

QUESTION BANK

1. Damping torque in the disc of an a.c. energy meter is provided by which one of the following?
 - (a) Electrostatic effect
 - (b) Magnetic effect
 - (c) Eddy current effect
 - (d) Chemical effect
2. **Assertion (A):** Any indicating instrument should have a damping torque.
Reason (R): Without a damping torque, the pointer takes more settling time.
 - (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 a correct explanation of A
 - (c) A is true but R is false
 - (d) A is false but R is true
3. **Assertion (A):** The needle of an indicating instrument attains a position where deflecting and control torque acting on the moving system are equal and opposite.
Reason (R): The oscillations of the needle are suppressed by the damping mechanism.
 - (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 a correct explanation of A
 - (c) A is true but R is false
 - (d) A is false but R is true
4. Match List-I with List-II and select the correct answer using the codes given below the lists:

List-I	List-II
A. Former	1. Produces deflecting torque
B. Coil	2. Provides base for the coil
C. Core	3. Makes the magnetic field radial
D. Springs	4. Provides controlling torque

Codes:

A	B	C	D
(a) 1	2	3	4
(b) 1	2	4	3
(c) 2	1	3	4
(d) 2	1	4	3
5. Poynting vector wattmeter uses
 - (a) Seeback effect
 - (b) Ferranti effect
 - (c) Induction effect
 - (d) Hall effect
6. Which one of the following statements is correct? Spiral springs are used in instruments is correct
 - (a) provide controlling torque
 - (b) provide damping torque
 - (c) lead the current to moving coil as well as to provide the controlling torque
 - (d) provide linear deflection
7. Which one of the following decides the time of response of an indicating instrument?
 - (a) Deflecting system
 - (b) Controlling system
 - (c) Damping system
 - (d) Pivot and jewel bearings
8. Torque/Weight ratio of an instrument indicates
 - (a) Selectivity
 - (b) Accuracy
 - (c) Fidelity
 - (d) Sensitivity
9. An indicating instrument is more sensitive if its torque to weight ratio is
 - (a) much larger than unity
 - (b) of the order of unity
 - (c) much less than unity
 - (d) made selection dependent
10. In eddy current damping systems, the disc employed should be of
 - (a) conducting and magnetic material
 - (b) conducting but non-magnetic material
 - (c) magnetic but non-conducting material
 - (d) non-conducting and non-magnetic material
11. Match List-I (Type of instrument) with List-II (Suitability for measurement) and select the correct answer using the codes given below the lists:

List-I	List-II
A. Moving iron	1. ac/dc voltage only
B. Electrodynamic	2. ac/dc voltage/current only

- C. Induction
D. Electrostatic
3. ac voltage/current/
power
4. ac/dc voltage/
current/power only
5. dc voltage/current
only

Codes:

A	B	C	D
(a) 2	4	3	1
(b) 2	4	1	3
(c) 1	2	3	5
(d) 1	2	5	3

12. Damping is provided in an instruments for
(a) increasing the range
(b) reducing the settling time
(c) increasing the speed of response
(d) none of the above
13. An example of integrating type instrument is:
(a) moving-iron voltmeter
(b) permanent magnet moving-coil ammeter
(c) Watt-hour meter
(d) electrostatic voltmeter
14. In a measuring instrument where the permanent magnet forms part of the operating system, the most efficient form of damping used is:
(a) Air friction damping
(b) Fluid friction damping
(c) Eddy current damping
(d) None of the above
15. As compared to indirect methods of electrical measurement, the direct methods are
(a) always feasible and practicable
(b) inaccurate & less sensitive
(c) preferred & mostly used
(d) used by measurement systems for measurement purposes
16. At a steady deflected position of an indicating instrument, the moving system is subjected to:
(a) deflecting and controlling torque
(b) deflecting torque only
(c) damping and controlling torque
(d) deflecting, controlling and damping torque

17. Eddy current damping is mostly used in
(a) energy meters
(b) moving iron measuring instruments
(c) induction type measuring instruments
(d) permanent magnet moving coil measuring instruments
18. The instruments having their uses merely confined within standardizing laboratories are:
(a) indicating type (b) recording type
(c) integrating type (d) absolute type
19. In an indicating type of instrument the pointer returns to its zero position on removing the source producing the deflecting torque. This happens due to:
(a) Damping torque (b) controlling torque
(c) Balancing torque (d) Mass of pointer
20. In an indicating instrument, the control torque is necessary for:
(a) accurate measurement
(b) steady deflection
(c) damping
(d) to deflect the moving system
21. Magnetic shielding of the working parts of an instrument is obtained by providing
(a) glass cover
(b) wooden case for meters
(c) antimagnetic substances
(d) covering case of cast iron
22. Match List-I (Name of instrument) with List-II (Classification) and select the correct answer using the code given below the lists:

List-I

List-II

- | | |
|----------------------------|----------------|
| A. Ohmmeter | 1. Absolute |
| B. Watt hour meter | 2. Indicating |
| C. Null balance recorders | 3. Recording |
| D. Raleigh current balance | 4. Integrating |

Codes:

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



ANSWERS AND EXPLANATIONS

1. **Ans.(c)**
AC energy meter is induction type instrument. The damping torque in induction type instruments is provided by the eddy currents produced in the rotating disc.
2. **Ans.(a)**
Damping torque reduces the oscillations in the pointer of the indicating instruments. If damping torque is zero the pointer would take more time to settle down. Thus both A and R are true and R is the correct explanation of A.
3. **Ans.(b)**
(I) The needle of an indicating instrument attains a position where deflecting and control torques acting on the moving system are equal and opposite. Thus the assertion is true
(II) The oscillations of the needle are suppressed by the damping mechanism. Thus the reason is true.
Therefore, both A and R are true but R is not a correct explanation of A
4. **Ans.(c)**
In indicating instruments,
A. Metal former used for damping provides base for the coil.
B. Coil is part of moving system which produces deflecting torque.
C. Core makes the magnetic field radial.
D. Springs provides controlling torque.
5. **Ans.(d)**
Poynting vector wattmeter uses hall effect.
6. **Ans.(c)**
Spiral springs are used in instruments lead the current to moving coil as well as to provide the controlling torque.
7. **Ans.(c)**
Damping system decides the time response of an indicating instrument.
8. **Ans.(d)**
Torque/Weight ration of an instrument decides the sensitivity of an indicating instrument. It should be high for high sensitivity of the instrument.
9. **Ans.(b)**
An indicating instrument is more sensitive if its torque to weight ratio is of the order of unity.
10. **Ans.(b)**
The disc employed in eddy current damping systems should be of conducting but non-magnetic material. the disc is made up of aluminium.
11. **Ans.(a)**
A. Moving iron type instruments can be used for measurement of ac/dc voltage/current only
B. Electrodynamic type instruments can be used for measurement of ac/dc voltage/current/ power only
C. Induction type instruments can be used for measurement of ac voltage/current/power only
D. Electrostatic type instruments can be used for measurement of ac/dc voltage only.
12. **Ans.(b)**
Damping is provided in an instruments for reducing the settling time.
13. **Ans.(c)**
Watt-hour (i.e energy) meter and ampere-hour meter are examples of integrating type instrument.
14. **Ans.(c)**
The eddy current damping is most efficient form of damping where a metallic disc or a former and permanent magnet already form part of the operating system.
15. **Ans.(c)**
As compared to indirect methods of electrical measurement, the direct methods are preferred & mostly used because they are the most simple and inexpensive.
Note: Indirect methods (i.e. comparison methods) are used in cases where a higher accuracy is required.
16. **Ans.(a)**
At a steady deflected position of an indicating instrument, the moving system is subjected to

deflecting and controlling torque only. But under dynamic conditions indicating instrument is subjected to all deflecting, controlling and damping torques.

17. Ans.(c)

Eddy current damping is mostly used in hot wire, moving coil and induction type measuring instruments.

18. Ans.(d)

The instruments having their uses merely confined within standardizing laboratories are absolute type.

19. Ans.(b)

The instruments of controlling torque:

- (i) To produce a torque equal and opposite to the deflecting torque at the final steady position of pointer.
- (ii) To bring the pointer back to zero position when deflecting torque is reduced to zero.

Note: when control torque is zero, the pointer will shoot beyond the full scale deflection.

20. Ans.(b)

The functions of controlling torque:

- (i) To produce a torque equal and opposite to the deflecting torque at the final steady position of pointer.
- (ii) To bring the pointer back to zero position when deflecting torque is reduced to zero.

21. Ans.(d)

Magnetic shielding of the working parts of an instrument is obtained by providing covering case of magnetic material having high permeability such as cast iron. This shunts external magnetic fields around the instrument and minimizes their effects on the deflection of pointer.

22. Ans.(b)

- A. Ohmmeter is an indicating type of instrument.
- B. Watt hour meter is on interacting type of instrument.
- C. Null balance recorders is a recording type of instrument.
- D. Raleigh current balance is absolute measuring instrument.

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