Unit 12 - Week 10

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Week 10 Assignment 10

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2019-10-09, 23:59 IST.

1) The self-inductances of two coils are 27H and 3H respectively and their mutual inductance is 6 H. The coupling coefficient (k) is: *1 point*

a. $\frac{3}{2}$
b. $\frac{2}{3}$
c. $\frac{3}{4}$
d. $\frac{3}{5}$

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
b.

2) *1 point*

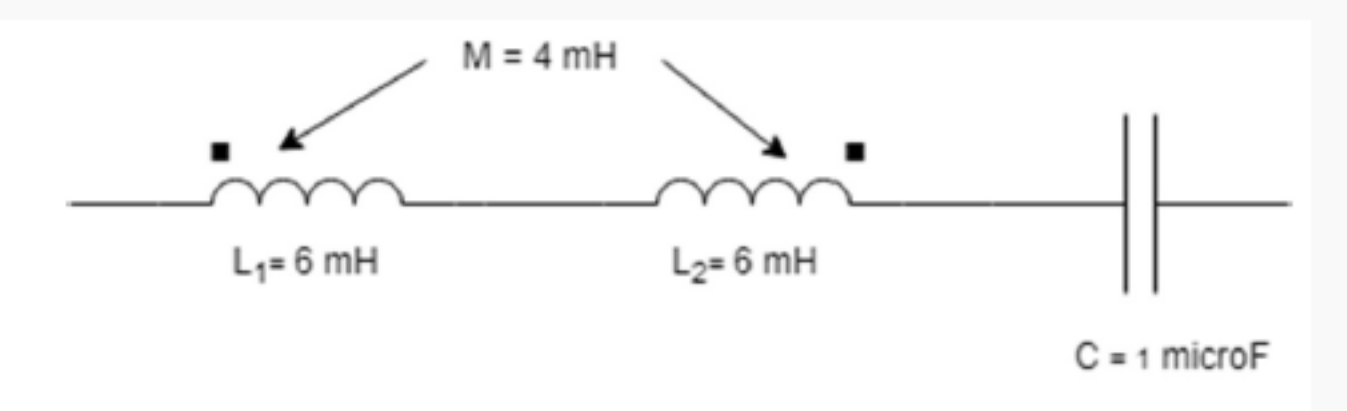

Fig.2

Find the resonant frequency (in kHz) of the circuit shown in Fig.2

a. 2.51 – 2.52
b. 3.21 – 3.22
c. 2.37 – 2.38
d. None of the above

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
a.

3) Two single-phase transformers A and B are supplied from a 440 V, 50 Hz source, and a 440V, 75 Hz source, respectively. The cross-sectional area of transformer A is X unit. The flux densities in both the transformers are same. Determine the cross-sectional area of transformer B: *1 point*

a. X unit
b. ($3X/2$) unit
c. ($2X/3$) unit
d. ($4X/9$) unit.

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
c.

