

# CHAPTERS [(1) TO (5)]

**Read the questions carefully then answer according to the instructions given in each question:**

1. **Choose to answer (A) or (B): Write down the scientific concept:**

- A. The total work done to transfer a quantity of charge of 1 Coulomb inside and outside the battery.  
B. The reciprocal of the material resistivity.

2. **Choose to answer (A) or (B): Give reason for:**

- A. The frequency of gamma-rays photon decreases on colliding with a free electron in Compton Effect.  
B. The dominant color of light emitted from an incandescent lamp differs than that emitted by burning charcoal.

3. **Choose to answer (A) or (B): Choose the correct answer:**

- A. A coil of 500 turns is placed normally to a magnetic field. If the magnetic flux through the coil changes at a rate of 0.01 Wb/s, the emf induced in the coil equals:

(A) 5V (B) 0.7V (C) 0.5V (D) Zero

- B. In Faraday's Experiment for electro-magnetic induction, the induced emf in the coil increases when:

- (A) Keeping the magnet still inside the coil.  
(B) Speeding up the magnet motion relative to the coil.  
(C) Connecting a galvanometer to the coil.  
(D) Increasing the spacing between the coils turns.

4. **Choose the correct answer:**

Two capacitors have capacitance ( $C_1$  and  $C_2$ ) where ( $C_1 = 2C_2$ ). They are connected together in series to an AC supply. In this case, the charge on the plates of the capacitor ( $C_1$ ) is ..... that on the plates of the capacitor ( $C_2$ ).

- (A) double (B) equal to (C) a half of (D) a quarter of

5. **Mention ONE use for:** Fleming's right hand rule.

6. **Choose the correct answer:**

The ratio between the numbers of coils to the number of sections of the commutator cylinder in the DC generator equals ..... respectively.

- (A) 1:1 (B) 2:1 (C) 1:2 (D) 3:1

7. A galvanometer has coil resistance of 200  $\Omega$ . Its pointer deflects to full scale as a current of 10mA passes through its coil.

**First: Calculate** the maximum voltage measured by the galvanometer.

**Second: What** is the value of the multiplier resistance required to increase its scale range to 20V?

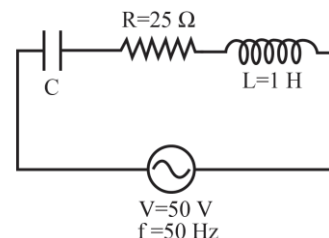
8. A step-down transformer of efficiency 80% and the number of turns of its primary coil is 4000 turns, connected to the end of A.C. power lines to step down the voltage from 3000 Volt to 120 Volt. If the electric power produced from the transformer is 15 KiloWatt. **Calculate:**

- 1) The number of turns of the secondary coil.  
2) The current intensity in each of primary and secondary coils.

9. In the electric circuit shown in figure, the value of current is 2A.

**First: Is** the circuit in a state of resonance?

**Second: Calculate** the capacitance of the capacitor (C). ( $\pi = 22/7$ )



10. **Choose to answer (A) or (B):**

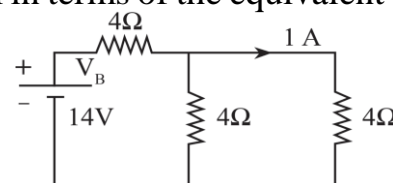
A. **Compare between:**

Connecting a number of identical resistors in series and in parallel in terms of the equivalent resistance.

B. **Choose the correct answer:**

In the given circuit, the internal resistance of the battery equals:

- (A) 0.5 $\Omega$  (B) 1 $\Omega$  (C) 2 $\Omega$  (D) 4 $\Omega$



# TRIAL EXAM (2)

## 11. Choose the correct answer:

An electron moves at velocity ( $v$ ) under the effect of potential difference ( $V$ ). If the potential difference applied to the electron is increased to ( $2V$ ), the electron velocity increases to:

- (A)  $2v$                       (B)  $\sqrt{2}v$                       (C)  $4v$                       (D)  $\frac{1}{2}v$

## 12. Define: Lenz's rule

## 13. Write down the mathematical formula represents the following:

The torque acting on a coil carrying an electric current whose plane is parallel to the direction of magnetic flux.

