TAKORADI TECHNICAL UNIVERSITY
FACULTY OF APPLIED SCIENCE
END OF FIRST SEMESTER EXAMINATIONS 2020/2021
BTECH INFORMATION TECHNOLOGY
BIT 411 BASIC ELECTRONICS

APRIL, 2021 TWO (2) HOURS

Answer ALL questions

1. A diode is not a two lead semiconductor that acts as a one way gate to electron flow.
   a) True
   b) False

2. Which of the diodes will conduct from the second half cycle of the full wave rectification shown fig1. 1
   a)D1,D4
   b)D2,D3
   c)D1,D3
   d)D1,D2

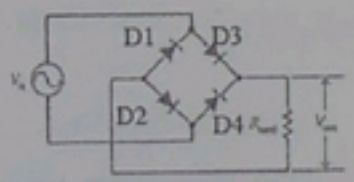

Fig.1

3. If a current of 5 A flows for 4 minutes, find the quantity of electricity transferred
   a)1200 C
   b) 300 C
   c)600 C

4. An electric heater consumes 3.6 MJ when connected to a 250 V supply for 30 minutes. Find the power rating of the heater and the current taken from the supply.
   a) 2 kW,8 A
   b) b) 2000 W, 0.8 A
   c) c) 2 kW,0.8 A
   d) d) 2000 W,80 A

5. An e.m.f. of 250 V is connected across a resistance and the current flowing through the resistance is 2 A. What is the power developed?
   Ans.....

6. A current of 8 A flows for 5 minutes. What charge is transferred?
   Ans.....
7. Diode allows current to pass in only one direction.

a) True
b) False

8. The current flowing through a resistor is 0.4 A when a p.d. of 30 V is applied. Determine the value of the resistance.
   Ans.....

9. A 24 V battery is connected across a load having a resistance of 12 Ω, Determine the current flowing in the load
   Ans.....

10. A battery is a device that converts chemical energy to electricity
    a) True
    b) False

11. The p.d. at the terminals of a battery is 24 V when no load is connected and 12 V when a load taking 10 A is connected. Determine the internal resistance of the battery.
    Ans.....

12. The capacity of a cell is measured in ampere-hours (Ah).
    a) True
    b) False

13. Two resistors, of resistance 3 Ω and 6 Ω are connected in parallel across a battery having a voltage of 12 V shown in fig.2 Determine the total circuit resistance.

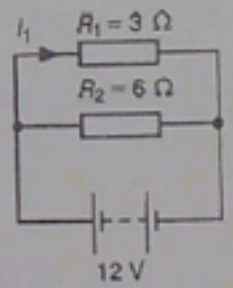

Fig.2

a) 9 Ω
b) 2 Ω
c) 4.5 Ω
d) 6 Ω

14. Resistances of 10 Ω, 20 Ω and 30 Ω are connected (a) in series and (b) in parallel to a 240 V supply shown in fig.3 and 4. Calculate the supply current in each case.

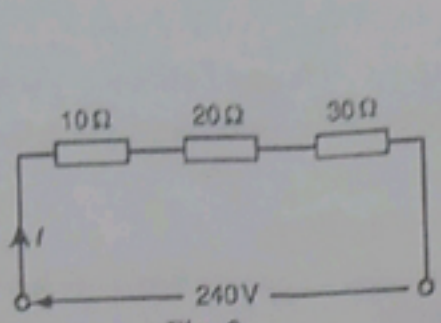

Fig. 3

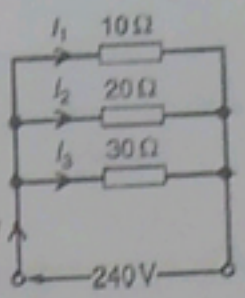

Fig.4

a) Ans ..... b) Ans.....

15. Calculate the equivalent capacitance of two capacitors of 8 μF and 4 μF connected (a) in parallel and (b) in series.

a) Ans..... b) Ans.....

