INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

ELECTRONICS AND COMMUNICATION ENGINEERING

DEFINITIONS AND TERMINOLOGY QUESTION BANK

Course Title	**ELECTRONIC MEASUREMENTS AND INSTRUMENTATION**				
Course Code	AECB32				
Program	B.Tech				
Semester	FIVE				
Course Type	Professional Elective				
Regulation	**IARE - R18**				
Course Structure	**Theory**			**Practical**	
	Lectures	**Tutorials**	**Credits**	**Laboratory**	**Credits**
	3	-	3	-	-
Course Coordinator	P.Annapurna, Assistant Professor				

COURSE OBJECTIVES:

I	The construction and operation of AC & DC voltmeters and ammeters, signal generators, signal analyzers, transducers and LCR meters.
II	The application of the principles of electronic measurements to monitor high tension power quality and build spectrum analyzers for scientific and industrial applications.
III	To explore the applications of measuring instrument in environment monitoring and health monitoring of a smart car.

S.No.	QUESTION	ANSWER	Blooms Level	CO
MODULE-1				
1	Define True Value?	The term true value refers to a value that would be obtained if the quantity under consideration were measured by an example method.	Remember	CO 1
2	Define Reproducibility.	It is the degree of closeness with which a given value may be repeatedly measured. It may be specified in terms of units for a given period of time.	Remember	CO 1

3	Define Drift.	Drift is an undesirable quantity in individual instrumentation. Because it is rarely apparent and cannot be easily compared.	Remember	CO 1
4	Define Accuracy.	It is the degree of closeness with which the instrument reading approaches the true value of the quality to be measured.	Remember	CO 1
5	Define Precision.	It is the measure of consistency or repeatability of measurements. It denotes the closeness with which individual measurements are departed or distribute about the average of number of measured values.	Remember	CO 1
6	What is meant by calibration?	Calibration is the process of making an adjustment or marking a scale, so that the readings of an instrument agree with the accepted and certified standard.	Remember	CO 1
7	Define Standard.	Standard is defined as the physical representation of the unit of measurement.	Remember	CO 1
8	What is meant by speed of response?	It is the rapidity with which the system responds to the changes in the quantity to be measured. It gives the information about how fast the system reacts to the changes in the input.	Remember	CO 1
9	Define Lag.	The retardation or delay in the response of a system is called lag. This is also called measurement lag.	Remember	CO 1
10	What is meant by null type instrument?	In a null type instrument, a zero or null indication leads to determination of the magnitude of measured quantity. The null condition is dependent on some other known conditions.	Remember	CO 1
11	Define Measurement?	The measurement of a given quantity is essentially an act or the result of comparison between the quantity (whose magnitude is unknown) and pre defined standard	Remember	CO 1
12	What is meant by direct method of measurement?	In direct method of measurement, the unknown quantity is directly compared against the standard. The result is expressed as a numerical number. The standard, in fact is a physical embodiment of a unit.	Remember	CO 1
13	What is meant by indirect method of measurement?	Measurement by direct methods is not always possible, feasible and practicable. These methods in most of the cases are inaccurate because they involve human factors. They are also less sensitive. Hence direct methods are not preferred and are rarely used. We are often using indirect methods for measurement purposes.	Remember	CO 1
14	Define Instrument?	It is defined as a device for determining the value or magnitude of quantity or variable.	Remember	CO 1
15	What are absolute instruments?	Absolute instruments give the magnitude of the quantity under measurement in terms of physical constants of the instrument. The examples of this class of instruments are, tangent galvanometer and Rayleigh‘s current balance.	Remember	CO 1
16	What are secondary instruments?	These instruments are so constructed that the quality being measured can only be measured by observing the output indicated by the instrument. These instruments are calibrated by comparison	Remember	CO 1

		with an absolute instrument or another secondary instrument which has already been calibrated against an absolute instrument.		
17	What is meant by signal conditioning?	The performance of non Linear processes like modulation, detection, sampling, filtering, chopping and clipping etc. on the signal to bring it to desired form is called signal conditioning.	Remember	CO 1
18	Define Static Characteristics of an instrument?	A static characteristic of an instrument is defined as instrument in which the system is used to a condition not to vary with time or to vary quite slowly. It is also possible to define a set of criteria that gives a meaningful description of quality of measurement without interfering with dynamic descriptions that involve the use of differential equations. These criteria are called static characteristics.	Remember	CO 1
19	Define Dynamic characteristics of an instrument	Dynamic characteristics of an instrument are defined as instrument in which the performance of the instrument is subjected to time varying input. Performance criteria based upon dynamic relations constitute the dynamic characteristics.	Remember	CO 1
20	What is meant by static error?	The most important characteristic of an instrument or measurement system is its accuracy. The accuracy is measured in terms of its error. Static error is defined as the difference between the measured value and the true value of the quantity	Remember	CO 1
21	Define True Value?	The term true value refers to a value that would be obtained if the quantity under consideration were measured by an example method.	Remember	CO 1
22	Define Reproducibility?	It is the degree of closeness with which a given value may be repeatedly measured. It may be specified in terms of units for a given period of time.	Remember	CO 1
23	Define Drift?	Drift is an undesirable quantity in individual instrumentation. Because it is rarely apparent and cannot be easily compared. Thus it must be carefully guarded against by continuous prevention, inspection and maintenance.	Remember	CO 1
24	Define Accuracy?	It is the degree of closeness with which the instrument reading approaches the true value of the quality to be measured.	Remember	CO 1
25	Define Precision?	It is the measure of consistency or repeatability of measurements. It denotes the closeness with which individual measurements are departed or distributed about the average of number of measured values.	Remember	CO 1
26	What is meant by calibration?	Calibration is the process of making an adjustment or marking a scale, so that the readings of an instrument agree with the accepted and certified standard. The various performance characteristics are obtained in one form or another by process is also called calibration.	Remember	CO 1
27	Define Standard?	Standard is defined as the physical representation of the unit of measurement.	Remember	CO 1