## 14. Choose the correct answer:

The emission of electrons from the metal surface (photoelectric effect) depends on .....

- (A) The intensity of the incident light.                      (B) The frequency of the incident light.  
(C) The exposure time.                      (D) The speed of light.

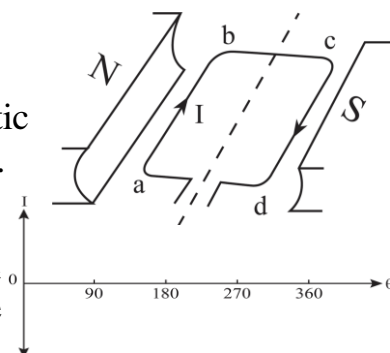
## 15. What is meant by? Ohm's law.

## 16. Choose to answer (A) or (B):

A. The diagram shows a simple electric motor:

**First: Name** the rule that can be used to determine the magnetic flux direction due to the flowing of current through the side ( $ab$ ).

**Second: Determine** the direction of the coil rotation.



B. In an AC dynamo, the two metal rings at the coil terminals are replaced by a commutator. **Plot** a curve to represent the generated current in this case. Then **define** the rectification.

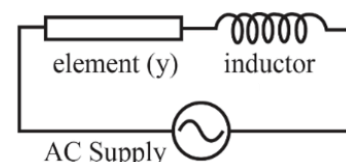
17. A series AC circuit consists of an inductive coil of ohmic resistance  $1000\Omega$  and inductive reactance  $2000\Omega$  is connected to a capacitor of capacitive reactance  $1000\Omega$  and an AC supply of frequency  $500/\pi$  Hz. **Calculate** the impedance of the circuit and the capacitance.

18. Solenoid carries an electric current. **What** would happen to the magnetic flux density at a point on its axis inside it when the spacing between its turns are reduced to half (keeping the cross-sectional area and the current intensity unchanged)?

## 19. Choose to answer (A) or (B): Choose the correct answer:

A. An inductive coil of negligible resistance is connected to an unknown element ( $y$ ) and an AC supply as shown. The total potential difference = The potential difference between the coil terminals + The potential difference between the terminals of ( $y$ ). This element is:

- (A) an ohmic resistance.                      (B) an inductive coil of negligible resistance.  
(C) a capacitor.                      (D) an inductive coil of ohmic resistance.



B. In AC circuit, an inductive coil of inductive reactance  $40\Omega$  and ohmic resistance  $30\Omega$  is connected to an AC supply of effective voltage  $60$  V. The dissipated power in the circuit equals:

- (A)  $43.2W$                       (B)  $51.4W$                       (C)  $72W$                       (D)  $120W$

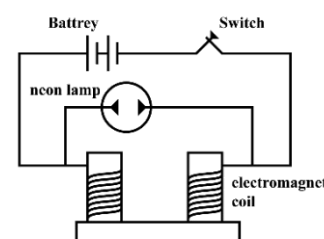
## 20. Choose to answer (A) or (B): Mention the physical quantity and ONE equivalent unit:

- A. Volt. meter<sup>2</sup>. Ohm<sup>-1</sup>                      B. Volt. Tesla.m/Ohm.

## 21. Choose to answer (A) or (B): What will happen when?

A. The motor coil rotates from the position being parallel to the magnetic flux till it reaches the perpendicular position to flux lines.

