2024 SHS2 END OF SEMESTER EXAMS – APPLIED ELECTRICITY 1

APPLIED ELECTRICITY

PAPER 1

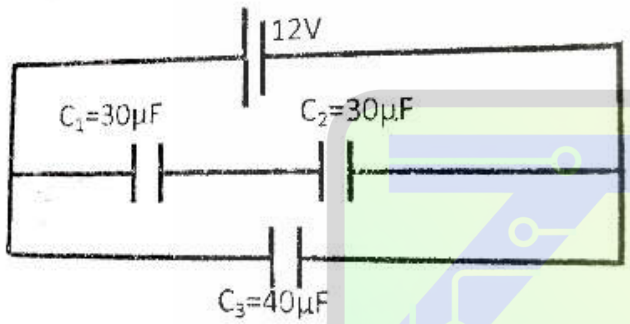
SECTION A

Answer **all** *questions in this session*

1. Permanent magnets are used in

   A. loudspeakers B. relays C. electric bells D. electric fans

   The figure below is a configuration of capacitors in a circuit. Use it to answer questions 2, 3, and 4.



2. The equivalent capacitance of the two capacitors in series in the figure is?

   A. 15μF B. 30μF C. 60μF D. 100μF

3. What is the charge on the 40μF capacitor in the circuit?

   A. 3.0×10^5 C B. 4.8×10^2 C C. 4.8×10^{-4} C D. 3.3×10^{-6} C

4. The voltage across C_2 is

   A. 24V B. 12V C. 9V D. 6V

5. The ability of a material to allow magnetic field to pass through it is known as

   A. Permeability B. conductivity C. permittivity D. retentivity

6. Soft iron magnetic materials include

   A. Mumetal B. ticonal C. alcomex D. alnico

7. Hard magnetic materials include

   A. Silicon steel B. cast steel C. mumetal D. ticonal

   Use the statement below to answer questions 8 and 9.

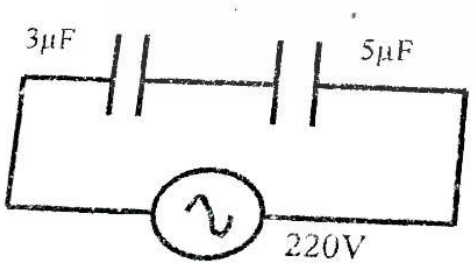
   The direction of induced current is such that the magnetic field resulting from the induced current opposes the change in the flow (or flux) that causes the induced current.

8. The statement is

   A. Lenz's law B. Faraday's law C. Ohm's law D. Kirchhoff's law

9. The statement is used to determine the
   A. Magnitude of current flow
   B. Polarity of induced e.m.f
   C. Magnitude of induced e.m.f
   D. Polarity of applied voltage
10. The unit of permittivity is
   A. Farad per meter B. Farad C. coulomb per meter D. coulomb
11. Which of these does not affect the current-carrying capacity of a conductor?
   A. Cross – sectional area of the conductor
   B. The number of strands
   C. The diameter
   D. Type of insulation
12. The direction of movement of a current- carrying conductor that is situated in a magnetic field can be determined using
   A. Flemings left hand rule B. Flemings right hand rule
   C. Faradays law D. Corkscrew rule
13. A coil of 100 turns with length 500mm allows a current of 2A through it. The magnetizing force is
   A. 500 Atm^{-1} B. 400 Atm^{-1} C. 200 Atm^{-1} D. 100 Atm^{-1}

The figure below shows two capacitors connected in series across a 220v supply. Use it to answer questions 14 to 16



14. The total capacitance of the circuit is
   A. 2μF B. 3μF C. 9μF D. 1.8μF
15. The total charge through the circuit is
   A. 440μF B. 660μF C. 1,980μF D. 412μF
16. The voltage across the 3μF capacitor is
   A. 73.3V B. 110.0V C. 137.5V D. 82.5V

17. An increase in the distance between the parallel plates of a capacitor
    A. Decrease the capacitance
    B. Increases the capacitance
    C. Decreases the permittivity
    D. Increases the permittivity
18. The capacitance of a capacitor is the ratio of
    A. Charge to p.d between plates
    B. P.d between the plates to plat spacing
    C. P.d between plates to thickness of dielectric
    D. P.d between plates to charge
19. A 10μF capacitor is charged to a potential of 250V. The charge stored in the capacitor is
    A. 0.25 mC B. 2.50 mC C. 250.0 mC D. 2500.00 mC
20. In Flemings Right Hand rule, the second finger points to the direction of
    A. current B. torque C. motion D. flux
21. The Lenz's law states that the induced e.m.f
    A. Is directly proportional to current
    B. Opposes the motion to current
    C. Opposes the motion producing it
    D. Is proportional to the flux change
22. The purpose of a reservoir capacitor in a power supply unit is for
    A. Smoothing B. stabilization C. rectification D. amplification
23. The magnitude of the self-induced emf in a coil is
    A. Independent of the rate of change of current
    B. Equal to the change of current
    C. Directly proportional to the rate of change of current
    D. Inversely proportional to the rate of change of current
24. A capacitor is a device which stores
    A. Current B. charges C. magnetic flux D. power
25. The total capacitance of a 40μF and 20μF capacitors connected in parallel is
    A. 13.3μF B. 20.0μF C. 60.0μF D. 800.0μF
26. The potential gradient necessary to cause a breakdown of a capacitor is termed
    A. Working voltage B. field strength C. permittivity D. permeability