28	What is meant by speed of response?	It is the rapidity with which the system responds to the changes in the quantity to be measured. It gives the information about how fast the system reacts to the changes in the input. It indicates activeness of the system. The system should respond very quickly to the changes in the input.	Remember	CO 1
29	Define Lag?	Every system takes some time, whatever small it may be to respond to the changes in the measured variable. This retardation or delay in the response of a system is called lag. This is also called measurement lag.	Remember	CO 1
30	What is meant by null type instrument?	In a null type instrument, a zero or null indication leads to determination of the magnitude of measured quantity. The null condition is dependent on some other known conditions.	Remember	CO 1
31	Define Span or Sensitivity Drift?	If there is proportional change in the indication all along the upward scale, then it is called span or sensitivity drift.	Remember	CO 1
32	Define Stability?	The ability of an instrument to retain its performance throughout specified operating life and the storage is called stability.	Remember	CO 1
33	What are systematic errors?	The systematic errors are mainly due to the short comings of the instrument, and the characteristics of the material used in the instrument, such as defective or worn parts, aging effects etc. A constant uniform deviation of the operation of an instrument is known as systemic error.	Remember	CO 1
34	What are primary standards?	Primary standards are absolute standards of such high accuracy that they can be used as the ultimate reference standards.	Remember	CO 1
35	What are secondary standards?	The primary standards are not available for use outside the national laboratories. The various industries need some reference standards so to protect highly accurate primary standard, the secondary standards are maintained, which are designed and constructed from the absolute standards.	Remember	CO 1
36	Define Scale Range?	The scale range of an instrument is defined as the largest and smallest reading of an instrument.	Remember	CO 1
37	Define resolution?	The smallest change in a measured variable to which an instrument will respond.	Remember	CO 1
38	What is meant by expected value?	The most probable value that calculations indicate one should expect to measure.	Remember	CO 1
39	Define sensitivity?	The ratio of the change in output of the instrument to a change of input or measured variable.	Remember	CO 1
40	Why calibration of instrument is important?	The calibration of all instruments is important since it affords the opportunity to check the instrument against a known standard and subsequently to errors in accuracy.	Remember	CO 1
41	Define arithmetic mean?	Arithmetic mean is calculated by taking the sum of all readings divided by the number of readings	Remember	CO 1
42	Define static error?	The static error of a measuring instrument is the numerical difference between the true value of a	Remember	CO 1

		quantity and its value as obtained by measurement		
43	Define instrumental errors?	These errors arise due to inherent short coming in the instrument, misuse of the instruments and loading effects.	Remember	CO 1
44	What is the need for measurement?	The need for the measurement is to know about the unknown magnitude	Remember	CO 1
45	Define environmental error?	This error occurs due to external conditions to the measuring device, including conditions in the area surrounding the instrument, such as the effects of change in temperature, humidity, magnetic or electrostatic fields	Remember	CO 1
46	Define Span or Sensitivity Drift?	If there is proportional change in the indication all along the upward scale, then it is called span or sensitivity drift.	Remember	CO 1
47	Define Stability?	The ability of an instrument to retain its performance throughout specified operating life and the storage is called stability.	Remember	CO 1
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MODULE-II				
1	Define deflection sensitivity.	The deflection sensitivity of a CRT is defined as the deflection of the screen per unit deflection voltage.	Remember	CO 3
2	What is a digital storage oscilloscope?	The digital storage oscilloscope stores a signal by converting successive samples to binary numbers, which are stored in a digital memory and used to recreate a composite waveform in much the same manner as the sampling oscilloscope display is created.	Remember	CO 3
3	What is storage target?	Mesh storage consists of a dielectric material deposited on a storage mesh. This is called storage target.	Remember	CO 3
4	What is aluminizing?	The phosphor screen is provided with an aluminum layer called aluminizing the cathode ray tube.	Remember	CO 3
5	What is special purpose oscilloscope?	A storage oscilloscope can retain the trace caused by a single sweep for a long period of time. This feature is particularly useful in studying non-repetitive events such as turn –on	Remember	CO 3

		transients or very low speed phenomena where the required sweep time is very the persistence of the standard oscilloscope phosphor.		
6	What is sampling oscilloscope?	Above the range of 50 – 300MHz. Sampling techniques have to be employed to obtain suitable display and CRO employing such sampling methods are called sampling oscilloscopes.	Remember	CO 3
7	Define dual beam oscilloscope.	Special cathode ray tube having two separate electron guns generating two separate beams. Each electron beam has itsown vertical deflection plates. But the two beams are deflected horizontally by the common set of horizontal plate	Remember	CO 3
8	Define dual trace oscilloscope.	A dual-trace oscilloscope is capable of plotting one or two signals simultaneously and features two independent input channels — one channel for each trace — each of which has its own connectors and controls.	Remember	CO 3
9	Define a sampling time base.	The time base circuit of the sampling oscilloscope is different than the conventional oscilloscope. The time base of sampling oscilloscope has two functions: i) To move the dots across the screen ii) To generate the sampling command pulses for the sampling circuit.	Remember	CO 4
10	Define a comparator.	The comparator compares the two voltages and whenever these two voltages are equal, it generates a sampling pulse.	Remember	CO 4
11	Define digital storage oscilloscope modes.	This mode is used to display very fast varying signals, clearly on the screen. The fast varying signals displayed as if it is changing slowly, on the screen. In this mode, the input signal is not triggered at all.	Remember	CO 4
12	What is mesh storage?	A mesh Storage Oscilloscope contains a dielectric material de- posited on a storage mesh, a collector mesh, flood guns and a collimator, in addition to all the elements of a standard CRT.	Remember	CO 4
13	Define an oscilloscope?	The device which allows, the amplitude of such signals, to be displayed primarily as " function of time, is called cathode ray oscilloscope, commonly known as C.R.O.	Remember	CO 4
14	Define CRT?	The cathode ray tube (CRT) is the heart of the CR.O. the CRT generates the electron beam, ,accelerates the beam, deflects the beam and also has a screen where beam becomes visible ,as a spot.	Remember	CO 4
15	Define an electron gun?	The electron gun section of the cathode ray tube provides a sharply focused electron beam directed towards the fluorescent-coated screen.	Remember	CO 4
16	Define deflection system?	When the electron beam is accelerated it passes through the deflection system, with which beam can be positioned anywhere on the screen. The deflection system of the cathode-ray-tube consists of two pairs of parallel plates, referred to as the vertical and horizontal deflection plates.	Remember	CO 4

