.	With a suitable diagram explain the construction and working of Planar Interdigital Sensors and Planar Electromagnetic Sensors.	15	1	U	
82.	Describe the structure of planar electromagnetic sensor and explain the electrical equivalent circuit for the same sensor.	15	1	U	
83.	Give brief note on i)Carbon Dioxide (CO2) Sensing Technology (8M) ii)TEDS (7M)	15	1	U	
84.	Give brief note on i)Carbon Dioxide (CO2) Sensing Technology (8M) ii)Optical sensor (7M)	15	1	U	
85.	Give brief note on i)Optical sensors (8M) ii)TEDS (7M)	15	1	U	
86.	Illustrate the optical type sensing methods and give their application.	15	1	U	
87.	With neat sketch explain the construction and working of RTD and thermistor.	15	1	U	
88.	With neat sketch explain the construction and working of RTD.				
89.	With neat sketch explain the construction and working of thermistor.	15	1	U	

S. No	Question	Mark	CO	Level	Answer
90.	Explicate the humidity and moisture sensing methods.	15	1	U	
91.	Explain in detail about humidity measurement.	15	1	U	
92.	Explain in detail about moisture measurement.	15	1	U	
93.	Zigbee protocols use IEEE standard a)802.15.4 b)802.15.11 c)802.11 d)802.4	1	2	U	A
94.	Which of the following RF range is not an ISM band? a)900MHz b)1.8GHz c)2.4 GHz d)3GHz	1	2	U	D
95.	Which of the following applications cannot be used in the RF 2.4GHz? a)Microwave ovens b)Cordless phones c)Bluetooth d)Television	1	2	U	D
96.	In electromagnetic radiation spectrum radio waves wavelength is from _____ to _____. a)1mm to 15Mm b)0.1mm to 15Mm c)1mm to 10Mm d)0.1mm to 10Mm	1	2	U	C
97.	For the inference immunity in XBee transceiver _____ technique is implemented. a)CDMA b)DSSS c)AES d)CSMA	1	2	U	B
98.	Bluetooth and XBee uses _____ technique to avoid interference. a)CDMA b)DSSS c)AES d)CSMA	1	2	U	B
99.	Zigbee is a _____ Communication protocol using for low power digital radios and sensor network a) Low level b)High level c)Medium level d)Normal level	1	2	U	B
100.	HART communication protocol is a hybrid _____ Industrial automation protocol a)analog b) digital c)analog + digital d)pulse + digital	1	2	U	C
101.	_____standard used for Industrial wireless controls and Instruments	1	2	U	ISA100 OR HART
102.	HART Field communication is a _____ way communication.	1	2	U	two
103.	Wireless HART follow _____ standard.	1	2	U	IEC62591-1
104.	In WirelessHART, communications are precisely scheduled based on _____ and employ a channel hopping. A)TDMA b)CDMA c)FDMA d)WDMA	1	2	U	a
105.	In Wireless HART scheduling is performed by a _____.	1	2	U	Network Manager

S. No	Question	Mark	CO	Level	Answer
106.	Wireless HART supports _____ channels in a network. A)5 b)10 c)15 d)20	1	2	U	c
107.	In wireless HART alloted time slot for each data transmission. A)6msec b)8msec c)10msec d)12msec	1	2	U	c
108.	Which layer in wireless HART protocol responsible for routing and security for data transfer? A)Physical b)Network c)Transport d)Application	1	2	U	b
109.	Which layer in wireless HART protocol responsible for time division multiplexing and hopping for data transfer? A)Datalink b)Network c)Transport d)Application	1	2	U	a
110.	The data link layer of ISA100 uses _____ MAC standard. A)IEEE802.11 b)IEEE802.15 c)IEEE802.11.a d)IEEE802.15.4	1	2	U	d
111.	The network and transport layer of ISA100 are based on _____, IPV6 and UDP standards.	1	2	U	6LOWPAN
112.	Which layer in ISA 100 implements routing, time division multiplexing and hopping for data transfer? A)Datalink b)Network c)Transport d)Application	1	2	U	a
113.	In ISA100 architecture nodes connected within a single star or mesh are collectively called as _____	1	2	U	DL Net or Data Link Subnet
114.	_____ layer in ISA100 creates and uses graph routing. A)Application b)Network c)Transport d)Datalink	1	2	U	d
115.	The network layer in ISA100.11a utilizes 6LoWPAN in network layer of ISA100. Say TRUE/FALSE	1	2	U	TRUE
116.	_____addressing is used for end-to-end routing in network layer of ISA100. a)IPv2 b)IPv4 c)IPv6 d)IPv8	1	2	U	c
117.	In zigbee communication channel sharing is achieved using _____.	1	2	U	Carrier Sensitive Multiple Access
118.	Which of the following error detection mechanism is not available in XBee communicating device?	1	2	U	b

