2025 SHS2 END OF SEMESTER EXAM APPLIED ELECTRICITY 1

OBJECTIVES

Answer all questions in this section

Each question is followed by four (4) letters A to D, find the correct option for each

1. A battery consists of
a) two or more cells connected together
b) two electrodes separated by electrodes
c) an electrolyte
d) primary cells

2. An element used to convert a moving coil instrument to a voltmeter is
a) air spring
b) magnet
c) shunt
d) multiplier

3. Which of the following quantity is measured in kilowatt – hour?
a) active power
b) apparent power
c) heat energy
d) electrical energy

4. The reactance of a capacitor which has capacitance of 1μF at a frequency of 50Hz is
a) 3184.7Ω
b) 314.0 Ω
c) $3.184 \times 10^{-3}\Omega$
d) 3.140×10^{-4} Ω

5. The peak voltage of mains supply $220V_{r.m.s}$ is
a) 155.5V
b) 200.0V
c) 311.1V
d) 345.4V

6. A transformer changes the value of voltage in a circuit by using
a) magnetic effect
b) electric effect
c) heating effect
d) mechanical effect

7. The main component of rectifier circuit is a/an
a) Transformer
b) diode
c) inductor
d) capacitor

8. The most common form of semi-conductor material in use is
a) arsenic
b) gallium
c) silicon
d) antimony

9. The number of diodes used in full-wave bridge rectifier circuit is
a) two
b) four
c) three
d) five

10. Free electrons in a p-type material are
a) majority charge carriers
b) take no part in conduction
c) are minority charge carriers
d) exist in the same numbers as holes

11. A component that is used to smooth d.c output in a rectifier circuit is
a) conductor
b) resistor
c) diode
d) inductor

12. The function of a stabilizer circuit in a power supply unit is to
a) step-up a.c voltage
b) step-down a.c voltage
c) reduce ripples
d) provide a steady output

13. The range of moving-coil ammeter can be extended by connecting a
a) high resistance in parallel with the instrument
b) high resistance in series with the instrument
c) low resistance in parallel with the instrument
d) low resistance in series with the instrument

14. In a stabilizer power supply block diagram, the rectifier block comes after the
a) transformer
b) voltage regulator
c) d.c output
d) rectifier block

15. The function of a voltage stabilizing circuit is to
a) double the load resistor
b) compensate for the voltage drop in the rectifying diode
c) keep the load current constant
d) keep the power dissipated in the load high

16. A device that changes an a.c input voltage into a d.c voltage is called
a) rectifier
b) stabilizer
c) transformer
d) an invertor

17. The supply voltage to a load of 10Ω that consume a power of 40W is
a) 200V
b) 2kV
c) 20V
d) 20Kv

18. An auto transformer has
a) one coil
b) two coils
c) three coils
d) four coils

19. A coil having an inductance of 0.4H is connected across a 230V, 50Hz supply. The reactance of the coil is
a) 314.3Ω
b) 62.8Ω
c) 125.6Ω
d) 2.5Ω

20. The power station which uses water as a motive force is
a) hydro-power station
b) coal-fired power station
c) gas-fired power station
d) oil-fired power station

21. According to KVL, the algebraic sum of all IR drops and e.m.f's in any close loop of a network is always
a) zero
b) positive
c) negative
d) none of the above

22. The contact a person makes with an exposed conductive part that has become live under fault condition is known as
a) Fault protection
b) Electric shock
c) Earthing
d) Basic protection

23. Of the following substances, which is the most commonly used semiconductor?
a) Germanium
b) Silicon
c) Galena
d) Copper

24. In Ghana, the type of wiring commonly used for domestic installation is
a) PVC conduit
b) c) Steel conduit
c) Trunking
d) d) ducting

25. The output of an a.c generator comes from the conversion of
a) Electrical energy to mechanical energy
b) Mechanical energy to electrical energy
c) Mechanical energy to light energy
d) Electrical energy to sound energy

26. Which of the following is **not** part of a cable?
a) Conductor
b) conduit
c) Sheath
d) insulation

27. When two or more cables are contained in a single conduit, the cables are
a) Joined
b) phased
c) Bunched
d) Looped

28. Which of the following is not a fault in an electrical installation?
a) Open circuit
b) overload
c) Short circuit
d) discrimination