17	Define persistence?	The light produced by the screen does not disappear immediately when bombardment by electrons ceases, i.e., when the signal becomes zero. The time period for which the trace remains on the screen after the signal becomes zero is known as "persistence". The persistence may be short as a few micro second, or as long as tens of seconds and minutes.	Remember	CO 4
18	Define phosphor screen characteristics?	Many phosphor materials having different excitation times and colours as well as different phosphorescence times are available. The type PI, P2, PI1 or P3I are the short persistence phosphors and are used for the general purpose oscilloscope.	Remember	CO 4
19	Define vertical amplifier?	The input signals are generally not strong to provide the measurable deflection on the screen. Hence the vertical amplifier stage is used to amplify the input signals. The amplifier stages used are generally wide band amplifiers.	Remember	CO 5
20	Define a delay line?	The delay line is used to delay the signal for some time in the vertical sections. When the delay line is not used, the part of the signal gets lost	Remember	CO 5
21	Define a trigger circuit?	It is necessary that horizontal deflection starts at the same point of the input vertical signal, each time it sweeps. Hence to synchronize horizontal deflection with vertical deflection a synchronizing or triggering circuit is used. It converts the incoming signal into the triggering pulses, which are used for the synchronization.	Remember	CO 5
22	Define time base generator?	The time base generator is used to generate the sawtooth voltage, required to deflect the beam in the horizontal section. This voltage deflects the spot at a constant time dependent rate.	Remember	CO 5
23	Define Lissajous pattern.	When both pairs of the deflection plates (horizontal deflection plates and vertical deflection plates) of CRO (Cathode Ray Oscilloscope) are connected to two sinusoidal voltages, the patterns appear at CRO screen are called the Lissajous pattern.	Remember	CO 5
24	Define current probe?	It is sometimes necessary to measure current waveforms on an oscilloscope. This can be achieved using a current probe. This has a probe that clips around the wire and enables the current to be sensed.	Remember	CO 5
25	Define – Deflection Sensitivity	The deflection sensitivity of a CRT is defined as the deflection of the screen per unit deflection voltage.	Remember	CO 5
26	What is a digital storage oscilloscope?	The digital storage oscilloscope stores a signal by converting successive samples to binary numbers, which are stored in a digital memory and used to recreate a composite waveform in much the same manner as the sampling oscilloscope display is created.	Remember	CO 5

27	What is storage target?	Mesh storage consists of a dielectric material deposited on a storage mesh. This is called storage target.	Remember	CO 5
28	What is aluminizing?	The phosphor screen is provided with an aluminum layer called aluminizing the cathode ray tube.	Remember	CO 5
29	What is special purpose oscilloscope?	A storage oscilloscope can retain the trace caused by a single sweep for a long period of time. This feature is particularly useful in studying non-repetitive events such as turn –on transients or very low speed phenomena where the required sweep time is very the persistence of the standard oscilloscope phosphor.	Remember	CO 5
30	What is sampling oscilloscope?	Above the range of 50 – 300MHz. Sampling techniques have to be employed to obtain suitable display and CRO employing such sampling methods are called sampling oscilloscopes.	Remember	CO 5
31	Define dual beam oscilloscope?	Special cathode ray tube having two separate electron guns generating two separate beam Each electron beam has its own vertical deflection plates. But the two beams are deflected horizontally by the common set of horizontal plate	Remember	CO 5
32	Define dual trace oscilloscope?	A dual-trace oscilloscope is capable of plotting one or two signals simultaneously and features two independent input channels — one channel for each trace — each of which has its own connectors and controls. For the most part a dual-trace oscilloscope operates in the same manner as a single-trace oscilloscope, but multiple inputs and traces create greater complexity.	Remember	CO 5
33	Define a sampling time base?	The timebase circuit of the sampling oscilloscope is different than the conventional oscilloscope. The timebase of sampling oscilloscope has two functions: i) To move the dots across the screen ii) To generate the sampling command pulses for the sampling circuit.	Remember	CO 5
34	Define a comparator used in sampling oscilloscope?	The comparator compares the two voltages and whenever these two voltages are equal, it generates a sampling pulse.	Remember	CO 5
35	Define roll mode of digital storage oscilloscope?	This mode is used to display very fast varying signals, clearly on the screen. The fast varying signals displayed as if it is changing slowly, on the screen. In this mode, the input signal is not triggered at all.	Remember	CO 5
36	What is mesh storage used in oscilloscope?	It is used to display Very Low Frequencies (VLF) signals and finds many applications in mechanical and biomedical fields. The conventional scope has a display with a phosphor peristence ranging from a few micro seconds to a few seconds. The persistence can be increased to a few hours from a few seconds. A mesh Storage Oscilloscope contains a dielectric material	Remember	CO 5

		deposited on a storage mesh, a collector mesh, flood guns and a collimator, in addition to all the elements of a standard CRT.		
37	What is phosphor storage used in oscilloscope?	The phosphor storage is not appropriate for intensity modulation and variable persistence operation. It is used general P1 phosphor for storage as well as display target	Remember	CO 5
38	What is ramp generator?	a ramp generator is a circuit that creates a linear rising or falling output with respect to time. The output variable is usually voltage, although current ramps can be created. Linear ramp generators are also known as sweep generators.	Remember	CO 5
39	What is the function of pre- accelerating anode, accelerating anode in CRT?	Electron beam is focused on the screen by an electrostatic lens consisting of two more cylindrical anodes called the focusing anode and accelerating anode apart from the pre-accelerating anode. The focusing and accelerating anodes may be open or close at both ends and if covered, holes must be provided in the anode cover for the passage of electrons. The function of these anodes is to concentrate and focus the beam on the screen and also to accelerate the speed of electrons.	Remember	CO 5
40	Define the function of high & low voltages in CRO?	Power supply in CRO produces both high and low voltages. The negative high voltage and positive low voltage are applied to anodes of CRT and other circuits respectively.	Remember	CO 5
41	Define horizontal amplifier?	Horizontal Amplifier − It amplifies the sawtooth signal and then connects it to the horizontal deflection plates of CRT.	Remember	CO 5
42	What is the method of amplitude measurement in CRO?	CRO displays the voltage signals a function of time on its screen. The amplitude of that voltage signal is constant, but we can vary the number of divisions that cover the voltage signal in vertical direction by varying volt/division knob on the CRO panel. $A=j\times nv$ Where, A is the amplitude is the value of volt/division, nv is the number of divisions that cover the signal in vertical direction.	Remember	CO 5
43	What is the method of frequency measurement in CRO?	The frequency, f of a periodic signal is the reciprocal of time period, T. Mathematically, it can be represented as $f=1/T$	Remember	CO 6
44	What is the method of time measurement in CRO?	CRO displays the voltage signal as a function of time on its screen. The Time period of that periodic voltage signal is constant, but we can vary the number of divisions that cover one complete cycle of voltage signal in horizontal direction by varying time/division knob on the CRO panel. Therefore, we will get the Time period of the signal, which is present on the screen of CRO by using following formula. $T=k\times nh$ Where,	Remember	CO 6

