Q.1 Which one of the following is best definition of Accuracy ?

(a) It is measure of consistency or reproducibility of measurements.

(b) Ratio of change in OP to change in IP signal.

(c) Smallest change in measurand

(d) closeness with which an instrument reading approaches the true value of quality being measured.

Q.2 The difference between measured value and true value is called

Q.3 Match List-1 (term) with List-2 (statement) and select the correct answer using the code given below

L-1 → [A] Relative Error, [B] Precision, [C] calibration [D] resolution

L-2 → [1] The ability of device to give identical OP when repeated measurements are made with the same IP signal.

[2] The ratio of difference between measured value and the true value to the true value of measurand.

[3] The smallest increment in measurand that can be detected with certainty by the instrument.

[4] The process of making adjustments on the scale so that the instrument readings conform to be accepted standard.

Code

	A	B	C	D
(a)	2	3	4	1
(b)	4	1	2	3
(c)	4	3	2	1
(d)	2	1	4	3

Q.4 Threshold of a measurement system is

Q.5 Sensitivity of instrument defined by
(a) Smallest perceptible change in OP
(b) Deviation of OP from true value
(c) Ratio of change in instrument readings to the change in measured variable

Q.6 (A) Precision is a necessary prerequisite of accuracy

(B) Precision is guarantees of accuracy.

Q.7 An ameter of range (0-25)A has a guaranteed accuracy of 1% of full scale reading. The current measured by the ammeter is 5A. The limiting error in reading is

Q.8 A 300V full-scale deflection voltmeter has an accuracy of ±2%, when it reads 222V. The actual voltage.

Q.9 The measured value of capacitor is 100 μF. The true value of capacitor is 110 μF. The % relative error is ?

10 A Voltmeter has a range [0-20]v and manufacturer rates its accuracy as ±1% fsd. Match List-I (Voltage Value) with List-II (Error as % of True Value) and Select the correct answer using the codes given below

11 The voltage across an impedance is measured by a voltmeter having input impedance comparable with the impedance causing an error in the reading. What is the error called?
(a) Random Error (b) Gross error
(c) Systematic error (d) Loading error

12 A meter having a sensitivity of 2KΩ/V is used for the measurement of voltage across a circuit having an OP resistance of 1KΩ and an open ckt voltage of 8V. What is the reading of the meter at its 10V scale?

13 Two capacitance, $C_1 = 150 \pm 2.4\,\mu F$ & $C_2 = 120 \pm 1.5\,\mu F$ are connected parallel. What is the limiting error of the resultant capacitance C?

14 Which one of the following meters has maximum loading effect on the circuit under measurement?

15 A resistance is measured by a voltmeter-Ammeter method using DC excitation and a voltmeter of very high resistance connected directly across the unknown resistance. If the voltmeter and ammeter are subject to maximum error of ±2.4% and ±1.0% respectively.

then the magnitude of max error in the value of resistance obtained from the measurement is nearly ?

16/ The current is measured 235 μA and the accuracy of measurement is ±0.5%. This current passes through a resistor 35KΩ ± 0.2%. The voltage is estimated to be 8.23 V. The error in the estimation would be

17/ A current of 2±0.5% A passes through a resistor of 100±0.2% Ω. The limiting error in the computation of power is

18/ Error caused by the act of measurement on the physical system being tested is ?

19/ Precision is composed of two characteristics, one is the number of significant figure to which a measurement may be made, the other is ?

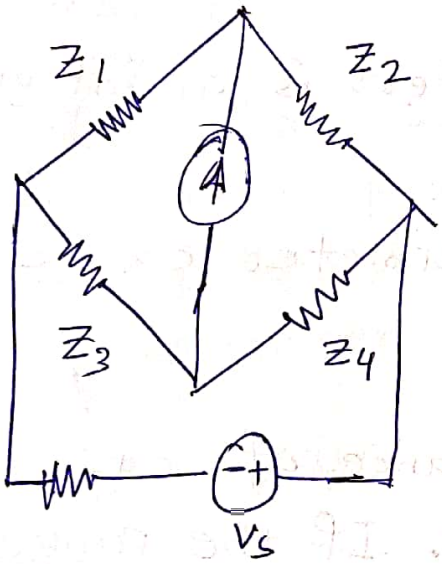
20/ The value of capacitance and inductance used in the series LCR circuits are 160 PF and 160 μH with tolerance limit −10% in each. Then, the resonance freq of the ckt in the range of

21 (i) Statement : The smallest change of IP detectable at the OP is called the resolution of a transducer

(ii) Statement : A high resolution means high accuracy.