S. No	Question	Mark	CO	Level	Answer
	a)Parity b)Checksum c)DCD d) HLDA				
119.	XBee-s1 communicates upto _____ meter in indoor applications. a)30 b)40 c)90 d)120	1	2	U	a
120.	XBee-s2 communicates upto _____ meter in indoor applications. a)30 b)40 c)90 d)120	1	2	U	b
121.	XBee-s1 communicates upto _____ meter in outdoor applications. a)30 b)40 c)90 d)120	1	2	U	c
122.	XBee-s2 communicates upto _____ meter in outdoor applications. a)30 b)40 c)90 d)120	1	2	U	d
123.	Which of the following communicating device suits more for forming mesh network? a)Radiometrix b)XBee-S1 c)XBee-S2 d)All the above	1	2	U	c
124.	In zigbee protocol security is provided by _____ bit Advanced Encryption Standard. A)32 b)64 c)128 d)256	1	2	U	c
125.	Communicating device Radiometrix operates at the frequency of a)118MHz b)218MHz c)318MHz d)418MHz	1	2	U	d
126.	Communicating device Radiometrix transmits the data at the rate of a)10kbps b)20kbps c)30kbps d)40kbps	1	2	U	D
127.	Communicating device Radiometrix transmits the data upto _____ meters in outdoor applications. a)80 b)100 c)120 d)140	1	2	U	C
128.	Communicating device Radiometrix transmits the data upto _____ meters in indoor applications. a)10 b)20 c)30 d)40	1	2	U	c
129.	Xbee deice follows which protocol for communication? a)IEC1892 b)IEEE802 c)Zigbee d)ISM	1	2	U	c
130.	A sensor network is used to perform a set of high level information processing task as a)Detection b)Tracking c)Classification d)All the above	1	2	U	d
131.	HART stands for	1	2	U	Highway Addressable Remote Transducer

S. No	Question	Mark	CO	Level	Answer
132.	HART communication uses _____ type of modulation. a)QPSK b)PSK c)ASK d)FSK	1	2	U	d
133.	List the advantages of wireless sensors.	2	2	U	
134.	Write a short note on wireless sensor.	2	2	U	
135.	Give the frequency at which wireless communication takes place.				
136.	Write a short note on ISM band.	2	2	U	
137.	Write a short note on sensor nodes and co-ordinators in WSN.	2	2	U	
138.	Write a short note on communicating device radiometrix.	2	2	U	
139.	Write a short note on Direct Sequence Spread Spectrum.	2	2	U	
140.	What is meant by HART? Specify the advantages of Wireless HART	2	2	U	
141.	List the basic network devices in a Wireless HART network.	2	2	U	
142.	List the advantages of wireless HART architecture.	2	2	U	
143.	List the design criteria of ISA 100 architecture	2	2	U	
144.	List the networks supported by ISA 100 and wireless HART.	2	2	U	
145.	List the functions of datalink layer in ISA100.	2	2	U	

S. No	Question	Mark	CO	Level	Answer
146.	State the disadvantages of radiometrix communicating device.	2	2	U	
147.	Compare radiometrix and zigbee communicating device.	2	2	U	
148.	Compare the Xbee S1 and Xbee S2	2	2	U	
149.	Write the features of Xbee devices.	2	2	U	
150.	Write the application of ISM band with respective frequency.	2	2	U	
151.	With a neat sketch explain the development of wireless sensor based on microcontroller and communicating	15	2	U	
152.	With a neat sketch explain the development of wireless sensor based on microcontroller and ZIGBEE.	15	2	U	
153.	Develop a wireless sensor network using Zigbee technology and illustrate the data processing between the sensor nodes.	15	2	U	
154.	Describe the layers of wireless HART.	15	2	U	
155.	With suitable diagram explain the architecture of wireless HART.	15	2	U	
156.	Describe the layers of ISA100.	15	2	U	
157.	With suitable diagram explain the architecture of ISA100 with routing technique.	15	2	U	
158.	Compare and contrast the ISA100 and Wireless HART architecture.	15	2	U	
159.	Write a brief note on ISA100	15	2	U	