		T is the Time period j is the value of time/division nv is the number of divisions that cover one complete cycle of the periodic signal in horizontal direction.		
45	Define X1, X10 probe used in CRO?	There are two main types of passive voltage scope probes. They are normally designated X1 and X10, although 1X and 10X are sometimes seen. The designation refers to the factor by which the impedance of the scope itself is multiplied by the probe.	Remember	CO 6
46	Define probes and classify?	To connect the scope to the point to be monitored it is necessary to use screened cable to prevent any pick- up of unwanted signals and in addition to this the inputs to most oscilloscopes use coaxial BNC connectors. While it is possible to use an odd length of coaxial cable with a BNC connector on one end and open wires with crocodile / alligator clips on the other, this is not ideal and purpose made oscilloscope probes provide a far more satisfactory solution.	Remember	CO 6
47	What is meant by synthesis?	The synthesis means to use a fixed frequency oscillator called reference oscillator or clock and to drive the wide frequency range in steps from the output of the reference oscillator	Remember	CO 6
48	Give the drawbacks of tuned circuit harmonic analyzer	At low frequencies, very large values for L and C are required and their physical size becomes rather impractical. Harmonics of the signal frequency are often very close in frequency, so that it becomes extremely difficult to distinguish between them.	Remember	CO 6
49	What is a Distortion analyzer?	It is an instrument that measures total harmonic distortion by determining the harmonic components of a given waveform	Remember	CO 6
50	Mention any four Signal generating instruments.	Low frequency(LF)sine wave generators Radio frequency (RF) sine wave generators Function generators Pulse generators Sweep frequency generators	Remember	CO 6
MODULE-III				
1	What is a signal analyzer?	Analysis of signals in the frequency domain, signal amplitude versus frequency is another important measurement technique widely used for providing information about the overall performance of electrical and physical systems.	Remember	CO 7
2	Mention the various types of signal analyzer	Wave analyzer Distortion analyzer Spectrum analyzer Digital Fourier analyzer	Remember	CO 7
3	What is a wave analyzer?	A wave analyzer is an instrument designed to measure the relative amplitudes of single frequency components in a complex or distorted waveform.	Remember	CO 7

4	What is the use of wave analyzer?	The uses of wave analyzer are 1. Measuring the amplitudes of individual components of a complex frequency system. 2. Measuring the energy in a specific well defined band width. 3. Measuring the signal amplitudes in the presence of noise and interfering signals.	Remember	CO 7
5	What are the two basic configurations of wave analyzer?	Frequency selective wave analyzer Heterodyne wave analyzer	Remember	CO 7
6	Write short notes on wave analyzer.	A wave analyzer is an instrument designed to measure relative amplitude of single frequency components in a complex waveform. It acts as a frequency selective voltmeter which is tuned to the frequency selective voltmeter which is tuned to the frequency of one signal while rejecting all other signal components.	Remember	CO 7
7	What is meant by network analyzer?	A network analyzer is an instrument that measures the network parameters of electrical networks. Network analyzer commonly measure s-parameters because reflection and transmission of electrical networks are easy to measure.	Remember	CO 7
8	Briefly explain about the frequency synthesizer.	A frequency synthesizer is an electronic system for generating any of a range of frequencies from a single fixed time base or oscillator. A frequency synthesizer can combine frequency multiplication, frequency division, and frequency mixing (the frequency mixing process generates sum and difference frequencies) operations to produce the desired output signal.	Remember	CO 7
9	What is known as inter modulation distortion	The distortion that occurs as a consequence of the interaction or heterodyning of two frequencies, giving an output which is the sum or different of the two original frequencies is known as inter modulation distortion	Remember	CO 7
10.	What is known as amplitude distortion?	The distortion that occurs due to the energy storage elements in the system which causes the output signal to be displayed in phase with the input signal is known as phase distortion.	Remember	CO 7
11	What is known as Harmonic distortion?	Non inear behavior of circuit elements introduces harmonics in the output waveform and the resultant distortion known as harmonic distortion.	Remember	CO 7
12	What are the methods to measure the harmonic distortion?	The methods to measure harmonic distortions are • Tuned-circuit harmonic analyzer • Heterodyne harmonic analyzer or wave meter • Fundamental – suppression harmonic distortion analyzer.	Remember	CO 7
13	What are the major sections of fundamental suppression harmonic distortion analyzer?	The instrument consists of four major sections. They are The input circuit with impedance converter • The rejection amplifier • The metering circuit	Remember	CO 7

		• Power supply • Demodulator (AM detector)		
14	What is meant by spectrum analyzer?	A spectrum analyzer separates an a.c. signal into its various frequency components and displays each component as a vertical line on a CRT screen. The amplitude of each vertical line in the display represents the amplitude of each frequency component and the horizontal position of each line defines the frequency.	Remember	CO 7
15	What are the applications of spectrum analyzer?	The applications of spectrum analyzer are as follows • Radars • Oceanography • Analyzing modulated signals. • Studying harmonic components of a signal • Bio-medical fields	Remember	CO 7
16	What are the advantages of spectrum analyzer?	The advantages of spectrum analyzers are • High sensitivity • Better performance since it is operated at IF frequency only.	Remember	CO 7
17	What is meant by network analyzer?	A network analyzer is an instrument that measures the network parameters of electrical networks. Network analyzer commonly measure s-parameters because reflection and transmission of electrical networks are easy to measure.	Remember	CO 7
18	Briefly explain about the frequency synthesizer.	A frequency synthesizer is an electronic system for generatingany of a range of frequencies from a single fixed time base or oscillator. A frequency synthesizer can combine frequency multiplication, frequency division, and frequency mixing (the frequency mixing process generates sum and difference frequencies) operations to produce the desired output signal.	Remember	CO 7
19	What is meant by a Fourier analyzer?	It is a computer driven instrument that determines the Fourier- series components of any periodic waveform	Remember	CO 7
20	Mention the types of spectrum analyzer	Three types of spectrum analyzers are there. They are ➢ Swept turned ratio frequency spectrum analyzer ➢ Swept super-heterodyne spectrum analyzer ➢ High frequency spectrum analyzer.	Remember	CO 7
21	What is digital spectrum analyzer?	The conventional spectrum analyzer is called a real time spectrum analyzer, while the analyzer using a computer algorithm and A/D conversion is usually called an FFT spectrum analyzer. Alternative namesare―Digital spectrum analyzer‖ and ―Fourier analyzer‖.	Remember	CO 7
22	What is digital LCR meter?	This meter is mainly used to measure the resistance, inductance, capacitance and dissipation factor.	Remember	CO 7