22 A liquid flows through a pipe of 100mm diameter at a velocity of 1 m/s. If the diameter is guaranteed with in ± 1% and the velocity is known to be within ± 3% of measured value, the limiting error for the rate of flow is

23 Consider the circuit as shown below, Z_1 is an unknown impedance and measured as $Z_1 = Z_2 Z_3 / Z_4$. The uncertainties in the value of Z_2, Z_3 & Z_4 are ±1%, ±1% and ± 3% respectively.



The overall uncertainty in the measured value of Z_1 is

(a) $\sqrt{11}$ % (b) ± 4%

(c) ± 5% (d) $\sqrt{5}$ %

24 Loading effect is primarily caused by instruments having.

UNIT:2 Measuring Instruments

25 PMMC instruments can measure
(a) DC only (b) AC only (c) AC & DC both
(d) Neither AC nor DC.

26 The scale of PMMC instrument is ___

27 The scale of MI instrument is ___

28 MI-Instrument can measure ___

29 Which of the following meters is an integrating type instruments?

30 A dynamometer type wattmeter can be used on

31 A dc ammeter has resistance of 0.1Ω and current range is 0-100 A. If the range is to be extended to 0-500 A, then meter requires shunt resistances of

32 The moving coil in a dynamometer wattmeter is connecccted.

33 To increase the range of voltmeter

34 Which one of the following types of instruments does suffer from error due to magnetic hysteresis?

35 Which one of the following does not employ a Null method of measurement ?
[a] Megger [b] DC potentiometer
[c] Kelvin double bridge [d] Ac potentiometer

36 Two parallel conductors carrying current in opposite directions will exert on each other
(a) An attractive force [b] Repulsive force
[c] An axial force [d] No force

37 In indicating instruments the springs are mainly used to

38 If a 110 V, 50 Hz is applied across a PMMC voltmeter of full scale range (0-220 V) and internal resistance of 10 KΩ, reading of voltmeter will be

39 The average value of the voltage wave $V = 110 + 175 \sin(314t - 25°)$ volts is
(a) 110 V (b) 175 V (c) 165.75 (d) 206.7V

40 If current through operating coil of a moving iron instrument is doubled, then operating force becomes

41 The multiplying power of the shunt of a multimeter is 8. If the circuit current is 200 mA, then current through the meter is

42 Moving coil and moving iron instruments can be distinguished by observing its :

43 Voltmeter has
[a] High resistance [b] Low resistance
[c] Both Low & High [d] Uncertain

44 More power is required to operate a moving-iron meter than a PM-MC meter because of the magnetic circuit is high

45 Match List (I) with List-II

A. Former	1. Produces deflecting torque
B. Coil	2. Provides Base for the coil
C. Core	3. makes magnetic field radial
D. Spring	4. Provides controlling torque.

46

A. PMMC	1. Square law type
B. MI	2. Very good high freq. respons
C. Thermo couple type instrument	3. linear scale over the entire range
D. Electrostatic type	4. Voltmeter

47 Which one of following meters does not exhibit square law response?

48 To increase the range of voltmeter

49 Which damping is used in PMMC meter
[a] Eddy current [b] Air [c] Liquid/fluid

50 Fluid friction damping can be used in
(a) Horizontal mounted instrument
(b) vertically mounted instruments
(c) both
(d) None

51 Which instrument is used to measure high voltage (KV)

52 Thermocouple instruments can be used for a frequency range

53 Electrostatic type instruments are primarily used as

54 The range of voltmeter is non-uniform It's type is
(a) MI (b) Electrostatic (c) EMMC (d) All

UNIT:3 Bridges [R, L & C]

55 Low resistance range is ?

56 low resistances generally have ——— teaminals?

