Assignment 1

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

1) Which of the following instruments measure average value of the unknown current.

   a. PMMC
   b. Electrodynamic
   c. Moving iron instrument

   No, the answer is incorrect.
   Score: 0
   Accepted Answers: a.

2) Which of the following instruments measure r.m.s value of the unknown current.

   a. PMMC
   b. Electrodynamic
   c. Moving iron instrument

   No, the answer is incorrect.
   Score: 0
   Accepted Answers: b. c.

3) Which of the following instruments can measure AC currents (without any rectifier).

   a. PMMC
   b. Electrodynamic
   c. Moving iron instrument

   No, the answer is incorrect.
   Score: 0
   Accepted Answers: b. c.
4) Which of the following instruments can measure DC currents (ignoring error due to retentivity)
   a. PMMC
   b. Electrodynam
   c. Moving iron instrument

5) If current in the fixed coil and the moving coil of an electrodynam instrument are 5 mA and 4 mA, then 60° deflection is produced. If we connect the fixed and moving coil in series and pass 3 mA current through them, then what will be the deflection (in degree)

   [Please enter only the numeric value without any unit.]

   No, the answer is incorrect.
   Score: 0
   Accepted Answers:
   (Type: Range) 26.5, 27.5

6) If 0.01 Hz (very low frequency) current is passed through a PMMC instrument, then at what frequency the pointer will oscillate (in Hz)?

   [Please enter only the numeric value without any unit.]

   No, the answer is incorrect.
   Score: 0
   Accepted Answers:
   (Type: Numeric) 0.01

7) If 0.01 Hz (very low frequency) current is passed through a moving iron instrument, then at what frequency the pointer will oscillate (in Hz)?

   [Please enter only the numeric value without any unit.]

   No, the answer is incorrect.
   Score: 0
   Accepted Answers:
   (Type: Numeric) 0.02

8) The controlling torque in an PMMC instrument ideally depends on
   a. \( \theta \)
   b. \( \frac{d\theta}{dt} \)
   c. Input current

   No, the answer is incorrect.
   Score: 0
   Accepted Answers:
   a.

9) The eddy current damping torque in an PMMC instrument ideally depends on
   a. \( \theta \)
   b. \( \frac{d\theta}{dt} \)
   c. Input current

   No, the answer is incorrect.
   Score: 0
   Accepted Answers:
   a.
10) A PMMC instrument has 100 turns in its moving coil. The length of the coil is 1.25 cm and the width of the coil is 1 cm. The air gap flux density is 0.8 \( \text{Wb/m}^2 \). If the coil carries 5 mA current, then how much electromagnetic torque will be produced (in \( \mu \text{Nm} \))?

[Please enter only the numeric value without any unit.]

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 50

11) If the spring constant of the above PMMC meter (Question 10) is 0.5 \( \mu \text{Nm/degree} \), then how much deflection will be seen (in degree) when the coil is carrying 2 mA current?

[Please enter only the numeric value without any unit.]

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 40

12) How much is the sensitivity of the above (Question 11) PMMC meter (in degree/mA)?

[Please enter only the numeric value without any unit.]

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 20

13) In an electrodynamic ammeter, the mutual inductance between the fixed and the moving coil is found to vary (roughly) as 500 \( \sin \left( \theta - \frac{2\pi}{9} \right) \) \( \mu \text{H} \), where \( \theta \) denotes the deflection of the moving coil in radian. When a current of 200 mA is flowing through the meter, the deflection is found to be \( \theta = 100^\circ = \frac{5\pi}{9} \) radian. Find the spring constant of the meter (in \( \mu \text{Nm/degree} \)).

[Please enter only the numeric value without any unit.]

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 0.09,0.11

14) The capacitance of a simple electrostatic instrument increases from 80 pF to 95.7 pF, when the coil moves from 95° to 104°. The spring constant is 2 \( \mu \text{Nm/degree} \). When the instrument is used to measure an unknown voltage, the pointer moves to 100°. What is the value of the unknown voltage (in Volt)?

[Hint: Assume capacitance changes linearly/uniformly with deflection. Use \( \pi = 3.14 \)]

[Please enter only the numeric value without any unit.]

No, the answer is incorrect.
Score: 0
Accepted Answers:
15) Assume that for an moving iron instrument, the self-inductance of the coil increases uniformly by an amount of $2.51 \text{ mH}$ within $0^\circ$ to $90^\circ$. The controlling spring constant is $10 \mu\text{Nm/degree}$. If $1 \text{ A}$ current flows through the coil how much will be the deflection (in degree)?