29. The defect that occurs in simple cell due to the accumulation of hydrogen gas bubbles around the copper electrode causing a back e.m.f. is termed as
a) Local action
b) Corrosion
c) Polarisation
d) Diffusion

30. A primitive device for indicating the presence of an electric current is
a) an electrometer
b) a galvanometer
c) a voltmeter
d) coulometer

31. A four-wire, three-phase star-connected system has a line current of 10A. The phase current is:
a) 40A
b) 20A
c) 10A
d) 30A

32. An advantage of an auto-transformer is that:
a) it gives a high step-up ratio
b) iron losses are reduced
c) copper loss is reduced
d) it reduces capacitance between turns

33. What is the primary purpose of a circuit breaker in an electrical system?
a) To increase the voltage in the circuit
b) To protect against electrical overloads and short circuits
c) To reduce energy consumption
d) To connect multiple appliances to an outlet

34. In normal operation, a p–n–p transistor connected in common-base configuration has
a) the emitter at a lower potential than the base
b) the collector at a higher potential than the base
c) the base at a higher potential than the emitter
d) the collector at a lower potential than the emitter

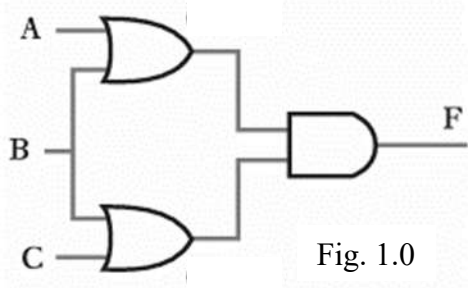

Fig. 1.0

In questions **35** to **37**, refer to the amplifier shown in Fig. 1.0, select the correct answer from those given.

35. Identify the logic gate at the output function F
a) NOT gate
b) OR Gate
c) NOR gate
d) AND gate

36. What is the output of the gate at the upper left?
a) A + B
b) A · B
c) A ⊕ B
d) $\bar{A} + \bar{B}$

37. The output function F is
a) (A+B) + (A+C)
b) (A+B) · (A+C)
c) $\overline{(A+B)+(A+C)}$
d) (A+B) · C

38. Which of the following is known to be a voltage controlled device:
a) Diode
b) Capacitor
c) BJT
d) FET

39. Which of the following is not an electrical component of hydro-electrical power plant?
a) Transformer
b) Transmission line
c) Generator
d) Turbine

40. What component of the hydro-electrical power plant carries water from reservoirs to turbines in power houses?
a) surge tanks
b) Penstocks
c) Radial gates
d) Gear box

41. All the following can be used to fuel a thermal power plant except:
a) Wind
b) Coal
c) Crude oil
d) Natural gas

42. The heart of the plant, where nuclear fission takes place is the _____
a) Turbine
b) Reactor
c) Generator
d) Gear box

43. The three terminals of an FET are the
a) Field, emitter, and base
b) Source, emitter and gate
c) Source, drain and gate
d) Source, field and drain

44. The abbreviation JFET stands for
a) Junction force effort transistor
b) Junction failed effect transistor
c) Junction field effect transistor
d) Junction force effect transistor

45. In an FET, current enters through the transistor at the
a) Gate
b) Field
c) Source
d) None of the above

46. The majority charge carriers in a BJT is/ are
a) Electrons
b) Holes
c) Both electrons and holes
d) None of the above

47. The colour code of a resistor of 220 Ω are
a) Brown. Red, Black
b) Red, black, red
c) Red, red, brown
d) Black, red, brown

48. A resistor with no fourth band has a tolerance of
a) 5%
b) 10%
c) 15%
d) 20%

49. A transformer is known to be a static machine because
a) It cannot be moved from one place to another
b) It is very rigid
c) It has no moving parts
d) All of the above

50. The process whereby a unidirectional current and voltage is obtained from a bidirectional current and voltage is known as
a) Transformation
b) Conversion
c) Rectification
d) Transmission

END OF PAPER