23	What is meant by signal generator?	Signal generators provide variety of different signals for testing various electronic circuits at low powers. The signal generator is an instrument which provides several different output waveforms including sine wave, square wave, triangular wave, pulse train and an amplitude modulated waveform	Remember	CO 7
24	What is known as _Window in FET. spectrum analyzer?	A wave analyzer is an instrument that measures amplitudes of the harmonic components of complex signal. A harmonic distortion analyzer is an instrument that measures total harmonic distortion by determining the harmonic components of a given waveform.	Remember	CO 7
25	What are the various requirements of a signal generator?	The various requirements of a signal generator are as follows ➢ The output signal should be free from distortion ➢ The amplitude of output signal must bestable. ➢ The output frequency of signal generator should be very stable. ➢ The amplitude of the output should be controllable from very small to relatively large values.	Remember	CO 7
26	Mention any four signal generating instruments.	Low frequency(LF)sine wave generators Radio frequency (RF) sine wave generators Function generators Pulsegenerators Sweep frequency generators.	Remember	CO 7
27	What is meant by function generator?	A function generator is aversatile instrument. It delivers different waveforms whose frequencies are adjustable over a wide range. The most required common output waveforms are the sine, triangular, square and saw tooth waves. The frequencies of these waveforms may be adjusted from a fraction ofa hertz to several hundredkilohertz	Remember	CO 7
28	For wha tpurpose square wave generator is used?	The square wave generator and pulse generator are generally used as measuring devices in combination with oscilloscope.	Remember	CO 7
29	What is the basic difference between square wave generator and pulse generator?	The square wave generator and pulse generator differs in duty cycle. The duty cycle is defined as the ratio of average value of a pulse over one cycle, to the peak value. It is also defined as the ratio of the pulse width to the period of one cycle.	Remember	CO 7
30	What is meant by pulse generator?	The pulse generator is a device which provides a voltage and current output whose waveform is a continuous waveform. It is used to activate integrated circuit, a multichip module, a connector or a cable.	Remember	CO 7
31	Distinguish between active circuits and passive circuits	Passive Circuits: • They are nothing but pulse shaping circuits. • This circuit is mostly used to clean up the pulse output having overshoots, ring ingetc	Remember	CO 7

		Active Circuits : • They are nothing but pulse generating circuits. • This circuit is mostly used to generate square waveforms and other waveforms.		
32	List out the advantages of audio frequency signal generator.	The advantages of audio frequency generator are • Stable and simple operation • Lowdistortion • Good amplitude stability • Relatively easily achievable audio frequency variation	Remember	CO 7
33	Give the types of multivibrators	.There are three types of multivibrators. They are astable multivibrator, monostable multivibrator, and bistable multivibrator	Remember	CO 7
34	What are multivibrators?	Multivibrators are pulse generating circuits	Remember	CO 7
35	What is an Oscillator?	Oscillator is an instrument that produces a sinusoidal wave, triangular wave & square wave output signal. Sine wave generates both in audio and radio frequency ranges are called as an oscillator.	Remember	CO 7
36	What is wobbluscope?	The wobblu scope is an instrument which is a combination of the instrument namely sweep generator, marker generator and an oscilloscope. It is used to align The RF, IF video sections of a T.V. receiver.	Remember	CO 7
37	What is known as Duty Cycle?	Duty cycle is the ratio of the average value of the pulse over one cycle to the peak value of the pulse Duty Cycle = Average Value/Peak Value. Since, the average and peak value are inversely related to their time duration, duty cycle can be also defined as in terms of the pulse width and the period or pulse repetition time. Duty Cycle = Pulse Width/Period	Remember	CO 7
38	Define – Rise Time and Fall Time of a pulse	The rise time is defined as the time required for the pulse to increase from 10% to 90% of its amplitude. The fall time is defined as the time required for the pulse to decrease from 90% to 10% of its amplitude	Remember	CO 7
39	Define – Preshoot and Overshoot of a pulse	Preshoot is defined as the deviation prior to reaching the baseline at the start of the pulse. Overshoot is defined as the maximum height immediately following the leading edge	Remember	CO 7
40	What is meant by marker generator?	A marker generator is basically RF signal generator with VHF and UHF bands. It has very high accuracy than other signal generators.	Remember	CO 7
41	What is the principle of Sweep Generator?	The principle of Sweep Generator is the triangular output can be made as a ramp output by charging and discharge currents of the generator.	Remember	CO 7
42	What are called as feedback oscillator?	Feedback oscillator uses an active device such as an amplifier whose output is feedback in phase to its input to cause regenerative action resulting in oscillations.	Remember	CO 7

43	List out the types of random noise.	The spectrum of random noise contains three types of noise. They are 1. White noise 2. Pink noise 3. Usani noise	Remember	CO 7
44	Define – THD	Total Harmonic distortion is defined as the ratio of the amplitude harmonic to that of the fundamental harmonic distortion.	Remember	CO 7
45	List some applications of random noise generators.	Random noise generator is used in vibration and fatigue testing of the aerospace components and assembly. The random noise in cyclo- acoustical measurement has greatly increased knowledge of process of hearing. In electrical measurement, noise can be used as a test signal. The random noise can stimulate vibration to which aircrafts and rockets are subjected to their fights.	Remember	CO 7
46	What is the use of noise generator?	The random noise generator is mainly used for testing of various systems. This generator uses single measurement over wide frequency instead of many measurements at one frequency t a time.	Remember	CO 7
47	List out the advantages of sweep generator.	The advantages of sweep generator are The output voltage over entire frequency band is available. The smooth and continuous frequency variation of output voltage is possible. Independent master oscillator frequency control is possible. The automatic level controller keeps power constant avoiding the source mismatch and loading effect.	Remember	CO 7
48	List out the disadvantages of sweep generator	The only disadvantage of sweep generator is, it does not give any precise information of the frequency on the traced curve.	Remember	CO 7
49	How many blocks are there in frequency synthesizer?	There are five main blocks in frequency synthesizer. They are • Voltage controlled oscillator(VCO) • Programmabledivider • Phasedetector • Referencefrequency source and • Loop filter	Remember	CO 7
50	Mention the applications of frequency synthesizer	In communication work, the excellent spurious frequency performance is frequency synthesizer. It is well suited to be used as master oscillator in a transmitter and as the local oscillator in the receiver. The synthesizers greatly helps surveillance work if it is used as local oscillator in a receiver designed to detect accurately the frequencies from remote	Remember	CO 7
MODULE-IV				
1	Define bridge.	If the electrical components are arranged in the form a bridge or ring structure, then that electrical circuit is called a bridge.	Remember	CO 10
2	What are the types of Bridges	The following two categories based on the voltage signal with which those can be operated. DC Bridges AC Bridges	Remember	CO 10