27. Magnetic field strength is measured in

A. Weber B. weber/m^2 C. ampere-turn D. ampere-turn/m^2

28. Faradays laws of electromagnetic induction are related to

A. e.mf of a cell

B. e.m.f of a generator

C. current flowing in a circuit

D. voltage drop in circuit

29. When a current-carrying conductor is paced at right angle in a magnetic field

A. Nothing happens to the conductor

B. The magnetic field collapses

C. The conductor current ceases to flow

D. The current- carrying conductor experiences force

30. The induced e.m.f of a current-carrying conductor of flux density(B), length(L), and velocity(V), is

A. BLV B. BLV^2 C. BL^2V D. B^2LV

31. The total flux of a magnetic field of density 0.15T threading an area of 500mm^2 is

A. 7.5μwb B. 75.0 μWb C. 750 μwb D. 7500 μwb

32. A current of 10A flowing through a circuit for 12 seconds produces a charge of

A. 0.8 C B. 1.2 C C. 2.0 C D. 120.0 C

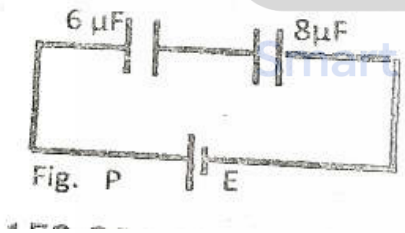


Fig. P

33. The resultant capacitance of the circuit in fig P above is

A. 0.252μF B. 2.000μF C. 3.429μF D. 14.000μF

34. The capacitance of a parallel plate capacitor is affected by

A. Nature of the dielectric

B. Frequency of the supplied voltage

C. The source of power supply

D. Conductivity of the plate

35. A coil of 100 turns with length 500 mm allows a current of 2 A through it. The magnetizing force is

A. 500 At/m B. 400 At/m C. 200 At/m D. 100 At/m

36. In Fleming's right hand rule, the first finger points in the direction of

A. Magnetic field B. rotation C. current flow D. applied voltage

Use the diagram below to answer questions 37 and 38

37. The effective capacitance of the circuit is

A. 24 μF B. 5 μF C. 2.67 μF D. 0.38 μF

38. If the charge stored on the capacitor is 0.08Mc, the applied voltage V is

A. 100.0 V B. 33.3 V C. 10.0 V D. 5.7 V

39. One advantage of an electrolytic capacitor is its

A. high capacitance and small size
B. low inductance
C. high breakdown voltage
D. low capacitance and large size

40. The magnitude of the e.m.f induced in a conductor moving through a magnetic field is

A. Inversely proportional to its velocity
B. Independent of its velocity
C. Directly proportional to its velocity
D. Zero

41. In a permanent magnet the lines of flux

A. Always act from north to south
B. Always act from south to north
C. Usually intersect at the poles
D. Pass through only the magnetic material

42. When capacitors are connected in series, the effective capacitance is always

A. Equal to the largest capacitor in the group
B. Greater than the largest capacitor in the group
C. Less than the smallest capacitor in the group
D. Equal to the smallest capacitor in the group

43. The permeability of a magnetic material having a flux density of 1 T and a magnetizing force of 500Am^{-1} is

A. 0.002 Hm^{-1} B. 0.020 Hm^{-1} C. 0.200 Hm^{-1} D. 2.000 Hm^{-1}

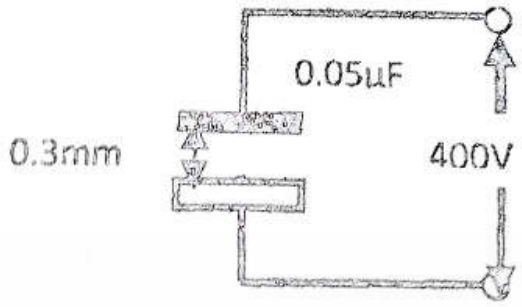
44. The instantaneous current of a capacitor is proportional to the rate of change of

A. current B. voltage C. energy D. charge

45. The expression for the force on a conductor of length, L situated in a magnetic field, B and carrying a current, I is given by

A. B^2LI B. BL^2I C. BLI^2 D. BLI

The figure below is diagram of parallel plate capacitor. Use it to answer questions 46 and 47.



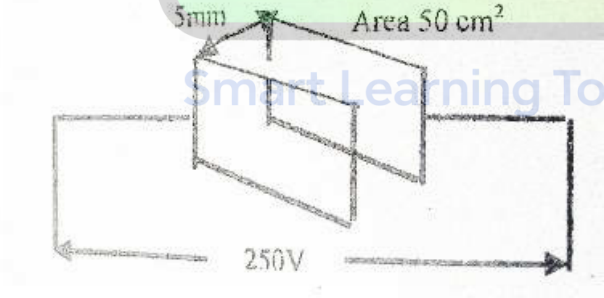
46. The potential gradient of the capacitor is

A. 20 kv/m B. 120 kv/m C. 1,333 kv/m D. 8.00 kv/m

47. The charge across the capacitor is

A. 1 μC B. 20 μC C. 120 μC D. 8,000 μF

The figure below shows a parallel plate capacitor of plate separation 5mm and plate area of 50cm^2. [The permittivity of the dielectric is 8.854 x 10^{-12} F\m] use the information to answer questions 48 to 50.



48. The potential gradient of the capacitor is

A. 50 Vm^{-1} B. 500 Vm^{-1} C. 5000 Vm^{-1} D. 50,000 Vm^{-1}

49. The capacitance of the capacitor is

A. 8.854 x 10^{-12} F B. 8.854 x 10^{-10}F C. 8.54 x 10^{-9} F D. 8.854 x 10^{-5} F

50. The electric charge on the capacitor is

A. 2.21 x 10^{-2} C B. 2.21 x 10^{-6} C C. 2.21 x 10^{-9} C D. 2.21 x 10^{-12} C

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