Assiut University
Faculty of Engineering
May – 2015

Final Exam

2nd Year Architect. Eng.
Course: Air Conditioning Part
Time: 1 Hour, Marks: 30

[Quality matter: This exam. measures ILOs a1 & a4, a5, a8, b2 & b3, ,b4 & b5.]

Psychrometric chart with student is allowed

Try the following questions.

Question no. 1 (5 points).

Define the following:

Coefficient of performance, Relative humidity – Latent heat – Sensible heat factor – Dew point temperature

Question no. 2 (4 points).

A 8 kg/s of an air stream at 10° C and 50% RH is mixed with 2 kg/s of an air stream at 35°C DBT and 0.014 kg w.v/kg d.a humidity ratio . find the DPT of the mixture.

Question no. 3 (6 points).

A 2 kg/s of air stream at 8 °C DBT and 5 °C WBT is heated sensibly up to 24°C DBT, then a 20 g w.v./s of moisture is added in a humidifying process. Calculate the sensible load and sensible heat factor.

Question no 4 (6 points).

A 60 cmm of moist air at a 32 °C DBT and 22 °C WBT enters a cooling and a dehumidifying coil. If it is desired that the air leaves the coil at 18 °C DBT and 16 °C WBT, determine the following:

a) the effective surface temperature of the coil

b) coil bypass factor

c) the coil cooling capacity

Question no. 5 (10 points).

The space shown is to be conditioned has the following:

One storey space of height 4 m, west glass area 12 m^2 door 2.0mx 1.5 m

At the hour of calculation you have:

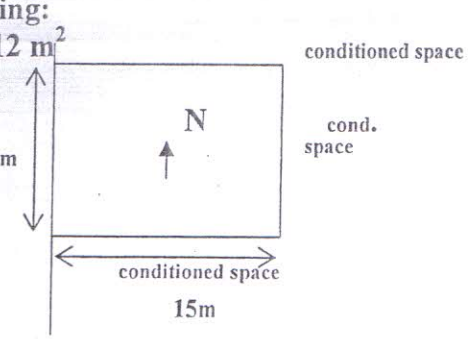
heat transmission through glass =45 W/m^2

solar heat gain through glass = 460 W/m^2

CLF for solar heat gain 0.7

U for west wall 3.5 W/m^2. °C and for roof of 2.5 W/m^2. °C.

$CLTD_{corr}$ for west wall 13° C, and for roof 17° C.



Outside design conditions: 40 C DBT and 27° C WBT, Inside design conditions 25 °C and 50 % R.H., lighting 25 W/m^2 , CLF = 0.7, Occupancy 25 persons, sensible heat gain per person 75 W and latent heat gain per person 65 W, CLF = 0.6

Ventilation air 12 m^3/hr per person and infiltration air 6 m^3/min.

Assume any missing data, calculate space cooling load.

Best wishes, Examiners: Prof. Ibrahim .M. Ismail + "The committee"

كلية الآداب — المادة: اللغة العربية

قسم : اللغة العربية — الزمن : ساعتان

الفرقة: الأولى – كلية الهندسة (جميع الشعب)

امتحان الفصل الدراسي الأول يناير ٢٠١٥م

أجب عن الأسئلة الآتية :

***السؤال الأول :** **(١٠ درجات)**

أ- " اللغة ألفاظ يعبر بها كل قوم عن مقاصدهم " اشرح ذلك .

ب- مثل لما يأتي : (الاسم – الفعل – الحرف – همزة قطع – ألف الوصل – همزة متوسطة – همزة متطرفة – بعض علامات الترقيم) .

***السؤال الثاني :** **(١٥ درجة)**

- قال الشاعر :

١- خدعـوها بقولهم حسناء — والغـواني يغـرهن الثناء

٢- أتـراها تناست اسمي لما — كثرت في غرامها الأسماء

٣- إن رأتنـي تميل عني كأن — لم يك بينـي وبينها أشياء

٤- نظـرة فابتسامة فسـلام — فكـلام فمـوعـد فلقـاء

أ- ماذا تعرف عن الشاعر ؟

ب- اشرح الأبيات السابقة شرحاً أدبياً .

