EE 151 APPLIED ELECTRICITY

NOVEMBER, 2006   1 ¼ H

Each question is followed by four options lettered A to D. Find out the correct option and circle without ambiguity the letter for the option you have chosen.

Index No…………………………..Dept…………….……………………Circle Your Year: 1, 2, 3 or 4.

1. If the voltage across a 1000-µF capacitor is $v(t) = 2t$ volts, find the current through the capacitor at $t = 10\,\text{s}$ in milliamps.
   A 100
   B   50
   C   4
   D   2

Use the circuit in Fig. 2 to answer questions 2 and 3 given that $I_2 = 1A$.

2. Determine the source current I_1 in amps.
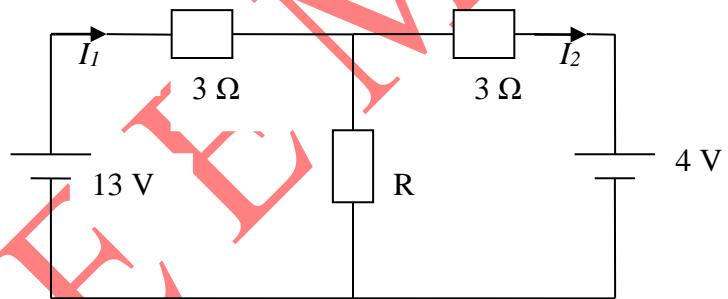   A 3.0
   B 2.0
   C 1.0
   D None of the above

3. Determine the value of the resistance R in ohms.
   A. 7.0
   B. 4.0
   C. 1.0
   D. None of the above

Fig. 2

Use the circuit in Fig. 4 to answer questions 4 to 6

4. Find the current supplied by the 24-V source in amps if it is acting alone.
   A 5.0
   B 4.0
   C 3.0
   D 2.0

5. Find the value of the current I in amps if the 32-V source is acting alone.
   E 8.0
   F 7.0
   G 6.0
   H 5.0

6. Find the value of I in amps if the two voltage sources are all in circuit.
   A 4.5
   B 3.0
   C 1.5
   D None of the above.

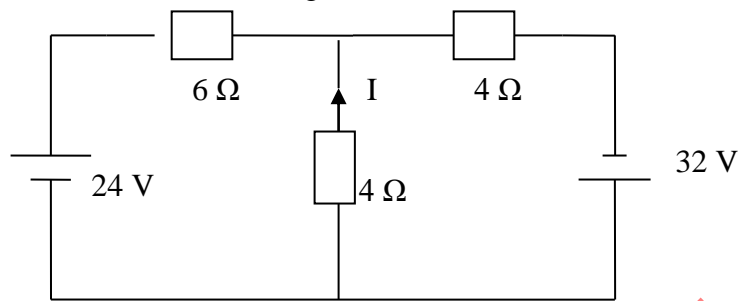6 Ω   I   4 Ω

24 V   4 Ω   32 V

Fig. 4

Use the circuit in Fig. 5 to answer questions 7 and 8.

7. Determine the voltage across the terminal A and B in volts.
   A 2.0
   B 1.5
   C 1.0
   D 0.5

8. Find in ohms the resistance seen between terminals A and B when the 6-V source is deactivated.
   A 5.40
   B 2.67
   C 1.45
   D 0.50

2 Ω   4 Ω
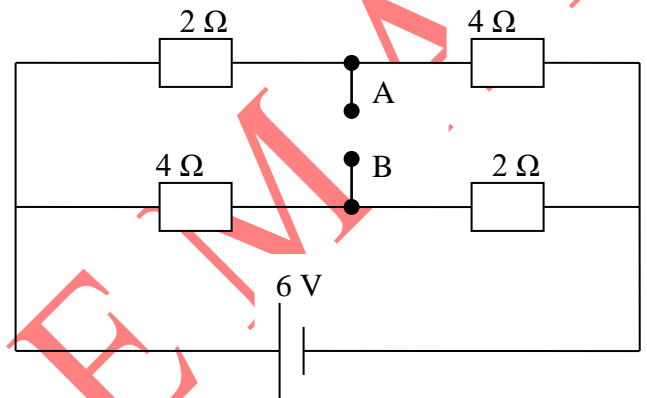A
4 Ω   B   2 Ω

6 V

Fig. 5

9. Calculate the r.m.s. value of the waveform in Fig. 8
   A 4.0
   B 3.0
   C 2.0
   D 1.0

10. Calculate the average value of the waveform in Fig. 8.
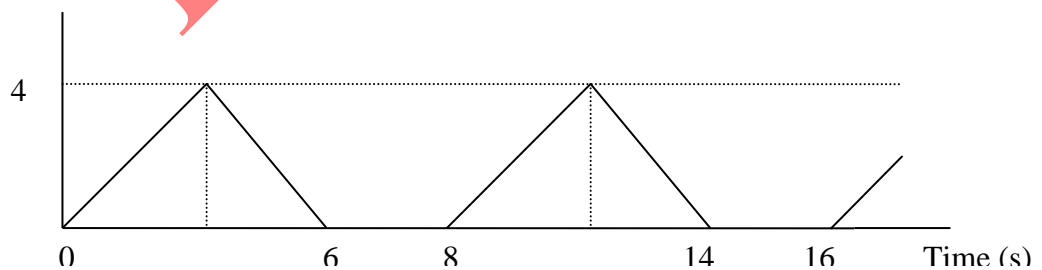   A 6.0
    B 4.5
    C 3.0
    D 1.5

4

0   6   8   14   16   Time (s)

Fig. 8

2

11. Four conductors meet at a junction, as shown in Fig. 9. The currents are $i_1 = 5\sin \omega t$,

$i_2 = 3\sin(\omega t + 90^o)$ and $i_3 = 2\sin(\omega t - 90^o)$.

Calculate the r.m.s. value of the current i_4.
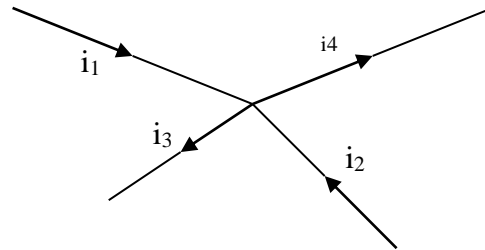
A 7.5
B 6.3
C 5.0
D None of the above.

Fig. 9

12. An alternating current is represented by

$i = 3 + 4\sqrt{2}\sin \omega t + 5\sqrt{2}\sin 3\omega t$. Calculate its average value.

A 12.0
B 9.0
C 6.0
D 3.0

13. Calculate the r.m.s. value of the current given in problem 19.

A 9.57
B 7.07
C 5.67
D 3.02

14. An inductor having inductance of $3/\pi$ H is connected in series with an 8-ohm resistor. A 28-V, 1-Hz supply is connected across this series circuit. Determine the voltage across the resistor in volts.

A 22.4
B 16.8
C 16.0
D 12.0

Use the information below to answer questions 15 and 16.

When a series circuit, containing inductance and resistance, was connected across a 240-V, 50-Hz supply, the current was 4 A and the power taken was 400 W.

15. Calculate the power factor of the circuit, when connected across the a.c. supply.

A 0.912
B 0.615
C 0.417
D 0.312

16. Calculate the inductance in henries.

A 0.515
B 0.437
C 0.256
D 0.174