16. Diode converts ac input voltage to a pulsed dc output voltage.
    a) True
    b) False

17. The following are some examples of power equations **except.**
    a) P=IV
    b) $P= I^2R$
    c) $P= V^2/R$
    d) P=V/I

18. Current is the quantity of electricity flowing inside a wire.
    a) True
    b) False

19. Resistance is not the opposition to the flow of current in a wire.
    a) True
    b) False

20. Capacitance is a measure of a capacitor's ability to store charge on its plates
    a) True
    b) False

21. Electron has a mass of nearly 9.1×10^{-13} kg and a charge of 1.6×10^{-19} C
    a) True
    b) False

22. Insulators are those materials in which valence electrons are bound very tightly to their parents atoms.
    a) True
    b) False

23. A frequency of 50 Hz.is mostly seen in Direct current.
    a) True
    b) False

24. Rectifier is a circuit which employs one or more diodes to convert ac pulsating voltage into dc voltage.

a) True
b) False

25. A semiconductor material is one whose electrical properties lie in between those of insulators and good conductors.
a) True
b) False

26. If an electric pressure or voltage is applied across any material there is a tendency for electrons to move in a particular direction.
a) True
b) False

27. Electromotive force of a cell is the p.d between its terminals when it is not connected to a load.
a) True
b) False

28. The internal resistance of a cell causes the voltage available at the terminals of the cell to fall when a load is connected.
a) True
b) False

29. A cell has an internal resistance of 0.02 Ω and an e.m.f of 2.0 V. Calculate its terminal p.d if it delivers a) 5 A b) 50 A
a) 1.9 V,1.0 V
b) 2 V,1.0 V
c) 1.8 V,1.0 A
d) 1.7 V,1.0 V

30. Which of the following is the main function of a battery?
a) To provide a source of steady DC voltage to fixed polarity
b) To provide a source of steady DC voltage of variable polarity
c) To provide a source of steady DC voltage of fixed polarity

[2 marks each]

Section B

1. Briefly define ohm's law. **[3 marks]**

2. What is a diode? **[2 marks]**

3. State the difference between semiconductors and insulators and give **two (2)** examples each. **[4 marks]**

4. Draw the following circuit symbols. **[7 marks]**
   a. Diode
   b. NPN Transistor
   c. PNP Transistor
   d. LED
   e. Resistor
   f. capacitor

g. Battery

5. Write the full meaning of the following abbreviations; BJT, FET, JFET and MOSFET. **[4 marks]**

Section C

1. Briefly explain an electronic circuit. **[3 marks]**
2.
3. Differentiate between a closed circuit and an open circuit **[4 marks]**
4.
5. Name the device used in troubleshooting an electronic circuit. **[1 mark]**

6. Under what conditions will the LED circuit not function and hence calculate the current in the circuit shown in fig. 1 below. **[5 marks]**

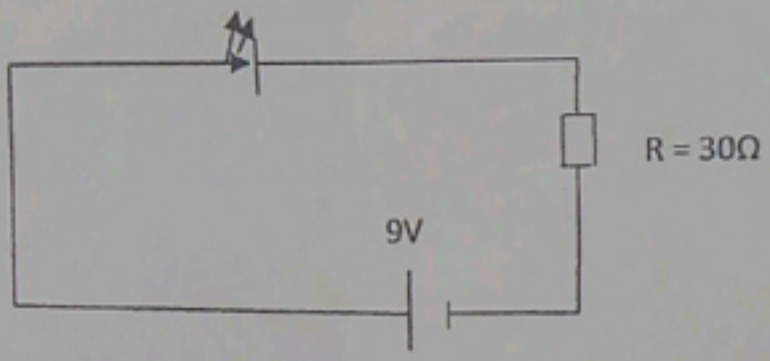

Fig. 1

7. Outline the project steps in completing the schematic diagram in fig. 2 below **[7 marks]**

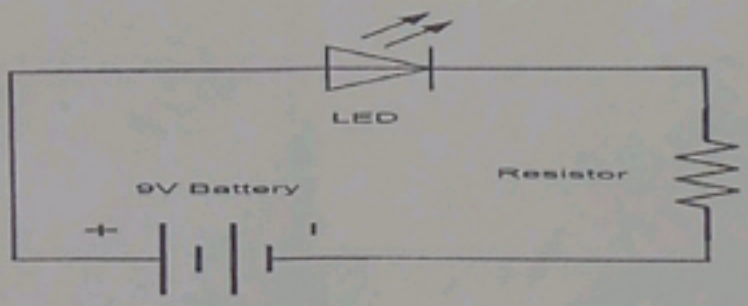

Fig. 2