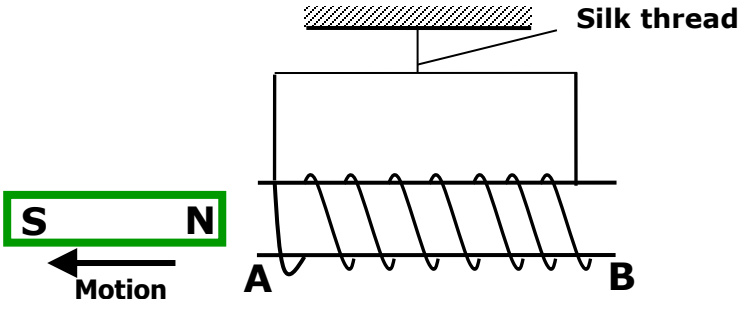
FORM 4 PHYSICS
APRIL HOLIDAY ASSIGNMENT - 2024

1.State Faraday's law of Electromagnetic induction.

2.State Lenz's law of electromagnetic induction. (2mks)

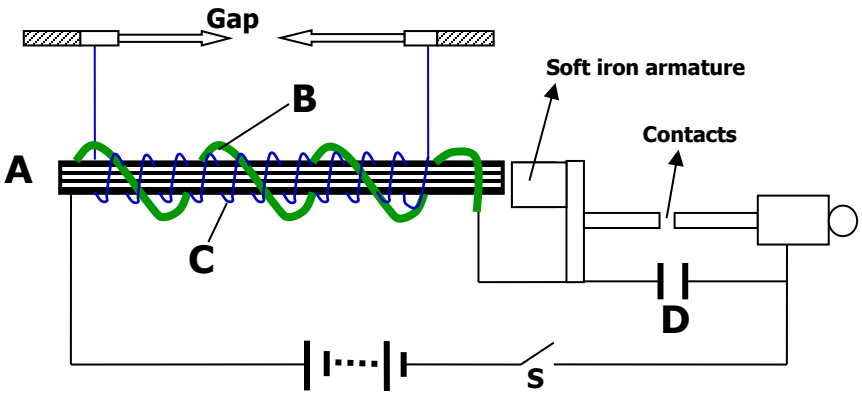
3.Define the volt. (1mk)

4.Figure below shows a rigid circuit ABCD suspended by a silk thread from a support. The coil AB is made of copper.



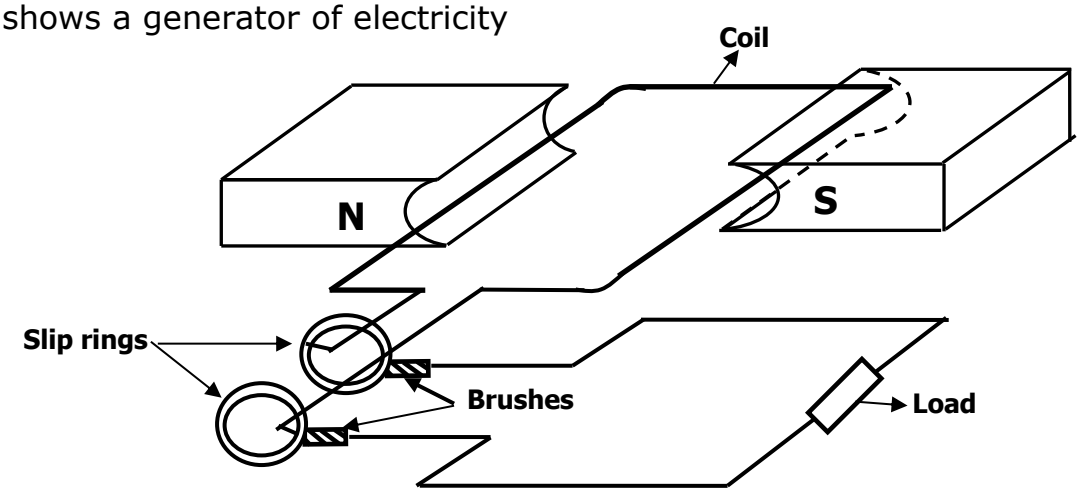
The magnet near A is suddenly pulled to the left. State and explain the observation on the circuit. (2mks)

5.Fig shows an induction coil.