B. The electric circuit is switched off, which illustrated in front of you.



# CHAPTERS [(1) TO (5)]

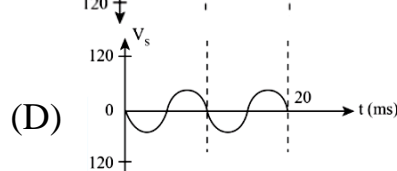
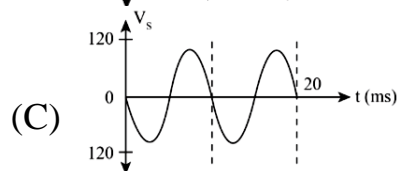
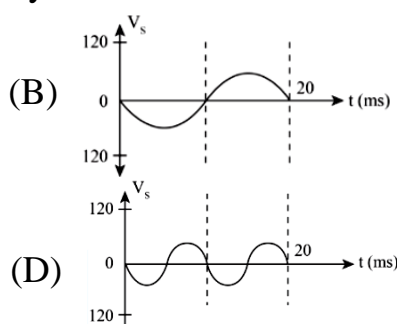
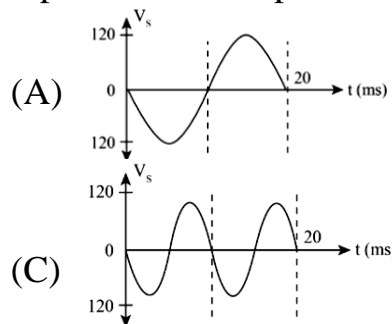
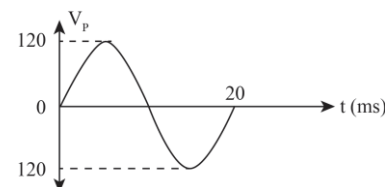
22. **Choose the correct answer:** Two parallel long straight wires, each of them carries an equal current ( $I$ ). The distance between the two wires is increased to double. In order to maintain the magnitude of the mutual force between them as its original value, the current intensity through each wire should be modified to be:

- (A)  $I/\sqrt{2}$  (B)  $I\sqrt{2}$  (C)  $2I$  (D)  $4I$

23. **Give reason for:** The coils of the electric transformer are made up of metallic wires having as low ohmic resistance as possible.

24. **Choose the correct answer:**

The graph represents the relation between the input voltage ( $V_P$ ) versus time ( $t$ ) in a step-down transformer. So, the curve that represents the output voltage in the secondary coil is:



25. A battery of e.m.f. 8 Volt and internal resistance 1 Ohm is connected to a straight wire of length 10cm, cross-sectional area  $3 \times 10^{-8} \text{ m}^2$  and its resistivity  $4.5 \times 10^{-6} \Omega \cdot \text{m}$ . Calculate the magnetic flux density at a point, which lies at normal distance of 20cm away from the center of the wire ( $\mu = 4\pi \times 10^{-7} \text{ Wb/Amp} \cdot \text{m}$ ).

26. **Prove that** the force which a light beam of power ( $P_w$ ) applies to the reflecting surface is given by:  $F = \frac{2P_w}{c}$

27. For the electric circuit shown in the figure, calculate the current intensity ( $I_2$ ).

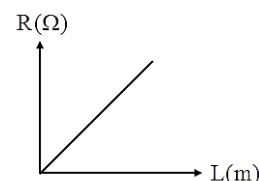
28. **Choose to answer (A) or (B): Mention the role of:**

- A. The soft iron cylinder in the moving coil galvanometer.  
B. The shunt resistance in the ammeter.

29. **Mention the factors affecting on:** Resistance at constant temperature.

30. **What is meant by?** Inductive reactance.

31. **Find the slope of the following graph:**



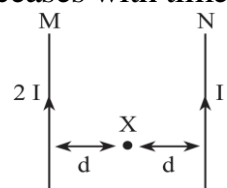
32. **Choose the correct answer:** If the emf of a cell equals 8 Volt, its terminal voltage when a current is flowing from the battery through its circuit is .....

- (A) 8 Volt (B) less than 8 Volt (C) greater than 8 Volt (D) none of the previous

33. **Give reason for:** The value of the alternating current in the oscillating circuit ceases with time.