4) *1 point*

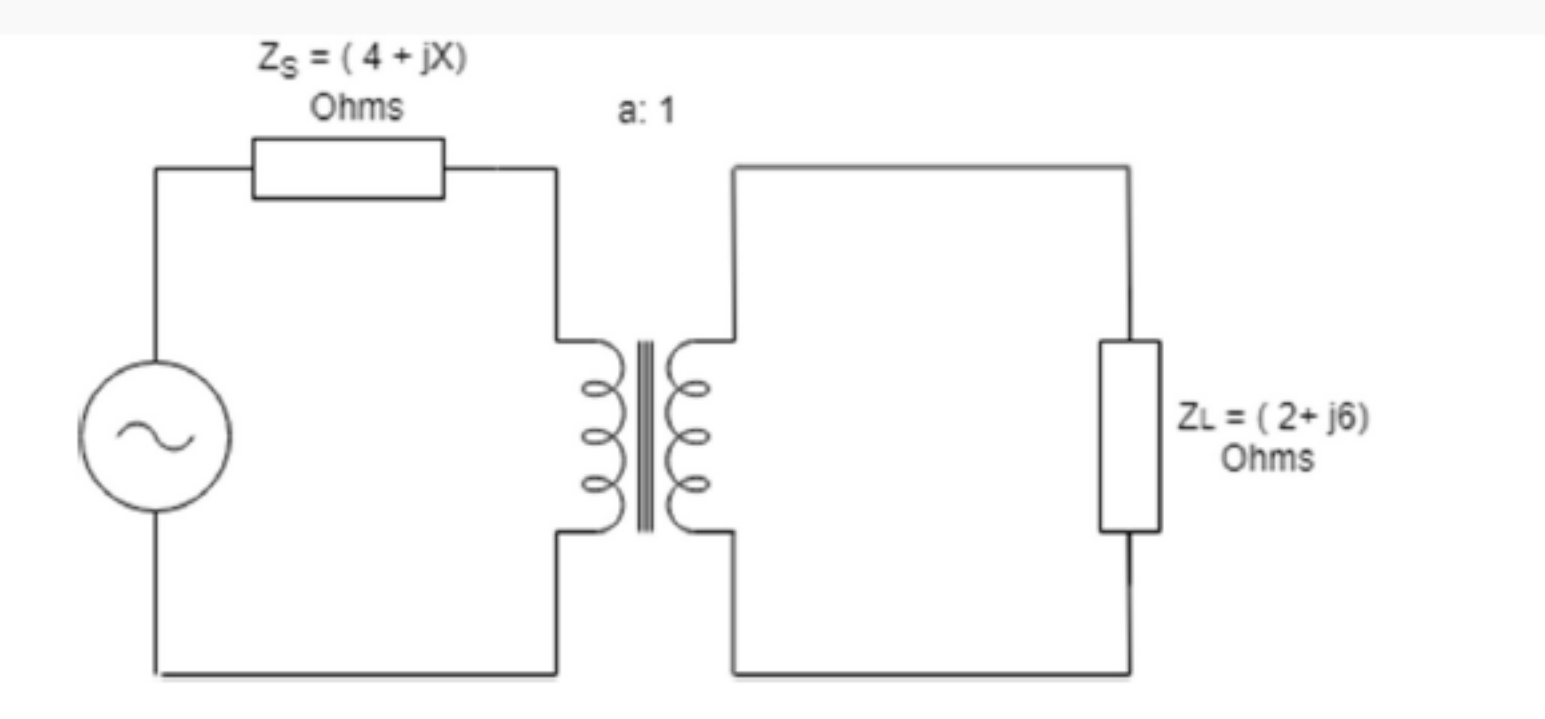

Fig.4

Fig. 4 shows a circuit where a source is connected to a load [with impedance Z_L = (2+j6) Ohms] via a single-phase transformer with turns ratio a:1. The source impedance Z_s = (4 + j X) Ohms. Find out 'a' and 'X' for maximum power transfer from the source to the load.

a. $a = \frac{1}{\sqrt{2}}$; $X = 12$
b. $a = 2$; $X = 12$
c. $a = \frac{1}{\sqrt{2}}$; $X = -12$
d. $a = \sqrt{2}$; $X = -12$

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
d.