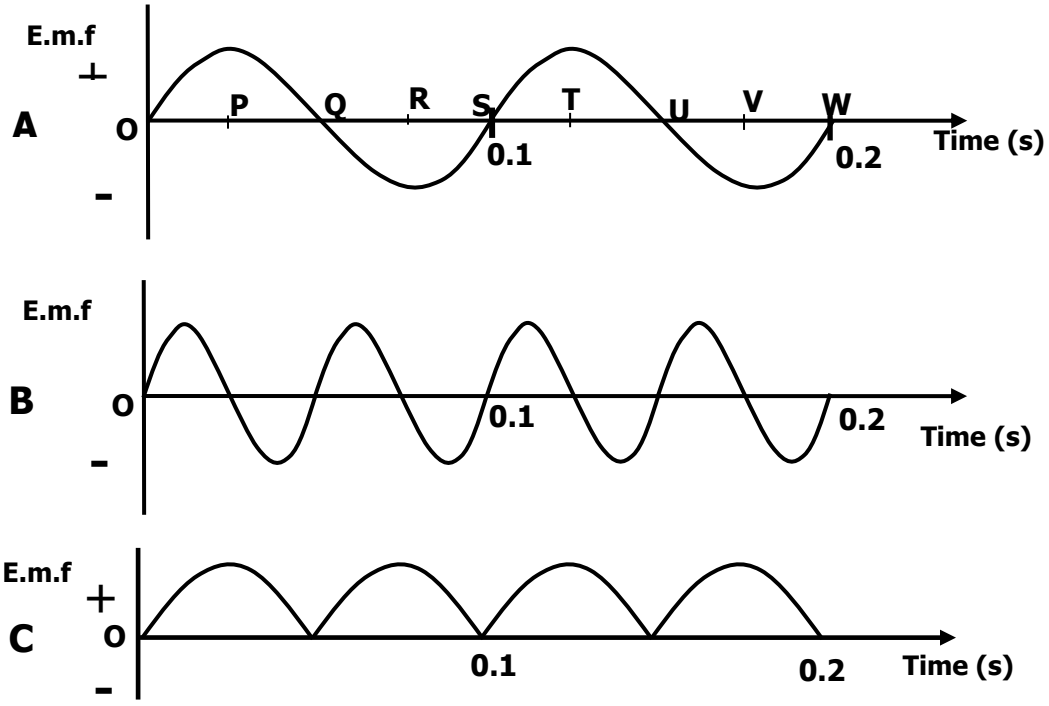
i) Name the parts labelled A, B, C and D. (2mk)
ii) Briefly explain what happens from the time the switch'**s**' is closed onwards. (4mk)
iii) State the purpose of the part labelled D in the circuit. (1mk)

6.Figures shows a generator of electricity



The coil rotates at a steady speed of 60 turns rotations per minute. An oscilloscope is connected a cross the load and adjusted to get on the screen a trace for one rotation of the coil. Sketch the trace for one rotation starting and finishing in the same position of the coil as shown in the figure. (3mk)

7.Graph A below shows how the e.m.f produced by a simple dynamo varies with time. Graphs Band C show how the e.m.f produced by the same dynamo varies with time after certain alterations and modifications have been made



(i) What is the frequency of the alternating e.m.f as shown by graph A? (2 marks)

(ii) Which letters on graph A correspond to the plane of the coil of the dynamo being parallel to the magnetic field? (1 mark)

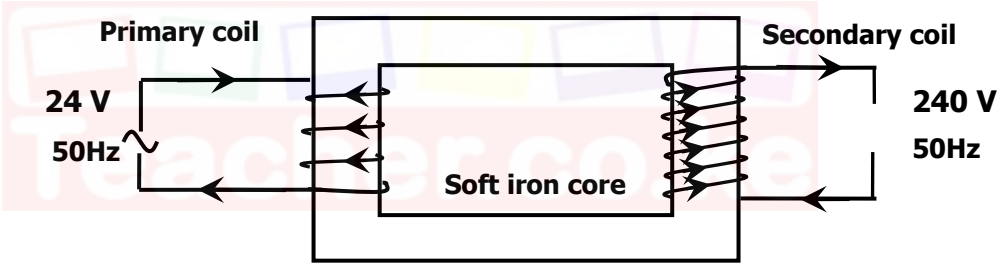
(iii) Explain why the e.m.f at Q is zero (3 marks)