S. No	Question	Mark	CO	Level	Answer
160.	Write a brief note on wireless HART.	15	2	U	
161.	Which of the following is not property of voltage regulator IC's? a)Thermal compensation b)Short circuit protection c)Surge protection d)Thermal Insulator	1	3	U	d
162.	LM317 output voltage formula is _____ for 1.25 to 37V.	1	3	U	1.25((R2/R1)+1)
163.	Battery/Cell converts _____ energy into _____ energy.	1	3	U	Chemical, Electrical
164.	In rechargeable battery electrical energy converts into chemical energy by _____ a)Reversing the voltage b)Reversing the current c)Changing electrolyte d)Adding distilled water	1	3	U	b
165.	Unit of charge capacity of a battery is a)Ahr b)Whr c)Wh/Kg d)Wh/m^3	1	3	U	a
166.	Unit of energy stored in a battery is a)Ahr b)Whr c)Wh/Kg d)Wh/m^3	1	3	U	b
167.	Unit of specific energy in a battery is a)Ahr b)Whr c)Wh/Kg d)Wh/m^3	1	3	U	c
168.	Unit of energy density in a battery is a)Ahr b)Whr c)Wh/Kg d)Wh/m^3	1	3	U	d
169.	In batteries self discharging rate is high if _____ parameter increases. a)Pressure b)Temperature c)Humidity d)Moisture	1	3	U	B
170.	_____ is the amount of electrical energy stored per cubic metre of battery volume. a)Charge capacity b)Specific energy c)Energy density d)Specific power	1	3	U	C
171.	_____ the amount of power obtained per kilogram of battery. a)Charge capacity b)Specific energy c)Energy density d)Specific power	1	3	U	D
172.	_____ Specific energy is the amount of electrical energy stored for every kilogram of battery mass. a)Charge capacity b)Specific energy c)Energy density d)Specific power	1	3	U	B

S. No	Question	Mark	CO	Level	Answer
173.	The effective use of _____with respective protocol is energy management a)Current b)Energy c) Power d)Voltage	1	3	U	B
174.	_____ and _____ are two essential considerations for wireless sensor network. a) Current and Voltage b) Energy management, harvesting c) Power, Energy d) Power Management, harvesting	1	3	U	B
175.	_____ device is used for RF energy harvesting	1	3	U	P2110
176.	If PV cells are connected in series, output _____ will increase. A)Current b)Voltage c) Both a & b d) Impedance	1	3	U	b
177.	If PV cells are connected in parallel, output _____ will increase. A)Current b)Voltage c) Both a & b d) Impedance	1	3	U	a
178.	Amorphous solar panel performs better than crystalline solar panel under _____ conditions without suffering as much power loss in high temperatures.	1	3	U	low light
179.	Crystalline solar panel performs better than amorphous solar panel under _____ conditions.	1	3	U	Good condition
180.	The rollable, folding and flexible panels are generally _____ type solar panel.	1	3	U	amorphous
181.	_____ type of solar panels tend to be aluminium framed and glass fronted.	1	3	U	Crystalline
182.	_____ diode prevent power from going back into the solar panel from the battery at night. A)Blocking b)Bypass c)Tunel d)Power	1	3	U	a
183.	In RF power harvesting device the leakage current of capacitor should be less than _____ µA at 1.2V. A)1 b)1.25 c)1.5 d)1.75	1	3	U	a
184.	In RF power harvesting device the leakage current of capacitor should be less than 1 µA at___ V. A)1.1 b)1.2 c)1.3 d)1.4	1	3	U	b
185.	Write the equation to choose the Capacitor value in designing RF power harvesting device.	1	3	U	C=15VoutIoutTon
186.	Which of the following liquid acts as an electrolyte in lead acid battery? A)Hydrochloric acid b)Sulphuric acid c)Acetic acid d)Polymer	1	3	U	b
187.	Which of the following liquid acts as an electrolyte in lithium polymer battery? A)Hydrochloric acid b)Sulphuric acid c)Acetic acid d)Polymer	1	3	U	d