57 Which one of the methods does not use to measure low resistance ?

58 Measurement of medium resistances is not taken by
[a] Wheatstone bridge [b] substitution method
[c] Ohmmeter [d] ~~Kelvin~~ double

59 Measurement of High resistance is not done by
(1) Loss of charge method
(2) megger method
(3) Mega ohm bridge
(4) direct deflection method
(5) ohmmeter

60 Megger is an instrument to measure

61 Four teaminal resistances are used for resistance values :
[a] $R > 10\ \Omega$ [b] $R > 1\ \Omega$ [c] $R < 1\ \Omega$
[d] R in $M\Omega$

62 Measurement of Inductance can be done by ?

63 Maxwell's Inductance capacitance bridge is used for measurement of inductance of

64 Which one of the following bridges is used to measure Q > 10

65 Which one of the following bridges is used to measure self inductance of very low Q-coils.

66 Which one of the following bridges are used to measure capacitance

67 Frequency measuring bridge is
[a] Wein's [b] owen's [c] schering [d] Anderson's

68 Hay bridge is modification of

UNIT 4 Measurement of power & energy

69 Which instrument is best suitable for power measurement

70 Fixed coil is also called ?

71 Moving coil is also called ?

72 Fixed coils are connected in ____ with the load.

73 Moving coils are connected ____ the load.

74 Which type of damping is used in Wattmeters.

75 Spring is used to provide which torque ?

76 Output power of wattmeter is

[a] proportional to V only
[b] " ____ I only
[c] " ____ VI only
[d] " ____ VI cos ϕ

77 In an electro-dynamometer type Wattmeter

1. Control torque is provided by spring
2. eddy current damping is used.
3. Fixed coil is iron-cored
4. Moving coil is air-cored
5. The pressure coil should be highly inductive

Which of the above statements are true ?

78 Active power measured by wattmeter is
[a] $VI\cos\phi$ [b] $VI\sin\phi$ [c] $VI\tan\phi$ [d] $VI\cot\phi$

79 For measurement of power in n wire system, minimum number of wattmeters required to measure power is
[a] n [b] n+1 [c] n-1 [d] n^2

80 In 3 wire star circuit system power measured by 2-wattmeters method is

81 Power factor of the above ckt system is
(a) $\tan^{-1}\left[\frac{\sqrt{3}[W_1-W_2]}{W_1+W_2}\right]$ [b] $\tan^{-1}\frac{\sqrt{3}[W_1+W_2]}{W_1-W_2}$
[c] $\cos\tan^{-1}\left[\frac{\sqrt{3}(W_1-W_2)}{W_1+W_2}\right]$ [d] $\cos\tan^{-1}\left[\frac{\sqrt{3}[W_1-W_2]}{W_1+W_2}\right]$

82 When P.F. angle $= 60^\circ$, then by two wattmeter method is
[a] then only one wattmeter reads full power
[b] both meters measure equal power
[c] Both measure +ve power
[d] " ——— -ve power

83 When one of the wattmeter shows -ve deflection, then range of power factor is from
(a) 0 to 0.5 (b) 0.5 to 1 (c) 0.3 to 0.6
[d] 0.2 to 1

84 If both meters in two wattmeter method show equal reading then it indicates
[a] $\cos\phi = 0$ [b] $\cos\phi = 1$ [c] $\cos\phi = 0.5$
[d] $\cos\phi = 0.866$

85 Energy is $\int_0^t x\,dt$. where x is ?

86 Which of the following instrument is integrating type of instrument ?

87 For A.C circuit Energy is measured in ?

88 For DC circuit, energy is measured in terms of ?

89 Energy meters works on the principle of
[1] Induction [2] Heating effect
[3] Electric effect [4] None

90 Total number of revolution made by the disc is proportional to the energy consumed by load over a ?
[a] rated voltage [b] time period
[c] rated current [d] fixed frequency

91 Creeping is phenomenon associated with energy meter which is
[a] phenomenon which causes breaking of disc revolution
[b] Continuous rotation of disc when pressure coil is energized and no current flows through current coil.

[c] Incorrect magnitude of fluxes due to abnormal values of current and voltage in series coil & potential coil respectively

[d] Incorrect phase angle

92 In an induction type of meter, maximum torque is obtained when the phase angle between the two fluxes is

(a) 0° (b) 45° (c) 60° (d) 90°

93 The meter constant of single phase energy meter is expressed in terms of

94 If voltage supply to the energy meter is more than the rated value, energy meter will run

(a) Slow (b) Fast (c) Either of above
(d) Now

95 Which meter has the best accuracy

96 Energy meter creeps

(a) due to change in supply
(b) due to reversal in polarity of voltage
(c) due to asymmetry in magnetic circuit
(d) due to turn ratio of transformer

97 How is the flux of shunt coil related to voltage?

98 In some energy meters, creeping can be avoided by

(a) attaching small gold pieces
(b) attaching small alluminium pieces
(c) attaching small iron pieces
(d) " —— zinc pieces.