ج- ضع عنواناً لها ، وما الغرض الشعري منها .

د- استخرج من البيت الثالث صورة خيالية .

***السؤال الثالث :** **(١٥ درجة)**

أ- درست سورتي : (الفيل – والكوثر) ما الهدف منهما ؟ وما نوع البلاغة في قوله تعالى : (كعصف مأكول) .

ب- مثل لكل من : (الإعلال – الإدغام – الإبدال) .

ج- ماذا تعرف عن علوم اللغة العربية ؟

مع أمنياتي التوفيق ،،،

د/ حسين محمد حسن

كلية الهندسة
قسم الهندسة المعمارية
امتحان نهاية الفصل الدراسي الثاني
٢٠١٥/٢٠١٤

مقرر التصميم المعماري (٣)
كود: A225

الفرقة الثانية – لائحة ٢٠٠٤
التاريخ: السبت ٢٠١٥/٥/١٩
النهاية العظمى: ٨٠ درجة
الزمن المحدد: ٦ ساعات

ملاحظات هامة

- الامتحان يقيس مهارة انتاج تصميمات معمارية تأخذ في الاعتبار اتساق النواحي الوظيفية والتشكيلية والانشائية وملاءمتها مع المحددات البيئية والمناخية للموقع.
- الامتحان مكون من صفحتين.
- يرجى الالتزام بالنظافة والدقة فى الرسم.
- يكون الحل النهائى فى اللوحة البيضاء وليس فى الشفافات.
- على الطالب فرض المعلومة التى يجدها ضرورية للتصميم إذا لزم الأمر.

يُراد إقامة "معهد عالي للهندسة" فى أحد المواقع بمدينة أسيوط الجديدة على مساحة تبلغ ثمانية آلاف متر مربع (٨٠٠٠ م٢) كما يبين الكروكي المرفق، والمطلوب عمل التصميم المعمارى للمعهد بتشكيل كتلى مميز وبنسبة بنائية لا تتجاوز ٤٠٪ من مساحة الأرض، ويراعى فى التصميم أن يشتمل على العناصر التالية:

أولا: الفراغات التعليمية:

- عدد ١٥ فصل دراسي يسع كل منها ٥٠ طالب.
- عدد ٤ صالة رسم تسع كل منها ٥٠ طالب.
- عدد ٢ مدرج يسع كل منها ١٠٠ طالب.
- عدد ١ قاعة مؤتمرات ومحاضرات تسع ٣٠٠ شخص.
- عدد ٢ معمل حاسب آلي مجهز لعدد ٥٠ طالب (ملحق به غرفة لأمين المعمل)
- مكتبة لعدد ٥٠ مستخدم.
- قاعة سيمينار تسع ٥٠ طالب.

ثانيا: مبنى الورش:

- مبنى للورش بمساحة حوالي ٦٠٠ م٢، لها مدخل خاص للتخديم متصل بأحد الشوارع.
- غرف تغيير ملابس للعمال (عدد ١٠ كبائن + دواليب حفظ) وأدشاش (عدد ١٠)، ودورات مياه (عدد ٥).
- مخازن بمسطح اجمالي حوالي ٢٠٠ م٢.

ثالثا: الفراغات التكميلية:

- الإدارة، وتشمل:
  - مكتب عميد المعهد بمساحة ٥٠ متر مربع.
  - مكتب رئيس مجلس ادارة المعهد بمساحة ٥٠ متر مربع.
  - غرفة سكرتارية بمساحة ٣٠ متر مربع.
  - غرفة اجتماعات بمساحة ٥٠ متر مربع.
  - غرفة وكيل المعهد بمساحة ٣٠ متر مربع.
  - غرف إدارية بمجموع مساحات ٢٠٠ متر مربع.
  - عيادة طبية ملحق بها غرفة للعزل بمساحة مناسبة.
  - قاعة رصد درجات بمساحة ٣٠ متر مربع.
- عدد ٨ مكاتب أعضاء هيئة التدريس بمساحة ٣٠ متر مربع لكل مكتب.
- عدد ٢ مكتب لمعاوني هيئة التدريس بمساحة ٣٠ متر مربع لكل مكتب