S. No	Question	Mark	CO	Level	Answer
188.	_____ type of routing protocol is more suitable for WSN.	1	3	U	Data centric
189.	_____ type of routing protocol is more suitable for internet.	1	3	U	Address centric
190.	_____ diode reduces the impact of partial shading in the solar panel. A)Blocking b)Bypass c)Tunel d)Power	1	3	U	b
191.	Copper - Constantan type thermocouple's measuring range is _____$^{\circ}$ C. A)-200 to 350 b)-200 to 1300 c)-150 to 1000 d)0 to 1450	1	3	U	a
192.	Chromel – Alumel type thermocouple's measuring range is _____$^{\circ}$ C. A)-200 to 350 b)-200 to 1300 c)-150 to 1000 d)0 to 1450	1	3	U	b
193.	Iron – Constantan type thermocouple's measuring range is _____$^{\circ}$ C. A)-200 to 350 b)-200 to 1300 c)-150 to 1000 d)0 to 1450	1	3	U	c
194.	A sensor network is subjected to a unique set of resource constraints such as a)Finite on board battery supply b)Limited Network communication Bandwidth c) Finite off board battery supply d)Both a & b	1	3	U	D
195.	The maximum voltage obtained from lead acid battery is a)5V b)12V c)24V d)9V	1	3	U	B
196.	Minimum power required for smart sensor is	1	3	U	3.3V
197.	Why piezoelectric crystals are preferred for harvesting energy from vibration.	2	3	U	
198.	Write a short note on power sources of sensor nodes.	2	3	U	
199.	Write a short note on thermopile.	2	3	U	
200.	Give the energy harvesting sources for wireless sensor network.	2	3	U	
201.	List the parameters considered for selecting the battery.	2	3	U	
202.	Define charge capacity and energy stored in battery.	2	3	U	
203.	Define specific energy and energy stored.	2	3	U	
204.	Define energy density and specific power.	2	3	U	
205.	Define charge efficiency and energy efficiency.	2	3	U	
206.	Write a short note on chemical reaction in Lead Acid Battery.	2	3	U	
207.	Write a short note on chemical reaction in Lithium Battery.	2	3	U	

S. No	Question	Mark	CO	Level	Answer
208.	List the software based energy management techniques.	2	3	U	
209.	Design a adjustable voltage regulator circuit to generate 3.3V DC.	2	3	U	
210.	List the importance of charge controllers.	2	3	U	
211.	Draw the block diagram of RF power harvesting device.	2	3	U	
212.	Write a short note on solar power harvesting.	2	3	U	
213.	Write a short note on RF power harvesting.	2	3	U	
214.	Write a short note on power harvesting from vibration.	2	3	U	
215.	Write a short note on thermal power harvesting.	2	3	U	
216.	List the features of RF power harvesting device.	2	3	U	
217.	Explain the energy management techniques in wireless sensor nodes.	15	3	U	
218.	Explain the power harvesting techniques from solar and RF energy.	15	3	U	
219.	Explain with neat sketch of energy management and power harvesting techniques for the developing wireless sensor network.	15	3	U	
220.	Enumerate the factors to be considered while selecting the battery for a particular application in a wireless network and aslo discuss the operation of any one battery.	15	3	U	
221.	With suitable diagram explain the various power sources available for WSN.	15	3	U	
222.	With suitable diagram explain the power harvesting technique from solar energy.	15	3	U	
223.	With suitable diagram explain the power harvesting technique from RF energy.	15	3	U	
224.	Explain the power harvesting techniques from thermal energy.	15	3	U	
225.	Explain the power harvesting techniques from RF energy.	15	3	U	
226.	Explain the power harvesting techniques from vibration.	15	3	U	
227.	Explain the power harvesting techniques from solar and thermal energy.	15	3	U	
228.	Explain the power harvesting techniques from solar and vibration energy.	15	3	U	
229.	Explain the power harvesting techniques from thermal and vibration energy.	15	3	U	
230.	Explain the power harvesting techniques from thermal and RF energy.	15	3	U	
231.	Explain the power harvesting techniques from vibration and RF energy.	15	3	U	
232.	Explain the power harvesting techniques from vibration and solar energy.	15	3	U	
233.	Zigbee protocol suits for _____ level communications.	1	4	U	high