5) *1 point*

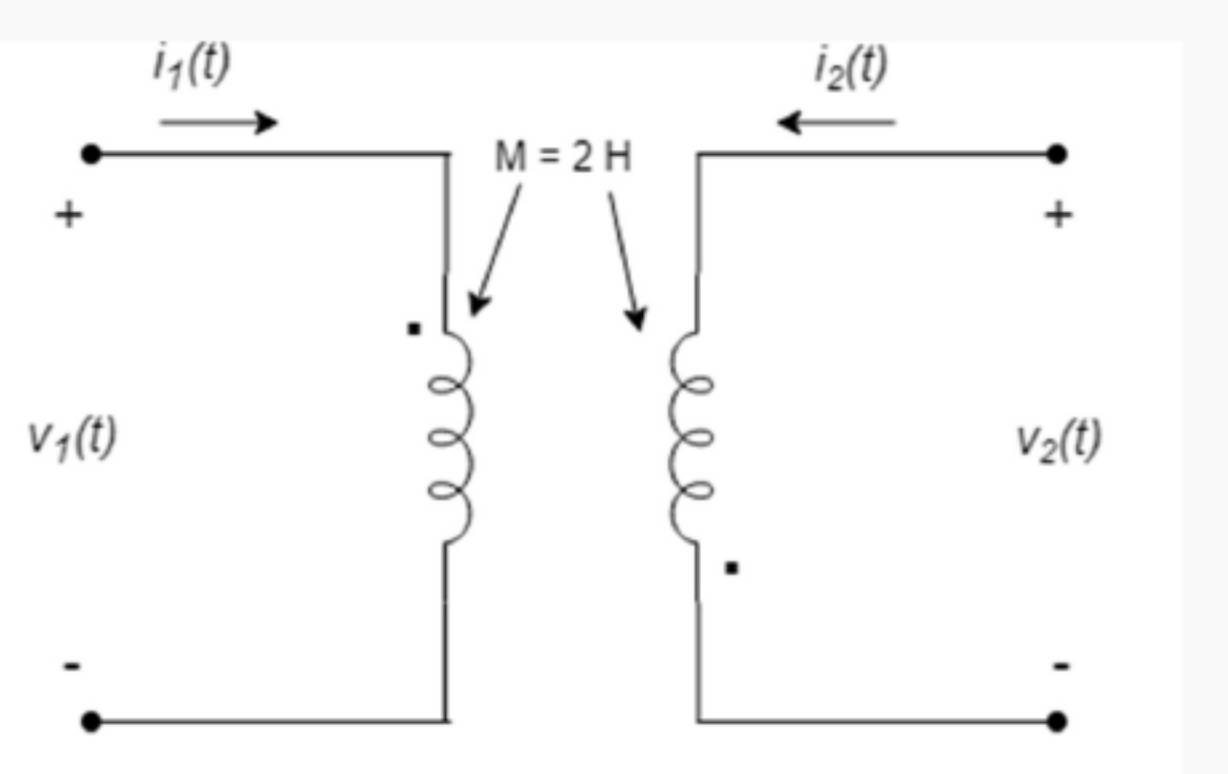

Fig.5

For the circuit shown in Fig.5, determine $V_1(t)$ if $i_2(t)$ = 5 sin (45t) A and $i_1(t)$=0.

a. 450 cos(45t) V
b. -450 cos(45t) V
c. 450 sin(45t) V
d. -450 sin(45t) V

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
b.