رابعا: الفراغات الخدمية:

- كافتريا بمساحة ١٥٠ متر مربع ملحق بها أوفيس للتخديم عليها.
- مصلى للطلاب مع توفير مكان للوضوء.
- دورات مياه للطلاب، ودورات مياه لاعضاء هيئة التدريس والإدارة.
- مجموعة مخازن بمساحات متعددة بمجموع مساحة ٢٠٠ متر مربع.

خامسا: الفراغات المفتوحة:

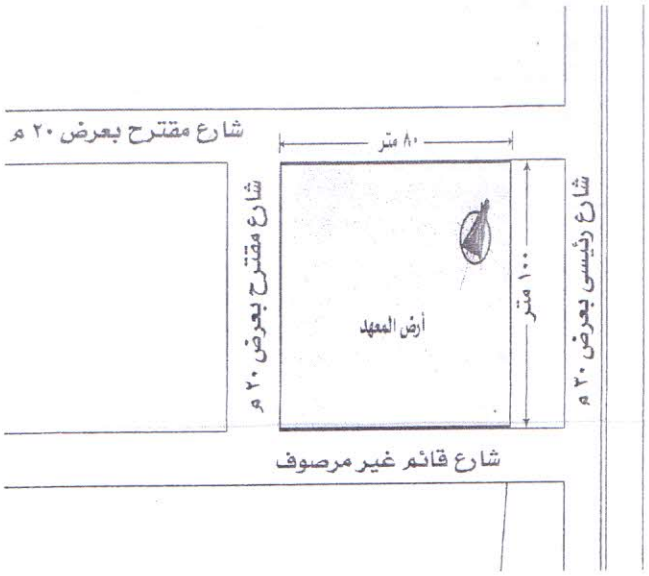
- فراغ مظلل بمساحة مناسبة ومناطق انتظار سيارات.
- ملعب خماسى بأبعاد ١٥X٢٥م.

من فضلك اقلب الورقة

المسطحات والمعايير اللازمة لكل عنصر طبقا للاشتراطات

متوسط نصيب الطالب من المساحة	الفصل والمدرج	المكتبة ومعمل الحاسب الآلي	معمل الحاسب الآلى	قاعة المؤتمرات	صالة الرسم وقاعة السيمينار
	١,٠٢ – ١,٠٤ م٢	١,٧٥ م٢	١,٧٥ م٢	١,٠٠ م٢	٢,٠٠ م٢

يراعى توفير ١ دورة مياه لكل ٢٥ – ٣٠ طالب ، دورة مياه لكل ٢٠ عضو هيئة تدريس
لا يقل عرض الطرقات فى الفراغات التعليمية عن ١,٨ م تزيد إلى ٣ م فى حالة التخديم على الناحيتين
الحد الادنى لعدد السلالم التى تخدم أى مبنى هو سلمين (عرض القلبة لا يقل عن ١,٥ م)
لا تزيد مسافة السير بين أبعد فراغ والسلم عن ١٨,٠٠ م



كروكي الموقع العام

المطلوب توضيح فكرة الحل من خلال الرسومات التالية:

- المساقط الأفقية موضحاً عليها الطريقة الانشائية — مقياس رسم ١/٢٠٠ أو ١/٤٠٠
- قطاع معمارى رأسى (أو قطاعات) فى مبنى المعهد وقاعة المؤتمرات. — مقياس رسم ١/٢٠٠
- الواجهة الرئيسية. — مقياس رسم ١/٢٠٠
- الموقع العام. — مقياس رسم ١/٤٠٠
- توضيح التكوين الكتلي للمشروع من خلال لقطة منظورية.
- أي رسومات أخري يراها الطالب لازمة لتوضيح فكرة الحل.

