

2024 WASSCE SUPER MOCK APPLIED ELECTRICITY 1

APPLIED ELECTRICITY

PAPER 1

1 hour

[50 marks]

Answer **all** the questions.

**Each** question is followed by **four** options lettered A to D. Find out the correct option for **each** question and shade **in pencil** on your answer sheet, the answer space which bears the same letter as the option you have chosen. Give only **one** answer to **each** question. Think carefully before you shade the correct space; erase completely any answer(s) you wish to change.

An example is given below.

A.C generators are rated according to their maximum

A. true power

B. voltage

C. current

D. apparent power

The correct answer is apparent power, which is lettered D, and therefore answer space D would be shaded.

[ A ]

[ B ]

[ C ]

[ D ]

Think carefully before you shade the answer spaces; erase completely any answer(s) you wish to change.

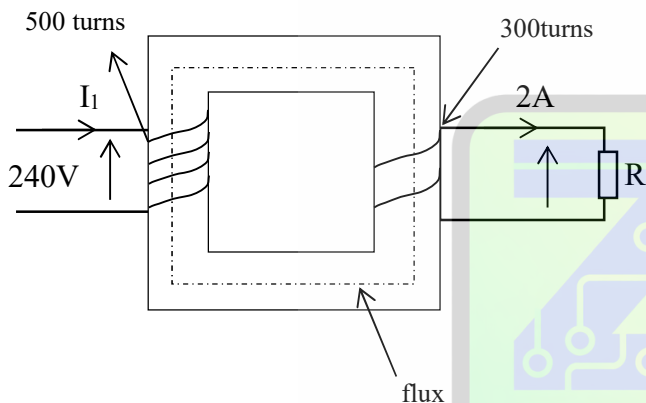
Do all the rough work on this question paper.

Now answer the following questions.

- The inductance of a coil can be increased by
  - Decreasing number of turns
  - Increasing core length
  - Using core material of high relative permeability
  - All of the above
- The resistance of a lamp rated at 240 V and 60 watts equal to
  - 960 ohms
  - 120 ohms
  - 240 ohms
  - 480 ohms
- Two resistances of 100 ohms and 0 ohms are connected in parallel. The overall resistance will be
  - 100 ohms
  - 50 ohms
  - 0 ohm
  - None of the above
- Which of the following materials is ferromagnetic?
  - Tungsten
  - Copper
  - Steel
  - Aluminium
- The material commonly used for cable insulation is
  - Ceramic
  - Rubber
  - Polyvinyl chloride
  - Glass
- In Fleming's right hand rule, the thumb represents
  - Direction of motion
  - Direction of induced e.m.f
  - Direction of magnetic field
  - Magnitude of induced e.m.f
- Which of the following control devices can be used in a moving-iron repulsion-type instrument?
  - Spring control
  - Pointer control
  - Air Control
  - Gravity control
- Which of the following devices prevents oscillation in a measuring instrument?
  - Controlling device
  - Reflecting device
  - Damping device
  - Operating device

9. Sheath is used in the cables to
- Prevent moisture from entering the cable
  - Provide the strength to the cable
  - Avoid the chances of the rust on the strands
  - Provide proper insulation
10. Which of the following is not part of a cable?
- Conductor
  - Sheath
  - Conduit
  - Insulation

**Fig. 1** shows a double wound transformer. Use it to answer questions 11 and 12.



11. The primary current  $I_1$  is
- 3.30 A
  - 3.00 A
  - 2.00 A
  - 1.20 A
12. The voltage across the load R is
- 400.0 V
  - 240.0 V
  - 144.0 V
  - 120.0 V
13. In a hydro-electric power station, the turbine drives the
- Armature
  - Rotor
  - Alternator
  - Transformer
14. Moving coil instruments have
- Linear Scale
  - High sensitivity
  - Non – Linear scale
15. The purpose of the verification of polarity test is to
- Measure the resistance of the earth continuity conductor
  - Check the operation of fuses or excess current circuit breakers
  - Check that the phase conductor is taken through the fuse and the switch
  - Check the continuity of the metallic circuit up to the earth.
16. Electricity is transmitted at high voltages from national grid network to
- Minimize transmission losses
  - Increase the efficiency of the grid
  - Maintain safety of the equipment
  - Reduce time taken
17. A nail accidentally drawn through a cable touches two conductors thereby causing a fault. The name of the fault is
- Short circuit
  - Insulation failure
  - Earthing continuity
  - Open circuit
18. The mechanical power developed by the D.C motor is maximum when back e.m.f is equal to
- Applied voltage
  - Zero
  - Half the applied voltage
  - Twice the applied voltage
19. A series motor at no load develops
- Zero speed
  - Average speed
  - Rated speed
  - Infinite speed
20. The cells are connected in series to
- Increase the current output
  - Increase the voltage output
  - Decrease the internal resistance
  - Decrease the amount of charging voltage required