6) *1 point*

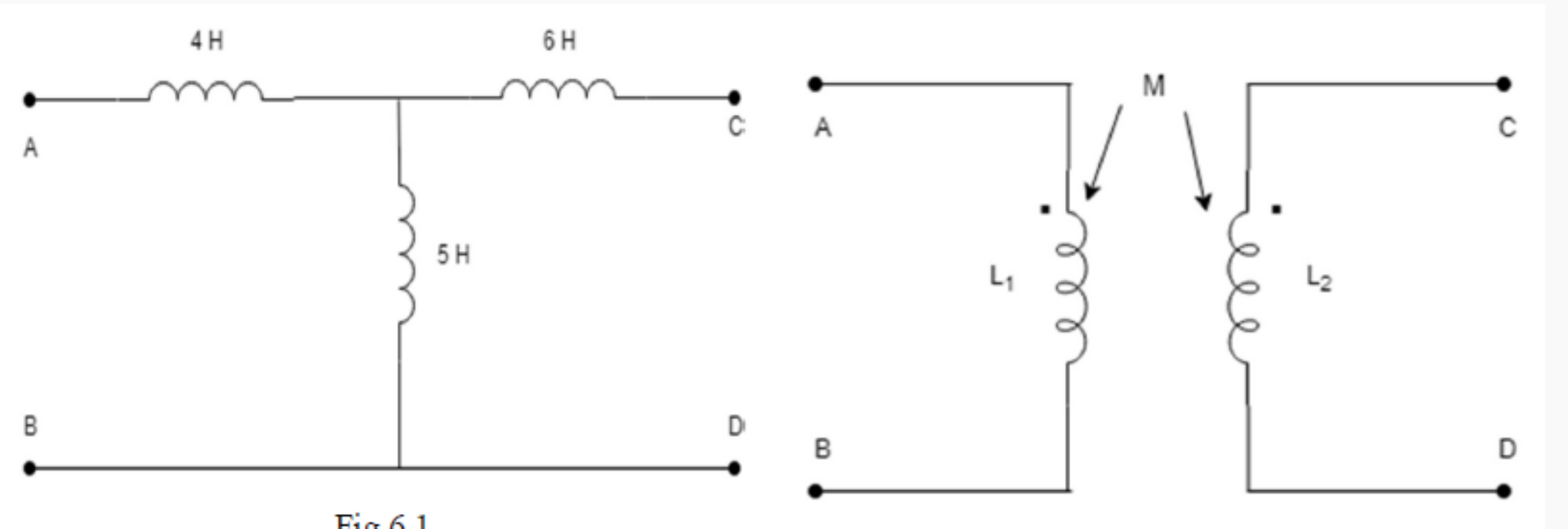

Fig.6.1 Fig.6.2

The networks of Fig.6.1 and Fig.6.2 are equivalent. Calculate the values of L_1 , L_2 and M.

a. L_1 = 6 H, L_2 = 4 H, M = 5H.
b. L_1 = 4 H, L_2 = 6 H, M = 5H.
c. L_1 = 11 H, L_2 = 9 H, M = 5H.
d. L_1 = 9 H, L_2 = 11 H, M = 5H.

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
d.

7) In a 3-phase balanced delta connection, the two wattmeter method is used to measure the power. If the readings of the two wattmeters are 56.26 kW and 26.62 kW, the power factor of the connection will be: *1 point*

a. 0.6
b. 0.85
c. 0.9
d. 1.0

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
b.

8) In a three-phase power measurement of a balanced load by the two wattmeter method, the reading of one of the wattmeters is double of the reading of the other wattmeter. The magnitude of the power factor angle of the load must be *1 point*

a. 30^0
b. 45^0
c. 60^0
d. 90^0

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
a.