3	Define DC bridge?	If the bridge circuit can be operated with only DC voltage signal, then it is a DC bridge circuit or simply DC bridge. DC bridges are used to measure the value of unknown resistance	Remember	CO 10
4	Define AC bridge?	If the bridge circuit can be operated with only AC voltage signal, then it is said to be AC bridge circuit or simply AC bridge. AC bridges are used to measure the value of unknown inductance, capacitance and frequency.	Remember	CO 10
5	What is mean by AC voltage source	AC bridge circuit can be excited with an AC voltage source by placing it in one diagonal. A detector is placed in other diagonal of AC bridge. It shows some deflection as long as the bridge is unbalanced.	Remember	CO 10
6	What is mean by DC voltage source	DC bridge circuit can be excited with a DC voltage source by placing it in one diagonal. The galvanometer is placed in other diagonal of DC bridge. It shows some deflection as long as the bridge is unbalanced.	Remember	CO 10
7	Give the usage of DC bridge?	DC bridges are useful for measuring the value of unknown resistance. Wheatstone‘s Bridge is an example of DC bridge.	Remember	CO 10
8	What is the usage of Maxwell Bridge?	An AC detector and AC voltage source are used to find the value of unknown impedance. Hence, one of these two are placed in one diagonal of Maxwell‘s bridge and the other one is placed in other diagonal of Maxwell‘s bridge. Maxwell‘s bridge is used to measure the value of medium inductance.	Remember	CO 10
9	What is the usage of Hay‘s Bridge?	Hay‘s bridge is a modified version of Maxwell‘s bridge, which we get by modifying the arm, which consists of a parallel combination of resistor and capacitor into the arm, which consists of a series combination of resistor and capacitor in Maxwell‘s bridge. Hay‘s bridge is used to measure the value of high inductance.	Remember	CO 10
10	What purpose bridges are used?	The bridges are used not only for the measurement of resistances, but also used for the measurement of various component values like capacitor, inductor etc.	Remember	CO 10
11	What is a bridge circuit?	A bridge circuit in its simplest form consists of network of four resistance arms forming a closed circuit. A source of current is applied to two opposite junctions. The current detector is connected to other two junctions.	Remember	CO 10
12	What is Maxwell‘s Inductance – Capacitance bridge?	Maxwell‘s Inductance– Capacitance bridge is the schematic used to measure an unknown inductance by comparing with a standard variable capacitance.	Remember	CO 10
13	Write the specification of Hay‘s bridge?	Hay‘s bridge is the schematic used to measure the inductance of medium Qcoil($1<Q<10$). It is a modification of Maxwell‘s bridge in which the resistance is connected in series with the standard capacitor.	Remember	CO 10

14	What is Wien‘s bridge?	Wien‘s bridge is the schematic used for the measurement of frequency like audio and HF.	Remember	CO 10
15	What are A.C. bridges?	An A.C. bridge in its basic form consists of four arms, a source of excitation and a balance detector. Each arm consists of impedance. The source is an a.c. supply which Supplies a.c. voltage at the required frequency.	Remember	CO 10
16	Give the uses of D.C. bridges.	The D.C. bridges are used for the measurement of very high and very low value resistances. In practice, the variety of D.C. bridges are available. The commonly used D.C.bridges are, (i) Wheat stone bridge (ii) Kelvin bridge.	Remember	CO 10
17	What is Schering‘s bridge?	Schering‘s bridge is the schematic used for measurement of capacitance at low voltage and for voltage and for the study of insulation structures at high voltages and also measures power factor of cables.	Remember	CO 10
18	What is Anderson‘s bridge?	Anderson‘s bridge is the schematic used for precise measurement of self inductance over a very wide range in terms of standard capacitor.	Remember	CO 10
19	Gives the advantages of bridge circuits.	The measurement accuracy is high as the measurement is done by comparing the unknown value with the standard value. The accuracy is independent of the sensitivity of the null detector, the impedance of the detector or any impedance shunting the detector.	Remember	CO 10
20	What are the commonly used detectors in ac bridges	Head phones, tuned amplifiers, vibration galvanometers used in bridges.	Remember	CO 4
21	Define Galvanometer?	The galvanometer is the device used for detecting the presence of small current and voltage or for measuring their magnitude. The galvanometer is mainly used in the bridges and potentiometer where they indicate the null deflection or zero current.	Remember	CO 4
22	What is the principle of Galvanometer	The potentiometer is based on the premise that the current sustaining coil is kept between the magnetic field experiences a torque.	Remember	CO 4
23	What is the application of Galvanometer	It is used for detecting the direction of current flows in the circuit. It also determines the null point of the circuit. The null point means the situation in which no current flows through the circuit .It is used for measuring the current.	Remember	CO 4
24	What are the types of sources in AC bridges?	For Low frequency measurement the powerline supply can serve as the source of excitation. For High frequency measurement the electronic oscillator is used as excitation voltage.	Remember	CO 10
25	Which inductance measured through AC Bridges?	There are following bridges are measured, i. Maxwell inductance bridge ii. Maxwell inductance- capacitance bridge iii. Hay‘s bridge iv. Anderson‘s bridge v. Owen‘s Bridge	Remember	CO 10