S. No	Question	Mark	CO	Level	Answer
234.	_____ and _____ are two modes of data transmission in XBee.	1	4	U	API & AT
235.	In XBee _____ bit PAN ID is available. a) 8 b)16 c)32 d)64	1	4	U	b
236.	In Zigbee/Xbee, Serial data are accepted in _____mode. a)API b)CPI c) DPI d)SPI	1	4	U	a
237.	Zigbee protocol follows _____ standard. a)IEEE802.11.4 b)IEEE802.11.5 c)IEEE802.15.4 d)IEEE802.14.5	1	4	U	c
238.	Expansion of XCTU is a) Xbee Configuration and Testing Utility b) Xbee Configure and Testing Utility c) Extension Configuration and Testing Utility d)Extension Configure and Testing Utility	1	4	U	a
239.	Expansion of API. a) Application Program Interface b) Application Programming Interface c) Application Programming Interconnect d) Application Program Interconnect	1	4	U	b
240.	Expansion of PAN is a)Professional Area Network b) Personal Area Network c) Professional Analog Network d)Personal Analog Network	1	4	U	b
241.	Expansion of WPAN is a) Wireless Professional Area Network b) Wireless Professional Area Network c) Wired Personal Area Network d) Wireless Personal Area Network	1	4	U	d
242.	Expansion of VISA is a)Virtual Instrumentation Serial Architecture b) Virtual Instrument Serial Architecture c) Virtual Instrumentation Software Architecture d) Virtual Instrument Software Architecture	1	4	U	d
243.	VISA is a _____ API that calls _____ drivers. a)Low Level, High Level b)Medium Level, Low Level c)High Level, Low Level d)High Level, Medium Level	1	4	U	c
244.	Virtual Instrument Software Architecture is a protocol built upon _____ driver and functions to meet the industry needs. a)488 b) 488.1 c) 488.2 d) 488.3	1	4	U	c
245.	XBee can operate at minimum voltage of a)1.2V b)3.3V c)3.7 V d)5V	1	4	U	b
246.	_____ mode is used for installing networks in wireless communication device characteristics.	1	4	U	d

S. No	Question	Mark	CO	Level	Answer
	a)fixed and wired b)mobile and wired c)Fixed and wireless d)Mobile and wireless				
247.	When placing a new function, control, indicator or constant, the _____ feature wires the terminals together if placed within close enough proximity. a)Block diagram Cleanup b)Automatic Error Handling c) Automatic Wiring d) Retain wire values	1	4	U	c
248.	The abbreviation for LabVIEW is	1	4	U	Laboratory Virtual Instrument Engineering Workbench
249.	VISA cannot control _____ instruments. a)Serial b)GPIB c)Image Acquisition d)PXI	1	4	U	
250.	Write a short note on Zigbee Protocol.	2	4	U	
251.	List the sensor network topology using Xbee.	2	4	U	
252.	State the limitations of transparent mode in Xbee module.	2	4	U	
253.	Mention the advantages of LabVIEW interfacing.	2	4	U	
254.	Write a short note on VISA.	2	4	U	
255.	Write a short note on VISA terminologies.	2	4	U	
256.	Describe API Mode Data Transmission and Testing the Communication between Coordinator and Remote Xbee	15	4	U	
257.	Develop a GUI based virtual network for receiving sensor data from different nodes.	15	4	U	
258.	I) Designate the data transmission in API mode.	15	4	U	
259.	II) Test the communication between Xbee modules (Router and Coordinator) with suitable example.	15	4	U	
260.	Write a Program to develop GUI using C	15	4	U	
261.	Write a Program to develop GUI using LabVIEW	15	4	U	
262.	Skin conductance response sensor is based on _____ rule	1	5	U	Voltage Divider
263.	Heart rate sensor is used in Intelligent Sensing System for Emotion Recognition is based on _____ principle	1	5	U	Photoplethysmography (PPG)
264.	_____ sensor is used in WSN Based Smart Power Monitoring System to measure current.	1	5	U	Current Transformer