توزع درجات الامتحان كالآتى:

• تحقيق المعدلات والعلاقات الوظيفية بشكل منطقي سليم	٢٥ درجات
• مراعاة الاعتبارات البيئية (التوجيه والاضاءة والتهوية).	٥ درجات
• تحقيق التميز التشكيلي للكتلة والمسقط الافقي والواجهة، وحسن التعبيرعنها.	٢٥ درجات
• حسن اختيار الطريقة الانشائية وصحة التعبير عنها في المساقط والواجهة والقطاع.	٢٠ درجات
• تصميم ورسم وإظهار الموقع العام	٥ درجات

دقة ونظافة الرسم وطريقة الإظهار يكون لها اعتبار عند التقييم

انتهت الأسئلة

دعواتنا بالتوفيق،، د. حنان رفعت محمد د. محمد رفاعه فهمى د. محمد محمد عزمي د. ريم وعظ أمجد +اللجنة

ASSIUT UNIVERSITY
FACULTY OF ENGINEERING
DEPT. OF ELECTRICAL ENG.

CIRCUIT THEORY

2nd Year Elect.
جميع الطلبة (لائحة ٢٠٠٤، ١٩٩٧)

First Term Examination, 2009/2010

Time: 3 Hours

الامتحان مكون من أربع صفحات، الإجابة فى نفس ورقة الأسئلة، النهاية العظمى ١٠٠ درجة.
الإجابة النهائية يجب أن تكون مكتوبة فى المكان المخصص لها ولن يلتفت لغير ذلك.

Question 1:

a) The op-amp in the circuit of Fig.a is ideal. Calculate the following: (10 Marks)

I_1	**0.4 mA**
I_2	**0**
I_3	**0.5 mA**
I_4	**0.9 mA**
V_o	**- 3.7 V**

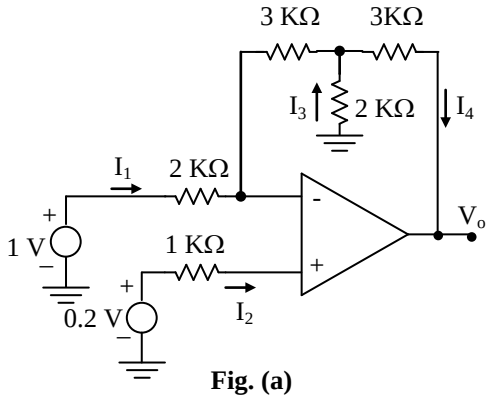


Fig. (a)

b) The switch in the circuit of Fig. (b) has been in position a for a long time. At t=0 it moves to position b. Calculate the following: (10 Marks)

$v_C(0^+)$	**26 V**
$i_L(0^+)$	**0.5 mA**
$v_o(0^-)$	**20 V**
$v_o(0^+)$	**22 V**
$i_c(0^+)$	**- 0.5 mA**

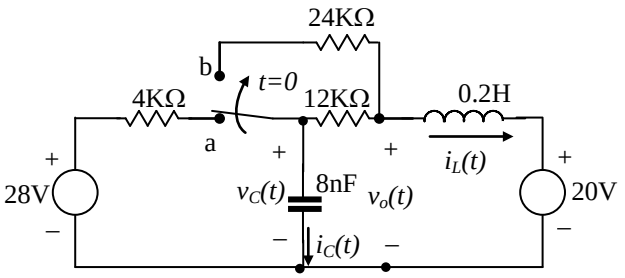


Fig. (b)

c) The circuit of Fig. (c) operates at radian frequency ω = 100 rad/sec. Find the mutual inductance *M*, the reflected impedance $\boldsymbol{Z_r}$ and the input impedance at port a-b. (6 Marks)

M	**1.5 H**
Z_r	**27-j36 = 45∠-53.1°Ω**
Z_{in}	**154.4∠30.3°Ω**

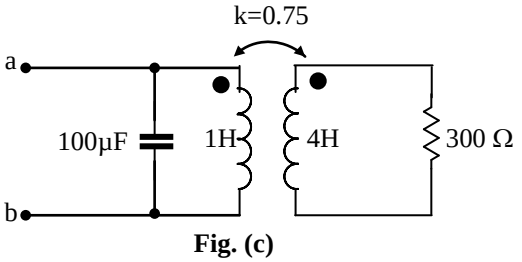


Fig. (c)