- 21.** If A.C is fed by mistake to a D.C motor, then the D.C motor will
- Burn as the eddy currents in the field produces heat
  - Run at its normal speed
  - Run at lower speed
  - Run continuously, but the sparking but the sparking takes place at the brushes
- 22.** Which of the following motors has high starting torque?
- D.C shunt motor
  - Squirrel edge induction motor
  - D.C series motor
  - A.C series motor
- 23.** The function of the commutator in a D.C machine is
- To change alternating current to a direct current
  - To improve commutation
  - To improve efficiency of motor
  - To change alternating voltage to direct voltage
- 24.** The current through the channel of a JFET is directly affected by all of the following, except the
- drain voltage.
  - Transconductance
  - gate voltage
  - gate bias
- 25.** The current consists mainly of holes when a JFET
- has a P-type channel
  - is forward-biased
  - is zero-biased
  - is reverse-biased
- 26.** In a P-channel JFET,
- the drain is forward-biased
  - the source-gate junction is forward-biased
  - the drain is negative relative to the source
  - the gate must be at d.c ground.
- 27.** Transconductance is the ratio of
- a change in drain voltage to a change in source voltage
  - a change in drain current to a change in gate voltage
  - a change in gate current to a change in source voltage
  - a change in drain current to a change in drain voltage.
- 28.** Which of the following electrical machines has the highest efficiency?
- D.C shunt motor
  - Transformer
  - Induction motor
  - Synchronous motor
- 29.** Which parameter is increased by step up transformer?
- Current
  - Resistance
  - Voltage
  - Frequency
- 30.** An enhancement-mode MOSFET can be recognized in schematic diagrams by the presence of
- an arrow pointing inward
  - a broken vertical line inside the circle
  - an arrow pointing outward
  - a solid vertical line inside the circle.
- 31.** The chemical energy in a battery or cell
- is a form of kinetic energy
  - cannot be replenished once it is gone
  - changes to electrical energy when the cell is used
  - is caused by electric current.
- 32.** A cell that cannot be recharged is known as
- a dry cell.
  - a wet cell.
  - a primary cell.
  - secondary cell.
- 33.** A direct short-circuit of a large battery can cause
- an increase in its voltage
  - no harm other than a rapid discharge of its energy
  - the current to drop to zero
  - a physical rupture or explosion

34. Which of the following statements is true?
- A galvanometer with low resistance in series is an ammeter
  - A galvanometer with high resistance in series is an ammeter
  - A galvanometer with high resistance in parallel is a voltmeter
  - A galvanometer with low resistance in parallel is a voltmeter
35. Which of the following refers to a parallel circuit?
- The current through each element is same
  - The voltage across element is in proportion to its resistance value
  - The equivalent resistance is greater than any one of the resistors
  - The current through any one element is less than the source current
36. Skin effect occurs when a conductor carries current at frequencies
- Very low
  - Low
  - Medium
  - High
37. Which of the following can vary with ac, but never with dc?
- Power
  - Voltage
  - Frequency
  - Amplitude
38. The length of time between a point in one cycle and the same point in the next cycle of an a.c wave is the
- Frequency
  - Magnitude
  - Period
  - Polarity

Fig. 2 is a logic symbol. Use it to answer question 39.