(iv) What alterations has been made for the dynamo to produce the e.m.f represented by graph B? (1 mark)

(v) What modification has been made to the dynamo for it to produce the e.m.f represented by graph C? (1 mark)

(vi) A dynamo is driven by a 5kg mass which falls at a steady speed of 0.8m/s. the current produced is supplied to a 12W lamp which glows with normal brightness. Calculate the efficiency of this arrangement (2 marks)

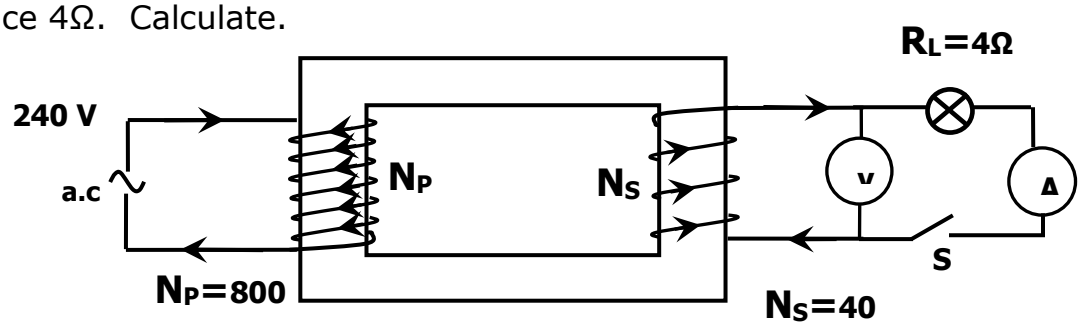
8.Figure below shows a single phase demonstration transformer intended to converted 24V, 50Hz as AC supply to 240V, 50Hz



(i)What is the purpose of the soft iron core? (1mk)

(ii)If the primary core has 50 turns of coil, how many turns of coils should the secondary have? (2mks)

9.The circuit below shows a step-down transformer used to light a lamp of resistance 4Ω. Calculate.



i)The reading of voltmeter, V, with ,S, open. (2mks)

ii)The reading of the ammeter A with S closed (neglect the effective resistance of the secondary winding)
(2mks)
iii)The power dissipated in the lamp. (2mks)
iv)The primary current if the transformer is 90% efficient. (3mks)

10.A hydro-electric power station produces 500KW at a voltage of 10KV. The voltage is then stepped up to 150KV and the power is transmitted through cables of resistance 200Ω to a step down transformer in a sub-station. Assuming that both transformers are 100% efficient. Calculate;
(i) The current produced by the generator (2mks)
(ii) The current that flows through the transmission cables (2mks)
(iii) The voltage drop across the transmission cables (2mks)
(iv) The power loss during transmission (2mks)
(v) The power that reaches the sub-station (2mk)

11.A transformer is designed to supply a current of 12A at a p.d. of 80V. The inlet cable is to be connected to an a.c. mains of 240V. The efficiency of this transformer is 80%. Calculate:
(i)Current in the primary coil of the transformer (2mks)
(ii)The power supplied to the transformer (3mks)
(iii)Explain how energy losses in a transformer are reduced by having a soft iron core. (2mk

12.A transformer has 10,000 turns on its secondary coil and 100 turns on its primary coil. An alternating current 5.0A flows in the primary circuit when it is connected to a 12v a.c supply.
i) State the type of transformer (1mk)
ii) Calculate the power input to the transformer (3mk
iii) Calculate the E.M.F across the secondary coil. (3mk)
iv) Determine the maximum current that could flow in a circuit connected to the secondary coil if the
v) In transmitting power why is it necessary to step it up before transmission