



# **POSTAL BOOK PACKAGE 2026**

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## **ELECTRONICS ENGINEERING**

### **Objective Practice Sets**

## **Electronic Measurements and Instrumentation**

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## Introduction

**Q.1** The difference between the indicated value and the true value of a quantity is

- (a) Gross error      (b) Absolute error  
(c) Dynamic error    (d) Relative error

**Q.2** Consider the following statements regarding "precision" of an instrument:

1. Precision is a measure of the degree of agreement within a group of measurements.
2. Precision is necessary, but not sufficient condition for accuracy.

Which of the above statements is/are correct?

- (a) 1 only                      (b) 2 only  
(c) Both 1 and 2          (d) Neither 1 nor 2

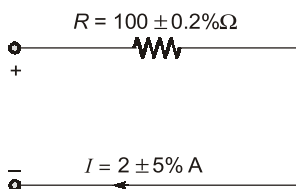
**Q.3** A 0 to 200 V voltmeter has a guaranteed accuracy of 1% of full scale reading. The voltage measured by this instrument is 50 V. What is the limiting error?

- (a) 4%                      (b) 2%  
(c) 1%                      (d) 0.25%

**Q.4** Two meters X and Y require 40 mA and 50 mA, respectively, to give full-scale deflection, then

- (a) sensitivity can not be judged with given information.  
(b) both are equally sensitive.  
(c) X is more sensitive.  
(d) Y is more sensitive.

**Q.5** In the circuit given in the figure, the limiting error in the power dissipation ' $I^2 R$ ' across the resistor  $R$  is



- (a) 1.2%                      (b) 5.2%  
(c) 10.2%                      (d) 25.2%

**Q.6** The dead zone in a pyrometer is 0.125% of span. The instrument is calibrated from 500°C to 2000°C. What temperature range must occur before it can be detected in degree centigrade \_\_\_\_\_.

**Q.7** A voltmeter reading 70 V on its 100 V range and an ammeter reading of 80 mA on its 150 mA range are used to determine power dissipation in a resistor. Both these instruments are guaranteed to be accurate within  $\pm 2\%$  at full scale deflection. The limiting error (in percentage) in power measurement is \_\_\_\_\_.  
(Answer upto one decimal place)

**Q.8** A first order instrument is characterized by

- (a) Time constant only  
(b) Static sensitivity and time constant  
(c) Static sensitivity and damping coefficient  
(d) Static sensitivity and time constant and natural frequency of oscillations

**Q.9** A resistance of  $108 \Omega$  is specified using significant figures as indicated below:

1.  $108 \Omega$
2.  $108.0 \Omega$
3.  $0.000108 \text{ M}\Omega$

Among these:

- (a) 1 represents greater precision than 2 and 3  
(b) 2 represents greater precision but 1 and 3 represents same precision  
(c) 2 and 3 represent greater precision than 1  
(d) 1, 2 and 3 represent the same precision

**Q.10** Match **List-I** (Accuracy) with **List-II** (Type of the standard) and select the correct answer:

List-I	List-II
A. Least accurate	1. Primary
B. More accurate	2. Secondary
C. Much more accurate	3. Working
D. Highest possible accurate	4. International

**Codes:**

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

**Q.11 Assertion (A):** Random errors can be minimized by statistical methods.

**Reason (R):** These are caused by arithmetic error while taking readings.

- (a) Both A and R are true and R is the correct explanation of A.  
 (b) Both A and R are true but R is NOT the correct explanation of A.  
 (c) A is true but R is false.  
 (d) A is false but R is true.

**Q.12** The following is not essential for the working of an indicating instrument

- (a) deflecting torque (b) braking torque  
 (c) damping torque (d) controlling torques

**Q.13 Assertion (A):** Damping torque is used to bring the pointer to the zero initial position if there is not deflecting torque.

**Reason (R):** Eddy current damping is preferred for the applications requiring high magnetic field.

- (a) Both A and R are true and R is the correct explanation of A.  
 (b) Both A and R are true but R is NOT the correct explanation of A.  
 (c) A is true but R is false.  
 (d) A is false but R is true.

**Q.14** Which one of the following is the definition of the dead zone of an instrument?

- (a) The time required by an instrument to warm up initially.  
 (b) The largest change of input quantity for which there is no output of the instrument.  
 (c) The time required by the instrument to begin to respond to a change in the measurement.  
 (d) The unmeasured quantity which exceeds the maximum range of the instrument.

**Q.15** During measurement in a college laboratory, nine different set of readings were observed. The standard deviation and variance can be calculated respectively using:

$$(a) \sqrt{\frac{\sum d^2}{9}}, \frac{\sum d^2}{9} \quad (b) \sqrt{\frac{\sum d^2}{8}}, \frac{\sum d^2}{9}$$

$$(c) \sqrt{\frac{\sum d^2}{8}}, \frac{\sum d^2}{8} \quad (d) \sqrt{\frac{\sum d^2}{9}}, \frac{\sum |d|}{9}$$

**Q.16** Consider the following:

- Human errors
- Improper application of instruments
- Error due to worn parts of an instrument
- Errors due to effects of environment

Which of the above come under the type of systematic errors?