Question 2:

a) The switch in the circuit shown in Fig.a has been closed for a long time before it opens at $t = 0$. Find $v(t)$ for $0 \le t \le \infty$. (10 Marks)

$i_L(0^+)$ = **2 A**

$v(0^+)$ = **- 12 V**

$v(\infty)$ = **0**

τ = **30 mS**

$v(t)$ = $\mathbf{-12e^{-\frac{t}{30}}}$ **V**

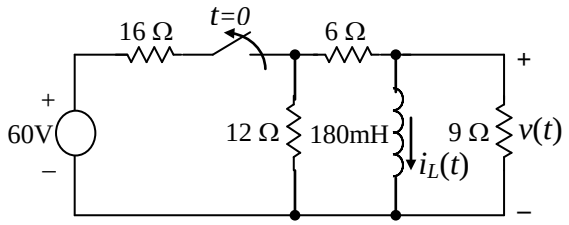


Fig. a

b) A balanced Y-connected load having an impedance of 18Ω/phase is connected in parallel with a balanced Δ-connected load having an impedance of 36Ω/phase. The parallel loads are fed from lines having an impedance of 2Ω/line. The magnitude of the line-to-neutral voltage at the Y-load is 720 V. Calculate the following: (10 Marks)

The magnitude of the line current **100 A**

The magnitude of the phase current in the Δ- load **$20\sqrt{3}$ = 34.6 A**

The magnitude of the phase current in the Y- load **40 A**

The magnitude of the line voltage at the sending end **$920\sqrt{3}$= 1593.5 V**

The total power dissipated in the loads **216 KW**

c)For the two-port of Fig. (c), Calculate: (8 Marks)

z_{11} = **6.8 Ω**

a_{21} = **0.714 S**

h_{12} = **0.3**

y_{22} = **0.378 S**

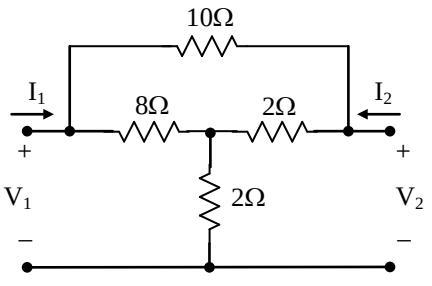


Fig. (c)

Question 3:

a) Find the first four Fourier coefficients of the voltage waveform of Fig.(a). (8 Marks)

a_o = **6.7**

C_1 = **5.5 ∠150°**

C_2 = **2.76 ∠30°**

C_3 = **0**

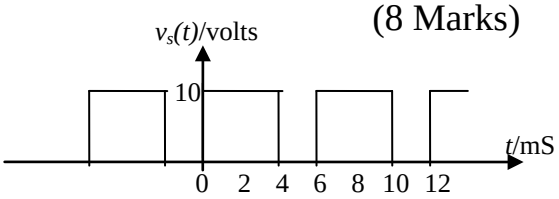


Fig. (a)

b) The voltage waveform of Fig.(a) is applied to the circuit of Fig. (b). Find the Fourier coefficients of the output voltage v_{ld}. (8 Marks)