26	What are the advantages of Maxwell inductance Capacitance Bridge?	Obtained balance equations are free from the frequency terms It is very useful for measurement of a wise range of inductance at power and audio frequencies.	Remember	CO 10
27	What is the use of wagner earthing device?	A Wagner earthing device is used in general to eliminate the stray capacitance effects in AC bridges. The stray capacitance effects between the components in the ratio arms with respect to ground can be eliminated through this method	Remember	CO 10
28	What is Null detector?	The entire premise of a "null detector" is that there is some voltage that the "adjustable voltage source" can be set to that causes zero current to flow through the "null detector", which is usually a high resistance voltmeter.	Remember	CO 10
29	What is simple bridge circuit?	A simple bridge circuit is made of a network consisting of 4 resistance arms. Usually a galvanometer is connected between the ends of the opposite two junctions in order to measure the flow of current.	Remember	CO 10
30	What is principle of bridge circuit?	A bridge circuit operates on the principle of null indication. Based on the deflection of the galvanometer, current flows between the two opposite junctions	Remember	CO 10
31	What is earthing device?	A Wagner earth device is generally used for shielding and grounding purpose. It consists of capacitances in the ratio arms along with a series RC combination connected across the ends of the bridge forming a potential divider.	Remember	CO 10
32	What is the usage of shielding and grounding	The stray capacitance effects in an AC bridge can be eliminated by shielding and grounding. This method helps in making the stray capacitances constant in value. They can be compensated.	Remember	CO 10
33	What is the usage of Maxwell inductance-capacitance bridge?	A Maxwell inductance capacitance bridge is used for the measurement of inductance by making comparison with a standard capacitance value. Voltmeter is used to measure voltage, while an ammeter is used to measure current.	Remember	CO 10
34	What is the significance of capacitors in a Maxwell bridge?	In a Maxwell inductance capacitance bridge, the capacitors are cheaper when compared to stable and accurate standard value of inductors.	Remember	CO 10
35	How to minimize the effect of earth apacitance?	In a high voltage Scheringbridge, the effect of earth capacitance on the circuit including the galvanometer and the contact leads is minimized by making use of a Wagner ground connection.	Remember	CO 10
36	What is the effect of breakdown of high voltage capacitor?	In a high voltage Schering bridge, a very high voltage appears across the branches when the breakdown of high voltage capacitor occurs. This is prevented by making use of a spark gap across the branches involved.	Remember	CO 10
37	What is the Significance of the balance equation on losses?	The balance equation in a Maxwell inductance capacitance bridge is independent of the losses associated with an inductance. According to the balance equation the unknown inductance is computed as Lx = R2 R3C1	Remember	CO 10

38	Define tuned circuit?	Tuned circuit is used for detecting balance condition. Vibration galvanometer is used for the same purpose. Unknown value of capacitance is obtained by comparing it with a standard value.	Remember	CO 10
39	How is the bridge balanced?	Bridge balance is obtained by varying the resistance R3. At balance we get the value of the unknown resistance as Rx = R R∕. 13R2	Remember	CO 10
40	What is stray Capacitance effect?	The stray capacitance effects in an AC bridge can be eliminated by shielding and grounding. This method helps in making the stray capacitances constant in value. They can be compensated.	Remember	CO 10
41	Define Galvanometer.	The galvanometer is the device used for detecting the presence of small current and voltage or for measuring their magnitude.	Remember	CO 10
42	What is earthing device?	A Wagner earth device is generally used for shielding and grounding purpose. It consists of capacitances in the ratio arms along with a series RC combination connected across the ends of the bridge forming a potential divider.	Remember	CO 10
43	Define Wheatstone‘s Bridge.	Wheatstone‘s bridge is a simple DC bridge, which is mainly having four arms. These four arms form a rhombus or square shape and each arm consists of one resistor.	Remember	CO 10
44	Define Guard arm.	The series combination of R and C in a Wagner earth device forms a potential divider across the ratio arms. It is also known as the guard arm.	Remember	CO 10
45	Define Vibration Galvanometer.	The galvanometer in which the oscillation frequency of the moving element and the measured current becomes equal is known as the vibration galvanometer. It uses for detecting the alternating current or alternating electromotive force.	Remember	CO 10
46	Define Weston Frequency Meter.	The Weston frequency meter is a moving iron instrument used for measuring the unknown frequency of a signal. The frequency meter consists one inductive and one resistive coil. When the frequency of the signal varies from standard frequency, the current distribution across the coils becomes changes.	Remember	CO 10
47	Define Ampere‘s Law.	Ampere‘s Law specifically says that the magnetic field created by an electric current is proportional to the size of that electric current with a constant of proportionality equal to the permeability of free space.	Remember	CO 10
48	Define Owen‘s Bridge.	The bridge which measures the induc tancein terms of capacitance is known as Owen‘sbridge.	Remember	CO 10
49	Define Capacitance Comparison Bridge.	Capacitance Comparison Bridge measure unknown capacitance value by comparing with the standard inductor.	Remember	CO 10
50	Define Digital Readout Bridge.	The tremendous increase in the use of digital circuit has a marked effect on electronic test instruments. The early use of digital circuits in bridges was to provide a digital read out.	Remember	CO 10

MODULE-V				
1	What is transducer?	A device (or medium) that converts energy from one form to another. The term is generally applied to devices that take physical phenomenon (pressure, temperature, humidity, flow, etc.) and convert itto an electrical signal	Remember	CO 9
2	What is transducer capacity?	Maximum load that a transducer can measure and still maintain specifications.	Remember	CO 9
3	What is Rated Output (RO)?	Output at the rated load minus output under no-load conditions. Rated output is expressed per volt applied to the transducer (mV/ V)	Remember	CO 9
4	What is Hysteresis?	Maximum difference between transducer output with increasing and decreasing loads. Hysteresisis expressed as a percentage of rated output(%RO)	Remember	CO 9
5	What is Ultimate overload rating?	Maximum load that can be applied continuously without causing permanent destructive change mechanically(%).	Remember	CO 9
6	What is Recommended exciting voltage?	Voltage that can be applied to the transducer and still maintain specifications (V).	Remember	CO 9
7	What is Allowable exciting voltage?	Maximum voltage that can be applied continuously to the transducer without causing permanent destructive damage (V).	Remember	CO 9
8	Define Repeatability.	Maximum difference in output when the same rated load is measured repeatedly under identical load and environmental conditions. Repeatability is expressed as a percentage of rated output(%RO).	Remember	CO 11
9	Define Sensor.	Sensor is a device that detects a change in a physical stimulus and turns it into a signal which can be measured or recorded	Remember	CO 11
10	What is Dead band?	The lack of response or insensitivity of a device over a specific range of the input. • In this range which may besmall, the output remains constant. • A device should not operate in this range unless this in sensitivity is acceptable.	Remember	CO 11
11	What is Sensitivity of a sensor?	Sensitivity of a sensor is defined as the change in output for a given change in input, usually a unit change in input. Sensitivity represents the slope of the transfer function.	Remember	CO 11
12	What is Strain gauge?	It is a measuring element (metal wire, metal foil or a strip of semiconductor material) for converting force, pressure, tension, etc., into an electrical signal. When subjected to strain, its resistance R changes, the fractional change in resistance being proportional to the strain	Remember	CO 11
13	Define Span.	The algebraic difference between the limits of the range from zero to full scale.	Remember	CO 5
14	What is Temperature Effect on Zero?	Transducer output due to changes In ambient temperature. Temperature effect on zero expresses change per degree of ambient temperature as a percentage of rated output (%RO/°C)	Remember	CO 5