- (a) 1, 2 and 3 (b) 2, 3 and 4  
 (c) 2 and 3 (d) 1, 2 and 4

**Q.17** Four ammeters M1, M2, M3 and M4 with following specifications are available (Full scale accuracy values as a percent of full scale).  $M_1 = 20 \pm 0.1$ ,  $M_2 = 10 \pm 0.2$ ,  $M_3 = 5 \pm 0.5$  and  $M_4 = 1 \pm 1$ . A current of 1 A is to be measured to obtain minimum error in the reading which meter should be chosen.

- (a)  $M_1$  (b)  $M_2$   
 (c)  $M_3$  (d)  $M_4$

**Q.18** The following measurement are obtained on a single-phase load:  $V = 220 \text{ V} \pm 2\%$ ,  $I = 10 \text{ A} \pm 1\%$  and  $P = 500 \text{ W} \pm 2\%$ . If the power factor is calculated using these measurements, the worst case error in the calculated power factor in percentage is \_\_\_\_ (Answer upto 1 decimal place)

**Q.19** A utility type voltmeter with an accuracy of  $\pm 3\%$  of full scale (at  $25^\circ\text{C}$ ) is used on 300 V scale to measure 230 V.

- (a) What is the possible percentage limiting error?  
 (b) What range will the actual voltage fall within if the instrument reads 200 V?  
 (a) 3.9%, 196-204 V (b) 3.9%, 191-209 V  
 (c) 7.6%, 221-239 V (d) 7.6%, 195-204.5 V

**Q.20** Which one of the following is the most stable frequency primary atomic standard for frequency?

- (a) Caesium beam standard  
 (b) Hydrogen maser standard  
 (c) Rubidium vapour standard  
 (d) Quartz crystal standard

**Q.31** Consider the following properties of any measurement system:

1. Fidelity
2. Reproducibility
3. Lag
4. Dead zone

Which of these are both dynamic and undesirable characteristics of a measurement system?

- (a) 1 and 3 both
- (b) 3 only
- (c) 3 and 4 both
- (d) 2, 3 and 4

**Q.32** A 4 dial decade box has

Decade a of  $10 \times 1000 \Omega \pm 0.2\%$

Decade b of  $10 \times 100 \Omega \pm 0.1\%$

Decade c of  $10 \times 10 \Omega \pm 0.5\%$

Decade d of  $10 \times 1 \Omega \pm 2\%$

It the setting is at  $8172 \Omega$ . Then range of resistance value is

- (a)  $(8165.5 \text{ to } 8178.5) \Omega$
- (b)  $(8159.5 \text{ to } 8184.5) \Omega$
- (c)  $(8155.5 \text{ to } 8188.5) \Omega$
- (d) None of these

■■■■

Answers		Introduction							
1. (b)	2. (c)	3. (a)	4. (c)	5. (c)	6. (1.875)	7. (6.6)	8. (b)	9. (b)	
10. (c)	11. (c)	12. (b)	13. (c)	14. (b)	15. (c)	16. (b)	17. (d)	18. (5)	
19. (b)	20. (a)	21. (b)	22. (a)	23. (1)	24. (1.956)	25. (b)	26. (b)	27. (d)	
28. (b)	29. (a)	30. (c)	31. (b)	32. (c)					

Explanations		Introduction							
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- 1. (b)**
- Absolute error = Measured/Indicating value – True value
  - Relative error =  $\frac{\text{Measured value} - \text{True value}}{\text{True value}}$

- 2. (c)**
- Precision is a measure of reproducibility of measurements i.e. for a fixed value of variable, it is the measure of the degree to which successive measurements differ from one another.
  - Precision is not sufficient condition for accuracy since precision of an instrument does not guarantee of the accuracy of the instrument.
  - Precision is not the guarantee of accuracy.

- 3. (a)**
- Given, full scale reading = 200 V
- Magnitude of limiting error of instrument is
- $$= \frac{1}{100} \times 200 = 2 \text{ V}$$
- $\therefore$  Relative limiting error =  $\frac{2}{50} \times 100 = 4\%$

- 4. (c)**
- Sensitivity  $\propto \frac{1}{\text{Deflection factor}}$
  - Static sensitivity =  $\frac{1}{I_{FSD}}$
- Here X have lower  $I_{FSD}$  and hence X is more sensitive meter.

- 5. (c)**
- $$P = I^2 R$$
- Limiting error is given as,
- $$\frac{dP}{P} \% = 2 \frac{dI}{I} \% + \frac{dR}{R} \%$$
- $$= 2 \times 5\% + 0.2\% = 10.2\%$$

- 6. Sol.**
- Span =  $2000^\circ\text{C} - 500^\circ\text{C}$
- $= 1500^\circ\text{C}$
- $\therefore$  Temperature change
- $$= \frac{0.125}{100} \times 1500$$
- $$= 1.875^\circ\text{C}$$