V_{ldo} = **6 V**

V_{ld1} = **4.85 ∠138.2° V**

V_{ld2} = **2.29 ∠7.3° V**

V_{ld3} = **0**

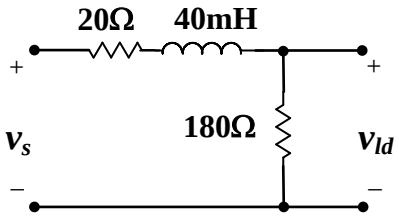
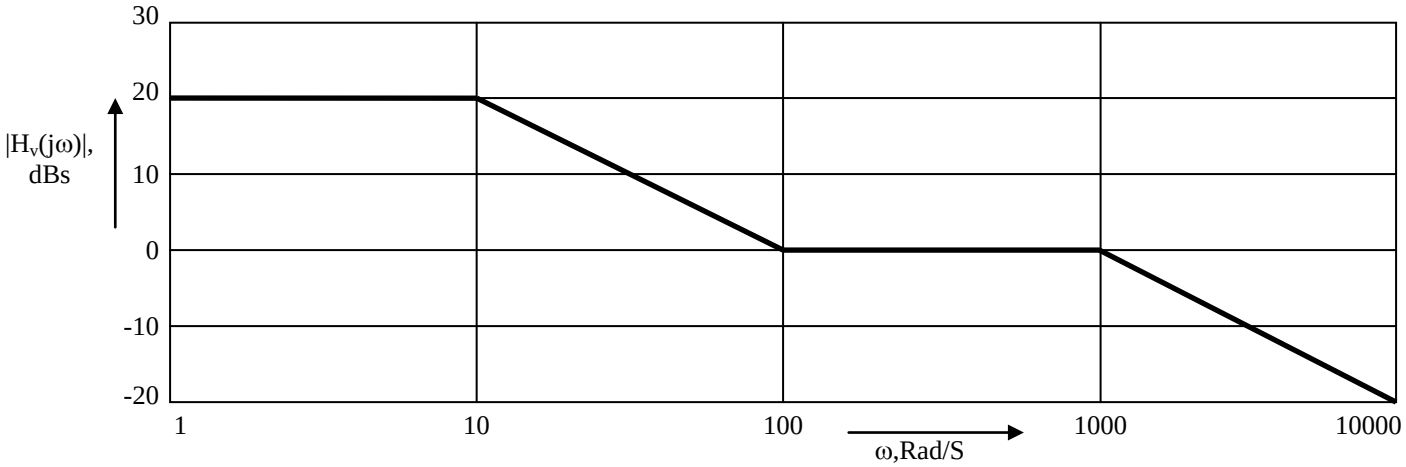


Fig. (b)

c) Sketch the Bode Diagram of the voltage transfer function: $H_v(s) = \dfrac{1000(s+100)}{(s+10)(s+1000)}$ (8 Marks)



Question 4:

a) Find the voltage transfer function and its poles and zeros for the circuit of Fig.a. (10 Marks)

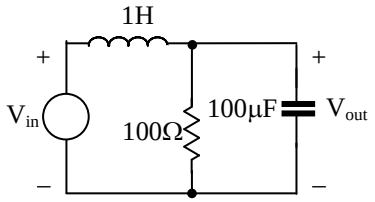


Fig.(a)

$$\boldsymbol{H_v(s) = \frac{10^4}{s^2 + 100s + 10^4}}$$

Poles: -50 + j 86.6, -50 - j 86.6

Zeros: ∞, ∞

b) The switch in the circuit shown in Fig.b has been opened for a long time before it closes at $t = 0$. Find $v_c(t)$ for $t \geq 0$. (12 Marks)

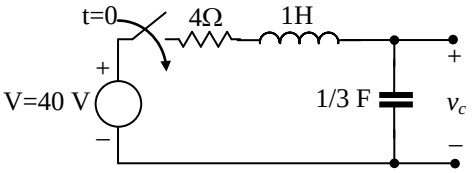


Fig. (b)

$$\boldsymbol{V_C(s) = \frac{120}{s(s^2 + 4s + 3)}}$$

$$\boldsymbol{= \frac{120}{s(s+1)(s+3)}}$$

$$\boldsymbol{= \frac{40}{s} - \frac{60}{s+1} + \frac{20}{s+3}}$$

$$\boldsymbol{v_C(t) = [40 - 60e^{-t} + 20e^{-3t}]u(t)\ V}$$

ASSIUT UNIVERSITY
FACULTY OF ENGINEERING
DEPT. OF ELECTRICAL ENG.