15	What is Temperature Effect on Span?	Rate of change in load output due to changes in ambient temperature. Temperature effect on span is expressed per degree of ambient temperature (%/°C).	Remember	CO 11
16	What is Compensated Temperature Range	Range of temperatures compensated for temperature effect on zero and span. (°C).	Remember	CO 11
17	Define Gauge Length.	Distance between two points used to measure displacement or strain	Remember	CO 11
18	Define Spring Force.	Approximate force required to displace capacity on the displacement tansducer(N).	Remember	CO 11
19	Define Natural Frequency.	Frequency under no-load conditions at which a transducer oscillates freely (Hz)	Remember	CO 11
20	What is Zero return?	The difference in zero balance measured immediately before rated load application of specified duration and measured after removal of the load, and when the output has stabilized.	Remember	CO 11
21	What is Zero balance?	The output signal of the transducer with rated excitation and with no load applied, usually expressed as a percent of rated output.	Remember	CO 11
22	What is Zero adjustments?	Used when "setting up" a transducer to adjust the output signal to zero when zero load/pressure is applied	Remember	CO 11
23	What is active transducer?	The transducer, which can produce one of the electrical quantities such as voltage and current is known as active transducer. It is also called self-generating transducer, since it doesn‘t require any external power supply. Examples 1.Piezo Electric Transducer 2.Photo Electric Transducer 3.Thermo Electric Transducer	Remember	CO 11
24	What is passive transducer?	The transducer, which can‘t produce the electrical quantities such as voltage and current is known as passive transducer. But, it produces the variation in one of passive elements like resistor (R), inductor (L) and capacitor (C). Passive transducer requires external power supply. Examples 1.Resistive Transducer 2.Inductive Transducer 3.Capacitive Transducer	Remember	CO 11
25	Define Vibration error.	The maximum change in output of a transducer when a specific amplitude and range of frequencies are applied to a specific axis at room temperature	Remember	CO 11
26	What is Thermocouple transducer?	Thermocouple transducer produces an output voltage for a corresponding change of temperature at the input	Remember	CO 11
27	What is Thermistor?	The resistor, which depends on temperature is called thermal resistor. In short, it is called Thermistor. The temperature coefficient of thermistor is negative. That means, as temperature increases, the resistance of thermistor decreases.	Remember	CO 11
28	What is piezo electric transducer?	An active transducer is said to be piezo electric transducer, when it produces an electrical quantity which is equivalent to the pressure input	Remember	CO 11

29	What is photo electric transducer?	it produces an electrical quantity which is equivalent to the illumination of light input	Remember	CO 12
30	Define Full scale output.	The algebraic difference between the minimum output (normally zero) and the rated capacity.	Remember	CO 12
31	Define diaphragm.	The sensing membrane that is deformed when pressure is applied	Remember	CO 12
32	Define transduction mode.	How the sensor acquires the desired information from the material. In general, this parameter is an indication of the ability of the sensor signal to provide information regarding a material property or state of interest	Remember	CO 12
33	What is smart sensor?	A sensor in which the electronics that process the output from the sensor, and forms the modifier, are partially or fully integrated on a single chip	Remember	CO 12
34	Define Strain gauge.	It is a measuring element (metal wire, metal foil or a strip of semiconductor material) for converting force, pressure, tension , etc., into an electrical signal.	Remember	CO 5
35	Define Span.	The algebraic difference between the limits of the range from zero to full scale.	Remember	CO 12
36	Define Temperature Effect on Zero.	Transducer output due to changes in ambient temperature. Temperature effect on zero expresses change per degree of ambient temperature as a percentage of rated output (%RO/°C)	Remember	CO 12
37	Define Temperature Effect on Span.	Rate of change in load output due to changes in ambient temperature. Temperature effect on span is expressed per degree of ambient temperature (%/°C).	Remember	CO 12
38	Define Compensated Temperature Range.	Range of temperatures compensated for temperature effect on zero and span. (°C).	Remember	CO 5
39	Define Gauge Length.	Distance between two points used to measure displacement or strain	Remember	CO 12
40	Define Spring Force.	Approximate force required to displace capacity on the displacement transducer(N).	Remember	CO 12
41	Define Natural Frequency.	Frequency under no-load conditions at which a transducer oscillates freely (Hz)	Remember	CO 12
42	Define Zero return.	The difference in zero balance measured immediately before rated load application of specified duration and measured after removal of the load, and when the output has stabilized.	Remember	CO 12
43	Define Sensitivity of a sensor.	Sensitivity of a sensor is defined as the change in output for a given change in input, usually a unit change in input. Sensitivity represents the slope of the transfer function.	Remember	CO 12
44	What is baretter?	The resistor, which depends on temperature is called thermal resistor. In short, it is called Thermistor. The temperature coefficient of thermistor is positive. That means, as temperature increases, the resistance of baretter increase.	Remember	CO 12
45	Define velocity	The velocity of an object is the rate of change of its position with respect to a frame of reference, and is a function of time.	Remember	CO 12

46	Define force	strength or energy as an attribute of physical action or movement.	Remember	CO 12
47	Define pressure	Pressure is defined as the physical force exerted on an object. The force applied is perpendicular to the surface of objects per unit area.	Remember	CO 12
48	Define volume	Volume is the quantity of three- dimensional space occupied by a liquid, solid, or gas	Remember	CO 12
49	Define moisture	water or other liquid diffused in a small quantity as vapour, within a solid, or condensed on a surface. "the air was constantly heavy with moisture	Remember	CO 12
50	Define humidity.	A quantity representing the amount of water vapour in the atmosphere or in a gas	Remember	CO 12

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