9) *1 point*

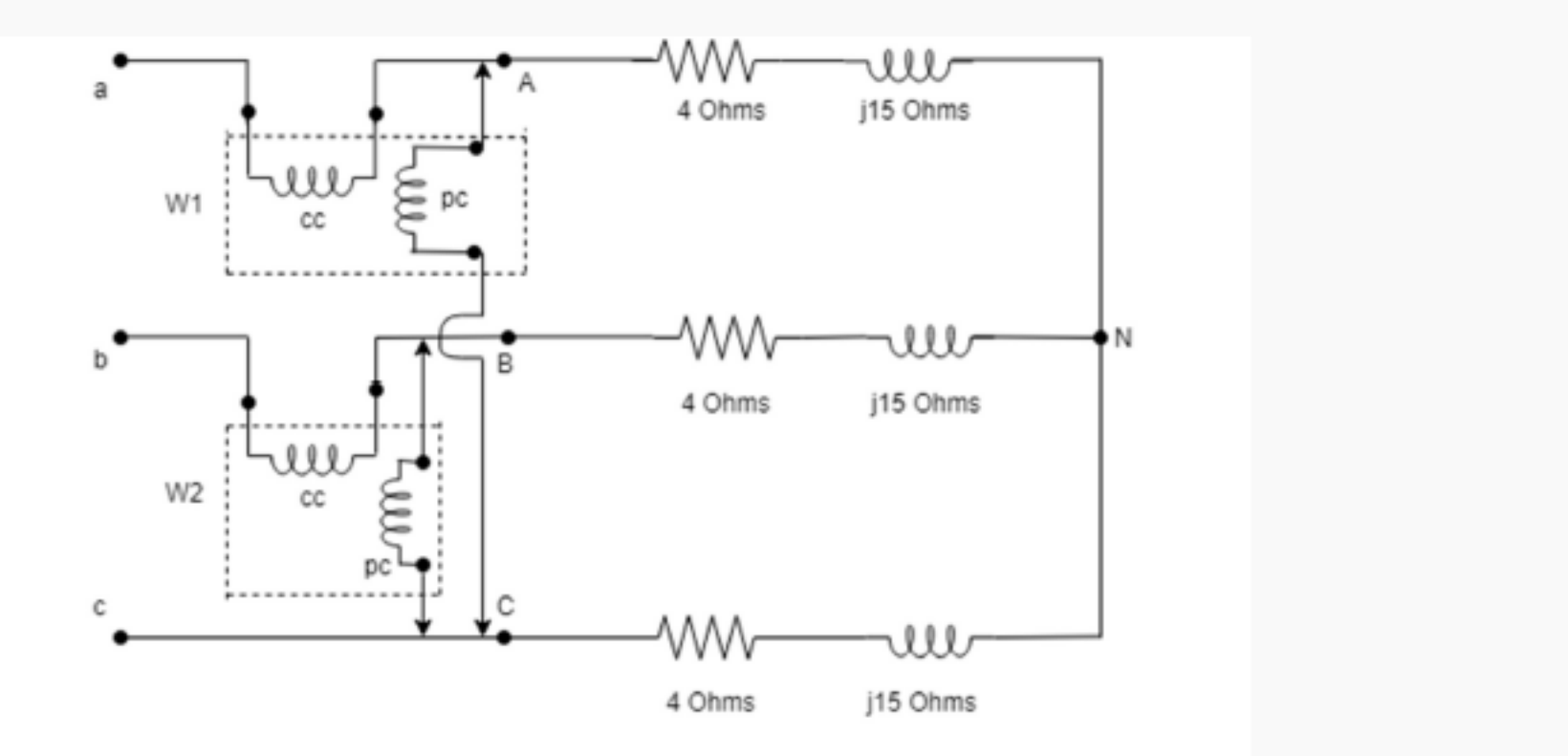

Fig.9

The balanced load in Fig.9 is fed by a balanced three-phase system having $V_{ab} = 230\angle 0^0\ V\ rms$ (i.e $V_{an} = \frac{230}{\sqrt{3}}\angle -30^0\ V\ rms$) and a-b-c phase sequence. In Fig.9, 'cc' means current coil of wattmeter and 'pc' means pressure (or, voltage) coil of wattmeter. W1 and W2 are the two wattemeters used for power measurement in the circuit. The detailed connection is shown in Fig.9. Find the readings of W1 & W2.

a. W1 = 510 to 513 W, W2= -1388 to -1391 W
b. W1 = -510 to -513 W, W2= 1388 to 1391 W
c. W1 = 1388 to 1391 W, W2= -510 to -513 W
d. W1 = -1388 to -1391 W, W2= 510 to 513 W

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
c.

10) A three-winding transformer is connected to an AC source voltage source as shown in Fig.10. The number of turns are as follows: N_1 =400, N_2= 100, N_3=100. If the magnetising current is neglected, and the currents in two windings are: $\overline{I_2} = 2\angle 30^0 A; \overline{I_3} = 2\angle 150^0 A$, then what is the value of the current $\overline{I_1}$ in Ampere? *1 point*

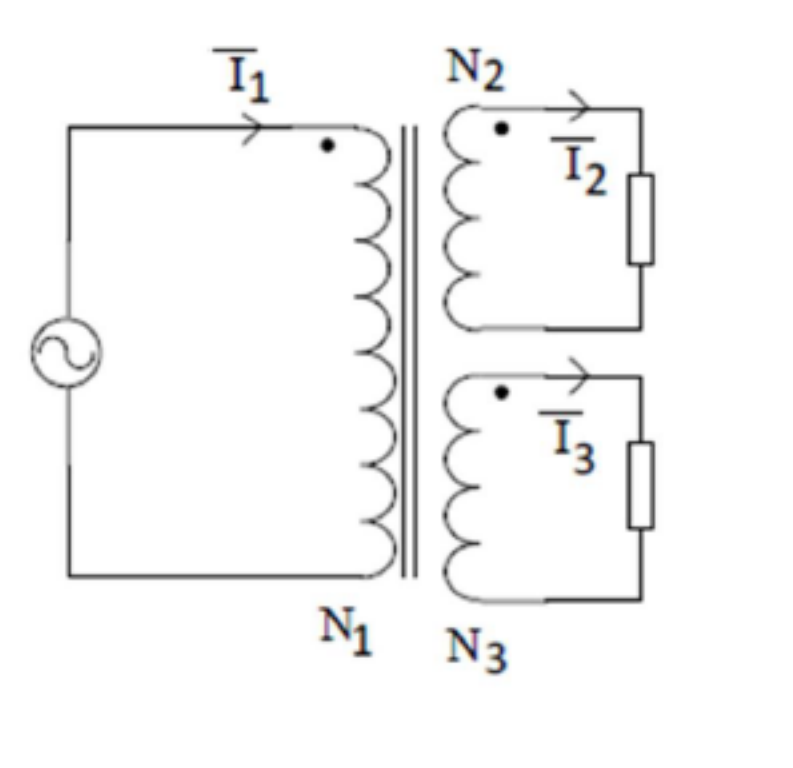

Fig.10

a. $0.5\angle 90^0$
b. $0.5\angle 270^0$
c. $8\angle 90^0$
d. $8\angle 270^0$

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
a.