E222 CIRCUIT THEORY

2nd Year Elect.
جميع الطلبة (لائحة ٢٠٠٤، ١٩٩٧)

First Term Examination, 2010/2011

Time: 3 Hours

الامتحان مكون من أربع صفحات، الإجابة فى نفس ورقة الأسئلة، النهاية العظمى ١٠٠ درجة.
الإجابة النهائية يجب أن تكون مكتوبة فى المكان المخصص لها ولن يلتفت لغير ذلك.

Question 1:

a) The voltage waveform v_g shown in Fig.(a-1) is applied to the circuit of Fig.(a-2). Sketch v_o and v_1 versus t, assuming ideal op-amp. (10 Marks)

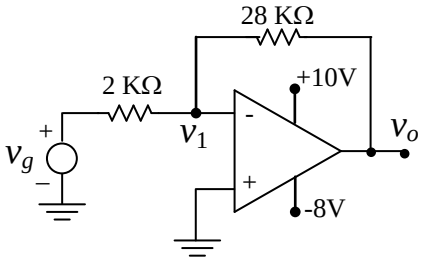


Fig. (a-2)

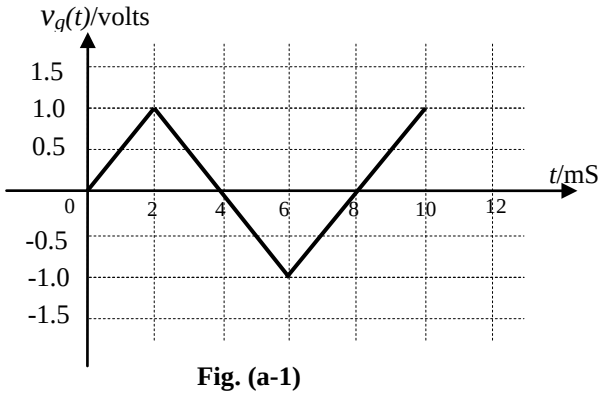
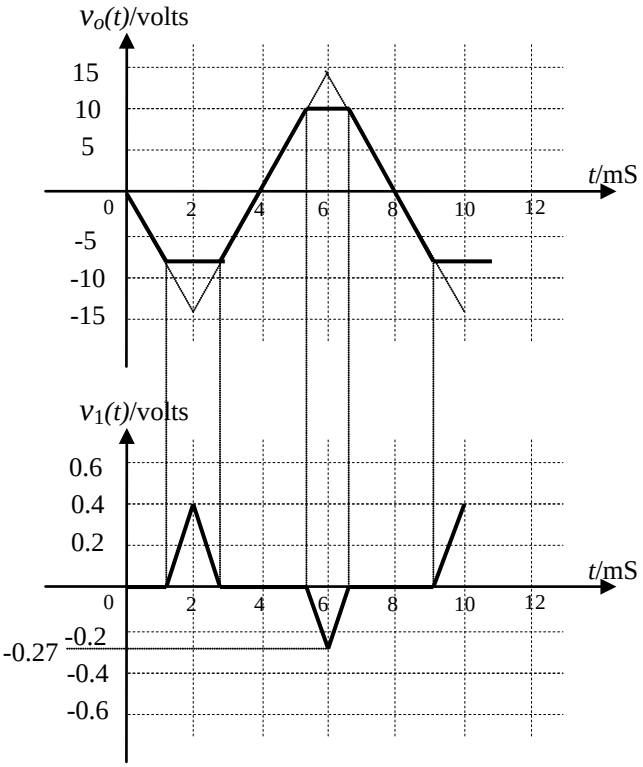


Fig. (a-1)



b) The switch in the circuit shown in Fig.b has been opened for a long time before it closes at $t = 0$. Find $i_o(t)$ for $0 \le t \le \infty$. (10 Marks)