34. **Choose to answer (A) or (B):**

- A. The diagram shows two long parallel wires (M and N) through which electric currents ( $2I$  and  $I$ ) pass respectively. What change should be done to the position of the wire (M) in order to make the magnetic flux density at the point (X) vanish?



- B. A circular coil is connected to a battery of negligible internal resistance. If a half of the coil turns is removed away and the remainder half is reconnected to the same battery, what change has happened to the density of magnetic flux at its center?

# TRIAL EXAM (2)

35. The table below records the values of the electromotive force generated in a dynamo coil and sine the angle between the normal to the coil plane and the direction of the magnetic flux.

Emf induced (Volts)	0	20	40	60	80	100
$\sin\theta$	0	0.1	0.2	0.3	0.4	0.5

**First:** Plot the graph that represents these data where the electromotive force is on the vertical axis and sine the angle on the horizontal axis.

**Second:** From the graph, find the maximum electromotive force generated in the dynamo.

36. **Answer the following:**

1) **Choose the correct answer:**

When a coil rotates in a magnetic field the direction of the induced electromotive force produced in the coil is changed each ..... cycle.

- (A) 0.25 (B) 0.5 (C) 0.75 (D) 1

2) **Mention the scientific term:** 0.7 Volt is the electromotive force induced in the coil when the current passing through it changes at a rate equals one ampere per second.

37. **Choose to answer (A) or (B): Compare between:**

A. The shunt and the multiplier resistances from the point of view of its connection to the coil of the galvanometer.

B. Digital measuring instruments and analog measuring instruments in terms of the way they display the value of the measured quantity.

38. **Give reason for:** When the area of wire increases its resistance decreases.

39. **Define:** Electric power.

40. **Choose the correct answer:**

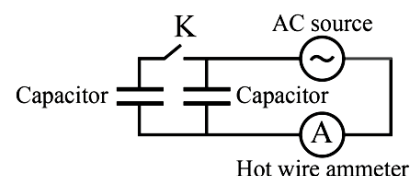
If the resistance of the coil of a galvanometer is (R) so the shunt resistance which reduces its sensitivity to (1/4) of its original value is .....

- (A) R/4 (B) R/3 (C) R/2 (D) R

41. **When the following value = max?** Current passing in ohmmeter.

42. **What** would happen to the reading of the hot wire ammeter when the switch (K) is closed?

- (A) Increase. (B) Decrease.  
(C) Become zero (D) Not change.



43. **Choose to answer (A) or (B):**

A. **Answer the following:**

1) **Mention ONE** role of the cathode in the photoelectric cell.

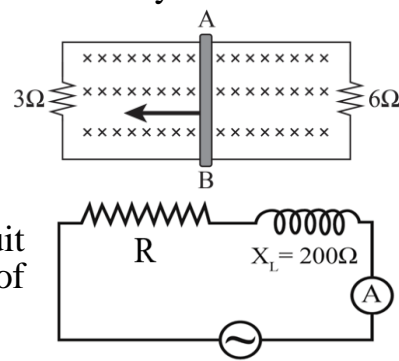
2) Blue light falls on a metal surface and photoelectrons are freed out. **What** is the effect of allowing ultra-violet rays having the same intensity to fall on the same surface?

B. **Answer the following:**

1) Blue light falls on a metal surface and photoelectrons are freed out. **What** is the effect of increasing the intensity of the incident blue light on the same surface?

2) **Mention ONE** role of the electric or magnetic fields in the cathode ray tube.

44. The figure shows a metal rod (AB) of length 0.2m is moving at a uniform velocity 8m/s perpendicular to a magnetic field of flux density 2.5T whose direction is inward perpendicular to the paper plane. **Calculate** the intensity of the current in the resistance  $6\Omega$  (neglecting the rod resistance).



45. **What happens to** the reading of the hot - ammeter in the circuit shown in figure when the coil is replaced by a resistance wire of  $200\Omega$ ? **Explain** the reason.