11) The magnetic circuit shown in Fig.11 has uniform core cross-sectional area and air gap of 0.2 cm. The mean path length of the core (including the air gap) is 40 cm. Assume that the leakage and fringing fluxes are negligible. When the core relative permeability is assumed to be infinite, the magnetic flux density computed in the air gap is 1.5 Tesla. With the same ampere-turns, if the core permeability is assumed to be 1000 (linear), the flux density (in Wb/m²) calculated in the air-gap will be: *1 point*

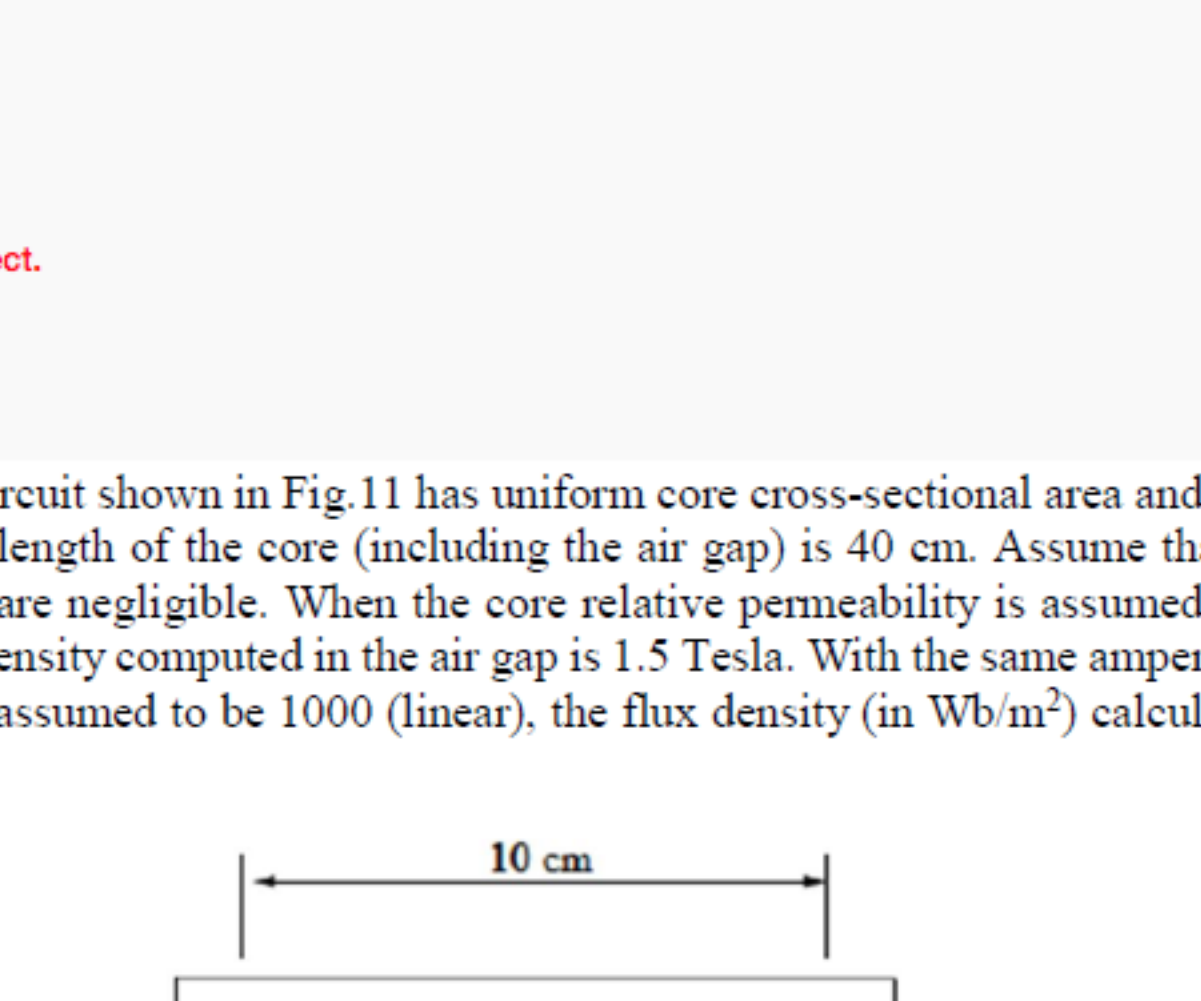

Fig.11

a. 0.545 – 0.565
b. 0.825 – 0.845
c. 1.785 - 1.805
d. 1.248 – 1.252