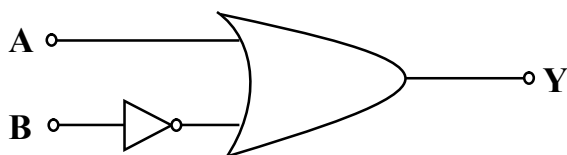


Fig. 2

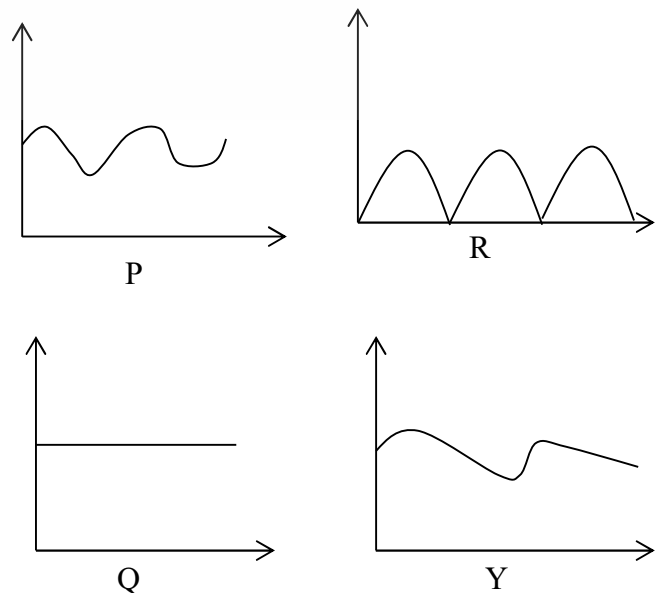
39. The Boolean expression for output Y is
- $\bar{A} + B$
  - $A + \bar{B}$
  - $\bar{A} \cdot B$
  - $A \cdot \bar{B}$
40. A current carrying coil wound around an iron core is described as
- Electric circuit
  - Magnet
  - Electromagnet
  - Inductor
41. In a hydro power plant, the turbine is driven by
- Kinetic energy of water
  - Potential energy of water
  - Atmospheric pressure
  - Force of gravity

Table 1

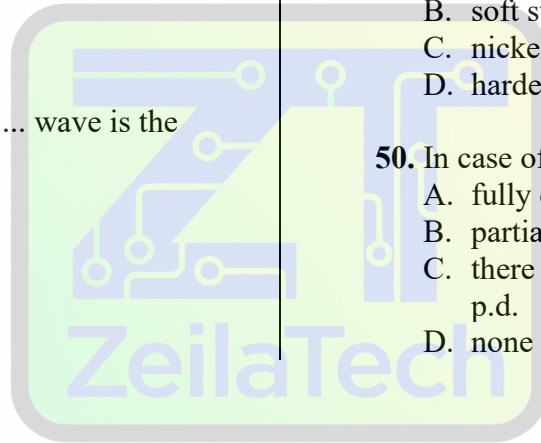
INPUT	OUPUT
0	1
1	0

42. The truth table in Table 1 represents
- OR gate
  - AND gate
  - NOT gate
  - NAND gate

Use the waveform in Fig. 3 to answer questions 43 and 44.



43. Which of the following waveforms in **Fig.3** represents the output of a full-wave rectifier without a filter?  
A. R  
B. Q  
C. Y  
D. P
44. The output waveform of **Q** represents.  
A. Pulsating d.c  
B. Pure d.c  
C. Half – wave rectifier  
D. Half – wave rectifier without a filter
45. The r.m.s. value of sinusoidally varying current is ..... that of its average value.  
A. more than  
B. less than  
C. same as  
D. none of the above
46. Out of the following ..... wave is the peakiest.  
A. sinusoidal  
B. square  
C. rectangular  
D. triangular
47. An electric fan and a heater are marked 100 W, 220 V and 1000 W, 220 V respectively. The resistance of the heater is  
A. zero  
B. greater than that of fan  
C. less than that of fan  
D. equal to that of fan
48. Electric lines of force about a negative point charge are  
A. circular, anticlockwise  
B. circular, clockwise  
C. radial, inward  
D. radial, outward
49. The magnetic material used in permanent magnets is  
A. iron  
B. soft steel  
C. nickel  
D. hardened steel
50. In case of liquids, Ohm's law is .....  
A. fully obeyed  
B. partially obeyed  
C. there is no relation between current and p.d.  
D. none of the above.



Smart Learning Tools

***END OF THE PAPER***