

## ► Electrical and Electronic Systems Questions

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Correct answers are given in **bold**

1. The power dissipated by a  $4\Omega$  resistor connected to a 12V D.C. supply is:
  - (a) **36W**
  - (b) 12W
  - (c) 6W
  - (d) 4W
  
2. Kirchhoff's Voltage Law states that the algebraic sum of voltages around a closed loop
  - (a) is equal to the applied voltage
  - (b) is equal to the current multiplied by the resistance
  - (c) is always positive
  - (d) **is zero**
  
3. The total resistance of three  $2\Omega$  resistors connected in parallel across a 12V D.C. supply is:
  - (a)  $6\Omega$
  - (b) 18A
  - (c)  **$0.66\Omega$**
  - (d) 6A
  
4. Magnetomotive force is proportional to current multiplied by the number of turns in a coil. It has units:
  - (a) Webers
  - (b) Teselas
  - (c) mmf
  - (d) **Amps**

## An Introduction to Mechanical Engineering Part 1

5. In electromagnetic theory, the reluctance of a circuit is analogous to:
- (a) **Resistance**
  - (b) Capacitance
  - (c) Voltage
  - (d) Current
6. The inductance of a coil is proportional to all of the following, except:
- (a) the number of turns in the coil squared
  - (b) **the circumference of the coil**
  - (c) the permeability of free space
  - (d) the cross sectional area of the coil
7. Fleming's Left Hand Rule states that the following three entities will be at right angles to each other:
- (a) force, motion and current
  - (b) force, inductance and current
  - (c) voltage, field and inductance
  - (d) **current, force and field**
8. Two 2nF capacitors are connected in parallel. The arrangement is then connected in series with a 4nF capacitor. The total capacitance is:
- (a) 1nF
  - (b) **2nF**
  - (c) 5nF
  - (d) 8nF
9. A 4nF capacitor is connected to a 12V D.C. supply. The total energy supplied in charging the capacitor is:
- (a)  $24 \times 10^{-9}$  Joules
  - (b)  $48 \times 10^{-9}$  Joules
  - (c)  **$288 \times 10^{-9}$  Joules**
  - (d)  $576 \times 10^{-9}$  Joules
10. The time taken to fully charge a capacitor is:
- (a) inversely proportional to the voltage supplied
  - (b) proportional to the capacitance
  - (c) inversely proportional to the current
  - (d) **infinite**

## An Introduction to Mechanical Engineering Part 1

11. Fleming's Right Hand Rule states that the following three entities will be at right angles to each other:

- (a) **force, emf and field**
- (b) motion, force and emf
- (c) motion, emf and current
- (d) force, field and current

12. The rms voltage for a 240V A.C supply is:

- (a) 15.5V
- (b) 120V
- (c) **169.7V**
- (d) 240V

13. A 100V rms 50Hz alternating voltage supply is connected to a 159nF capacitor. Calculate the current.

- (a) +j 2A
- (b) **+j 5mA**
- (c) -j 2A
- (d) +j 5A

14. A 100V rms ac supply feeds a 200 $\Omega$  resistor in series with a 100mH inductor. Calculate the power dissipated when the frequency is 50Hz.

- (a) 4W
- (b) 8W
- (c) 24W
- (d) **48W**

15. A balanced 3-phase 415V (line) 50Hz supply has a phase voltage of:

- (a) 83V
- (b) **240V**
- (c) 293V
- (d) 415V

16. For a delta or mesh connected load with a line voltage of 415V, the phase voltage is:

- (a) 83V
- (b) 240V
- (c) 293V
- (d) **415V**

17. The total power dissipation in a delta connected load is:
- (a) the same as a star connected load
  - (b) twice the power dissipated in a star connected load
  - (c) thrice the power dissipated in a star connected load**
  - (d) one third the power dissipated in a star connected load
18. A thyristor acts like a diode but has an additional terminal called a gate. The gate:
- (a) should be connected to a low voltage trigger**
  - (b) provides an additional input channel
  - (c) enables the current to be rectified
  - (d) allows current to be drawn
19. The average D.C. voltage from the circuit in Figure 5.56 when the input is a 50V rms A.C. supply is:
- (a) 25V
  - (b) 45V**
  - (c) 50V
  - (d) 141V
20. The average dc output from the smoothed uncontrolled half wave rectifier shown in Figure 5.57 is 12V, the load resistance is  $600\Omega$  and the supply frequency is 50Hz. The value of capacitance necessary to provide a ripple voltage of less than 0.5V is:
- (a)  $20\mu\text{F}$
  - (b)  $40\mu\text{F}$
  - (c)  $80\mu\text{F}$**
  - (d)  $100\mu\text{F}$