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
d.

12) The magnetic circuit of the Fig.12 consists of a winding with N= 83 turns on a magnetic core of infinite permeability with two parallel air gaps of length $g_1 = 2.3\ mm$ and $g_2 = 3.45\ mm$ and areas $A_1 = 1.8 \times 10^{-3}\ m^2$ and $A_2 = 2.7 \times 10^{-3}\ m^2$ respectively. Find the inductance (in mH) of the winding when it is carrying 10A current. Neglect leakage and fringing effects in the air gaps. *1 point*

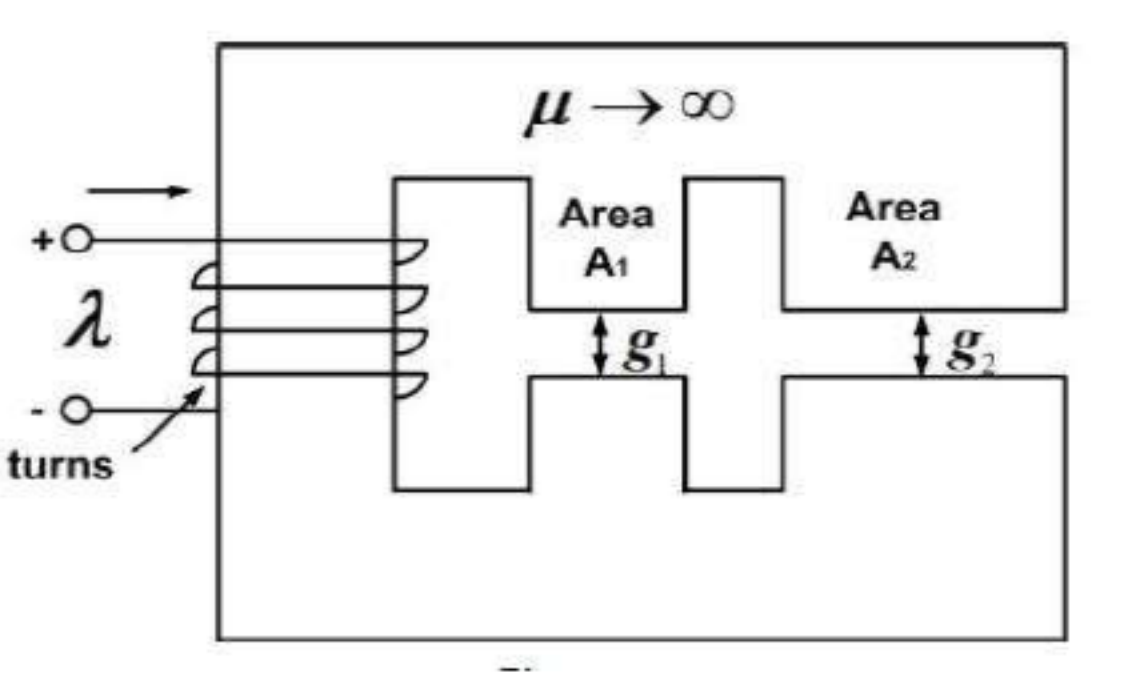

Fig.12

a. 3.35 – 3.45
b. 3.10 – 3.20
c. 13.50 – 13.60
d. 22.10 – 22.20

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
c.