[Please enter only the numeric value without any unit. Round the value to the nearest integer]

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 75,85

16) The inductance of a moving iron ammeter is given by the expression $L = (200 + 40\theta - 4\theta^2 - \theta^3) \mu\text{H}$, where $\theta$ is the deflection in radian from the zero position. It has a full scale deflection of $90^\circ$ at $1 \cdot 534 \text{ A}$. Estimate the spring constant of the pointer in $\mu\text{Nm/rad}$.

[Please enter only the numeric value without any unit.]

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 14,16

**Common Data for Question no. 17 to 23.**

17) A Galvanometer (PMMC Instrument) has the following parameters: The Galvanometer constant (Electro-magnetic Torque per unit coil current) $G = 1 \mu\text{Nm/mA}$. The friction and damping in the Galvanometer is negligibly small. The moment of inertia $J = 0.5 \mu\text{Kg m}^2$. The spring constant $K = 2 \mu\text{Nm/rad}$. The galvanometer was at rest at its zero position when a sudden and a very short duration current (an impulse current) flows through the coil. The impulse current stops immediately but setting the Galvanometer coil to oscillate. The total charge flown during the impulse current is $Q = 500 \mu\text{C}$.

[Please enter only the numeric value without any unit.]

How much will be the change in angular momentum (in $\text{gm cm}^2/\text{s}$)?

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 5

18) What will be the angular velocity of the coil immediately after the impulsive current (in rad/sec)?

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 1

19) How much will be the Kinetic energy of the coil system immediately after the impulse current (in nano-Joule)?

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 250
20) If the coil moves without any friction or damping then how much will be the potential energy stored in the spring at the moment when the spring is at maximum deflection position (in nano-Joule)?

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 250

21) What will be the amplitude of oscillation or the maximum angle moved by the coil (in rad)?

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 0.4, 0.6

22) For the above mentioned Galvanometer, if in another similar experiment an unknown impulse current flows through the Galvanometer causing the galvanometer to oscillate with an amplitude of 1.5 radian, then how much charge is flown during the impulse current (in micro Coulomb)?

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 1500

23) How much is the (charge measurement) sensitivity of the above galvanometer (in radian/milli Coulomb)?

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 1

Common Data for Question no. 24 to 35.

24) A PMMC instrument has following parameters: Number of turns $N = 250$. The length of the coil is $L = 2$ cm and the diameter of the coil is $D = 2$ cm. The air gap flux density is $0.8 \ Wb/m^2$. The spring constant is $0.5 \ \mu Nm/degree$. The coil is wound on a Aluminium former. If the coil is rotating at an angular velocity of $5 \ \text{rad/sec}$, then

Estimate the linear velocity of the coil sides (in cm/sec).

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 5

25) Estimate the EMF induced in one side of the coil (only one conductor) or one side of the former (in mV).

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 800

26) Estimate the total EMF induced in the entire length of the copper coil (i.e. in both sides of all the turns) (in mV).

No, the answer is incorrect.
27) If the resistance of the coil is 60 \( \Omega \), the resistance of the external circuit to which the coil is connected is 40 \( \Omega \). How much eddy current will be produced in the coil (excluding the current due to any external source) (in mA)?

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 400

28) How much torque will be produced by the eddy current in the coil opposing the motion of the coil? (in \( \mu Nm \)).

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 320

29) Find the coefficient of damping (torque per unit angular velocity) due to the eddy current in the coil (in \( \mu Nm/(rad/sec) \)).

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 64

30) The damping coefficient due to eddy current damping in the coil depends on

1. The parameters of the instrument
2. Depends on the external circuit

No, the answer is incorrect.
Score: 0
Accepted Answers:
1.
2.

31) Estimate the total EMF induced in the entire FORMER (i.e. in both sides of the former) (in \( \mu V \)).

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 1600

32) If the resistance of the FORMER is 0.8 \( \Omega \), the resistance of the external circuit to which the coil is connected is 40 \( \Omega \). How much eddy current will be produced in the FORMER (in mA)?

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 2

33) How much torque will be produced by the eddy current in the FORMER opposing the motion of the coil? (in \( \mu Nm \)).

No, the answer is incorrect.
Score: 0
34) Find the coefficient of damping (torque per unit angular velocity) due to the eddy current in the FORMER (in $\mu Nm/(rad/sec)$).

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 0.5, 0.8

35) The damping coefficient due to eddy current damping in the FORMER depends on
1. The parameters of the instrument
2. Depends on the external circuit

- 1.
- 2.

No, the answer is incorrect.
Score: 0
Accepted Answers:
1.