S. No	Question	Mark	CO	Level	Answer
265.	_____type of wireless network mostly prepared for smart power monitoring a)Mesh b)Point to Point c)Star d)All the above	1	5	U	c
266.	_____play a central role in decision making, problem solving, communicating and adapting to unpredictable environments a)Happiness b)Emotions c)Energy d)Giddiness	1	5	U	b
267.	Physiological sensors should be _____ and power efficient a)Active b)Invasive c)Non-Invasive d)Passive	1	5	U	c
268.	_____Algorithm mostly used in Structural health monitoring a)Ant Colony optimization b)Gaussian Noise c)Shortest path d)Travelling sales man	1	5	U	a
269.	In WSN based Physiological Parameters Monitoring System ADC inputs are _____ and sampled at _____ rate. a)time multiplexed, same b) time multiplexed, different c) frequency multiplexed, same d) frequency multiplexed, different	1	5	U	b
270.	DS100 temperature sensor has sensitivity of _____ mV/ ^{o}C. a)6.25 b)6.35 c)6.45 d)6.55	1	5	U	C
271.	NIR spectroscopy involves using light in the wavelength of _____to measure blood volume. a) 700-800nm b) 700-900nm c) 800-850nm d)800-900nm	1	5	U	b
272.	In which wavelength most tissues do not absorb light - other than hemoglobin a) 700-800nm b) 700-900nm c) 800-850nm d)800-900nm	1	5	U	b
273.	_____ sensor is used in the NIR spectroscopy for measuring blood volume.	1	5	U	silicon phototransistor / GaAs infrared emitting diode
274.	_____ algorithm is used to analyze the data in emotional parameter monitoring system. a)i-means clustering algorithm b)j-means clustering algorithm c)k-means clustering algorithm d)l-means clustering algorithm	1	5	U	c
275.	For switching ON/OFF of the electrical appliances in WSN Based Smart Power Monitoring System _____ is used. a)Diode b)DIAC c)TRIAC d)Transistor	1	5	U	c
276.	In Structural health monitoring system _____ is sensitive to damage but not to input/environmental changes.	1	5	U	a

S. No	Question	Mark	CO	Level	Answer
	a)ACF b)CCF c)CAF d)FCC				
277.	In Structural health monitoring system _____ is used to locate the damage. a)ACF b)CCF c)CAF d)FCC	1	5	U	b
278.	In a _____method, relevant features are determined solely based on attributes computed from the data. a) filter b)Wrapper c)PCA d)Lower dimensional Space	1	5	U	a
279.	_____ approach determines, how well a subset of features performs in a classifier. a) filter b)Wrapper c)PCA d)Lower dimensional Space	1	5	U	b
280.	Wireless sensors can be used in a)Health Monitoring b)Emotional Recognition c)Power Monitoring d)All the above	1	5	U	d
281.	The sensor used in emotion recognition is	1	5	U	Heart rate sensor, Skin Conductance sensor, Skin temperature sensor
282.	Mention the signal processing techniques used for wireless sensor applications.	2	5	U	
283.	List the sensors used in Intelligent Sensing System for Emotion Recognition.	2	5	U	
284.	Write a short note on temperature sensor used in Physiological Parameters Monitoring System.	2	5	U	
285.	Write a short note on heart rate sensor used in Physiological Parameters Monitoring System.	2	5	U	
286.	Write a short note on impact sensor used in Physiological Parameters Monitoring System.	2	5	U	
287.	Write a short note on Skin Conductance Response sensor.	2	5	U	
288.	Differentiate ACF and CCF.	2	5	U	
289.	Explain the role of ACF and CCF in structural health monitoring system.	2	5	U	
290.	Write a short note on Ant Colony Optimization algorithm.	2	5	U	
291.	Write a short note on normalization in SHM.	2	5	U	
292.	List some of the suitable normalization methods for SHM.	2	5	U	
293.	Indicate the six common emotions accepted in worldwide	2	5	U	
294.	Write a short note on feature extraction in SHM.	2	5	U	
295.	List some of the suitable feature extraction methods for SHM.	2	5	U	
296.	Write a short note on filter methods and wrapper methods in SHM.	2	5	U	

S. No	Question	Mark	CO	Level	Answer
297.	List the distinct feature of WSN Based Smart Power Monitoring System.	2	5	U	
298.	Explain the Physiological Parameters Monitoring System.	15	5	U	
299.	How to recognize the emotions using Intelligent sensing system? Explain in detail about Intelligent sensing system	15	5	U	
300.	Describe the WSN based smart power monitoring system for measuring voltage, current and power.	15	5	U	
301.	Discuss in detail about reviewing the signals of structural health monitoring systems.	15	5	U	
302.	i) Briefly describe how the intelligent sensing used for emotion recognition. (7Mark) ii) write neat diagram explain the WSN based smart power monitoring system.	15	5	U	