DE-2922
First Year B. Sc. (Sem. I) Examination
March / April – 2016
Electronics : Paper - I
(Basic Electrical Circuits)

Time : 2 Hours]  [Total Marks : 50

Instructions :

(1) Fill up strictly the details of signs on your answer book.

(2) There are total 28 questions in this question paper.

(3) Figure on the right indicates full marks

(4) All symbols and abbreviations have their usual meaning.

(5) Non-programmable calculators are allowed.

(6) Assume data if necessary.

Q. 1 to 12 Multiple choice questions : (1 mark)
Q. 13 to 22 Multiple Chiose Questions : (2 marks)
Q. 23 to 28 Multiple Choice Questions : (3 marks)

O.M.R. Sheet भरवा अंगैनी अतिपरिपुर्ण सूचीमालो आपेक्ष
O.M.R. Sheet-नी पाषण एरवे छ.
Important instructions to fillup O.M.R. Sheet
is given back side of provided O.M.R. Sheet.
1. ________ is often used to analyze multiple-source circuits.
   (A) Superposition
   (B) Kirchhoff's law
   (C) Ohm's law
   (D) Thevenin's theorem

2. Kirchhoff's voltage law is concerned with
   (A) junction voltage
   (B) battery EMFs
   (C) both IR drops and junction voltage
   (D) IR drops

3. According to Thevenin's theorem, any network with two open terminals
   can be replaced by a voltage source $V_{th}$ in ______ with a single resistance $R_{th}$.
   (A) parallel
   (B) short
   (C) open
   (D) series

4. The first goal to accomplish in analyzing a complex series-parallel circuit
   is to
   (A) equate all series components
   (B) solve for all the voltage drops
   (C) solve for the total current and resistance
   (D) equate all parallel components
5  _______ is a device whose resistance depends upon the quantity of light falling on its surface.

(A) VDR  
(B) thermistor  
(C) LCD  
(D) LDR

6  Which one of the following is not the passive component?

(A) inductor  
(B) capacitor  
(C) varactor diode  
(D) resistor

7  The distance that a signal's energy can travel in the time it takes for one cycle to occur is called the signal's:

(A) frequency  
(B) wavelength  
(C) period  
(D) amplitude

8  In DPDT switch there are total ______ terminals.

(A) 3  
(B) 6  
(C) 9  
(D) 2
9. Which type of test equipment is used to measure current?
   (A) ammeter
   (B) voltmeter
   (C) wattmeter
   (D) ohmmeter

10. As current travels within a conductor:
    (A) a magnetic field is developed around it
    (B) the wire tries to point north
    (C) an electrostatic field opposes the current
    (D) the magnetic field aids the current

11. Lead $Z_L$ for maximum power transfer is

   ![Diagram](image)

   (A) $R + j\omega L$
   (B) $R - j\omega L$
   (C) None
   (D) $R$

12. _______ has one winding common with the primary and secondary.
    (A) Auto transformer
    (B) Audio transformer
    (C) Line transformer
    (D) Power transformer
13 What is the number of turns required in the secondary winding for a transformer when 120 volts is applied to a 2400-turn primary to produce 7.5 Vac at the secondary?

(A) 150 turns
(B) 900 turns
(C) 1920 turns
(D) 75 turns

14 What is the total inductance of a 5 H and a 100 mH coil connected in parallel?

(A) 33.3 mH
(B) 98.0 mH
(C) 150.0 mH
(D) 4.76 mH

15 What is the total inductance in the given circuit?

(A) 300 mH
(B) 900 mH
(C) 1700 mH
(D) 160 mH

16 The voltage across a coil when \( \frac{di}{dt} = 20 \text{ mA/s} \) and \( L = 8 \text{ H} \) is

(A) 160 mV
(B) 1.6 mV
(C) 2.5 mV
(D) 16 mV
17 If $R_3$ opens in the given circuit, the total resistance (RT) between points A and B equals ________.

\[ \begin{array}{c}
\text{A} \quad 10 \, \Omega \\
\text{R}_2 \\
\text{B} \\
\text{R}_2 \\
\text{100} \, \Omega \\
\text{R}_3 \\
\text{900} \, \Omega
\end{array} \]

(A) 100 $\Omega$
(B) 110 $\Omega$
(C) infinite resistance
(D) 900 $\Omega$

18 Reactance in an inductive circuit will:
(A) decrease with frequency
(B) be independent from frequency
(C) depend on the value of $X_c$
(D) increase with frequency

19 Kirchhoff's current law state that
(A) algebraic sum of currents meeting at the junction is zero
(B) no current can leave the junction
(C) total sum of currents meeting at the junction is zero
(D) net current flow at the junction is positive

20 For $p = V^2/R$, a decrease in resistance should produce:
(A) an increase in ohms
(B) an increase in power
(C) a decrease in current
(D) a decrease in power

21 A capacitor stores 0.15C at 5 V. Its capacitance is
(A) 0.75 $\mu$F
(B) 0.03 F
(C) 0.03 $\mu$F
(D) 0.75 F

22 In a purely inductive circuit,
(A) voltage lags current by 90°
(B) voltage leads current by 90°
(C) voltage and current are in phase (0°)
(D) current leads voltage by 90°
23. How many amps are used by a 100 watt, 120 volt light bulb?

(A) 12000 amps

(B) 830 mA

(C) 12 amps

(D) 1.2 amps

24. How many ohms of resistance allow a current of 720 μA to flow when 3.6 kV is applied?

(A) 5 kΩ

(B) 200 kΩ

(C) 5 MΩ

(D) 200 nΩ

25. Two similar coils have self inductance of 1 mH each. Coefficient of coupling is 0.5. The mutual inductance M is

(A) 0.5 mH

(B) 0.707 mH

(C) 1 mH

(D) 0.25 mH
26. With 21 V applied, if \( R_1 = 5 \) ohms, \( R_2 = 35 \) ohms, and \( R_3 = 14 \) ohms, what is the current of \( R_2 \) if \( R_1 \) is series connected with parallel circuit \( R_2 \) and \( R_3 \)?

(A) 800 mA
(B) 600 mA
(C) 400 mA
(D) 200 mA

27. The Thevenin's equivalent of network in figure(1) is a 10 V source in series with 2Ω resistance. If a 3Ω resistance is connected across AB as shown in figure(2) the Thevenin's equivalent is

(A) 6 V in series with 1.2 Ω resistance
(B) 10 V in series with 5 Ω resistance
(C) 6 V in series with 5 Ω resistance
(D) 10 V in series with 1.2 Ω resistance

28. A 33 kΩ resistor with a 20% tolerance checks out as ok with which of the following ohmmeter readings?

(A) 24183 ohms
(B) 6600 ohms
(C) 39970 ohms
(D) 26400 ohms