$i_L(0^+)$ = **1 A**

$i_o(0^+)$ = **0.5 A**

$i_o(\infty)$ = **1.5 A**

τ = **0.5 S**

$i_o(t)$ = **$1.5 - e^{-2t}$ A, $0 \le t \le \infty$**

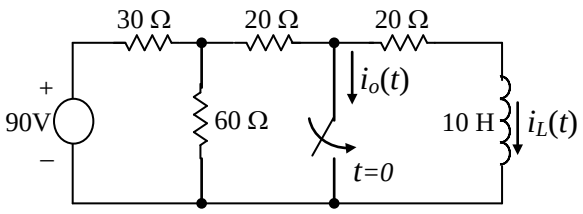


Fig. b

Question 2:

a) i) Write the two mesh equations for the circuit of Fig.(a) and solve them to find I_1, I_2, and the power dissipated in R_L. (10 Marks)

ii) Find the Thevenin equivalent circuit at the output port, hence find the value of R_L that consumes maximum power, and the value of this power. (6 Marks)

The first mesh equation

$80\ I_1 - 20\ I_2 + V_1 = 400$

The second mesh equation

$-20\ I_1 + 105\ I_2 - V_2 = 0$

I_1 = **0.25 A**

I_2 = **1A**

P_L = **85 W**

R_{Th} = **15Ω**

V_{Th} = **100 V**

P_{max} = **166.7 W**

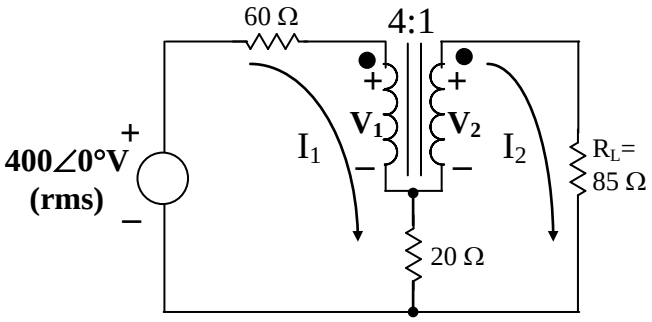


Fig. (a)

b) A three-phase Y-connected +ve sequence source having the phase voltage $\boldsymbol{V_a}$=220∠0°V. The source resistance is 2 Ω/Phase. The source supplies a balanced Δ-connected load having a load impedance of 36∠30°Ω/Phase. The three lines connecting the source to the load have a resistance of 1 Ω/Line. Find the following: (10 Marks)

The magnitude of the line current	**15 A**
The magnitude of the phase current in the Δ- load	**8.66 A**
The magnitude of the line voltage at the sending end	**334.5 V**
The magnitude of the line voltage at the load	**312 V**
The total active power dissipated in the load	**7015 W**

Question 3:

a) Find the mean value, RMS value, period, and fundamental frequency in Hz, for the voltage waveform of Fig.(a). (8 Marks)

Mean value =	**6.67 V**
RMS value =	**8.165 V**
Period =	**6 mS**
Fundamental frequency =	**166.7 Hz**

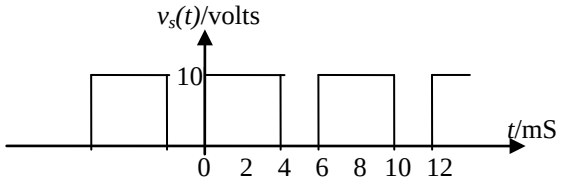


Fig. (a)

b) i) What is the type of filter shown Fig.(b)? (2 Marks)
ii) Write the voltage transfer function $H_v(s)$ of that filter. (2 Marks)
iii) Find the filter cut-off frequency f_c. (2 Marks)
iv) What is the maximum value of $H_v(s)$? (2 Marks)
v) At what frequency will $|H_v(s)|$ equals half its maximum value? (2 Marks)

type of filter	**High pass filter**
$H_v(s)=$	$\frac{0.9}{s+10^4}$
$f_c =$	**1592 Hz**
$H_v(s)\|_{max}=$	**0.9**
Frequency of ½ max value =	**919 Hz**

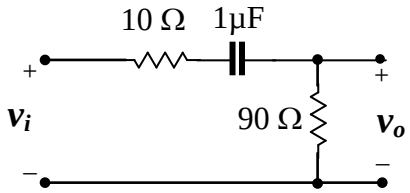
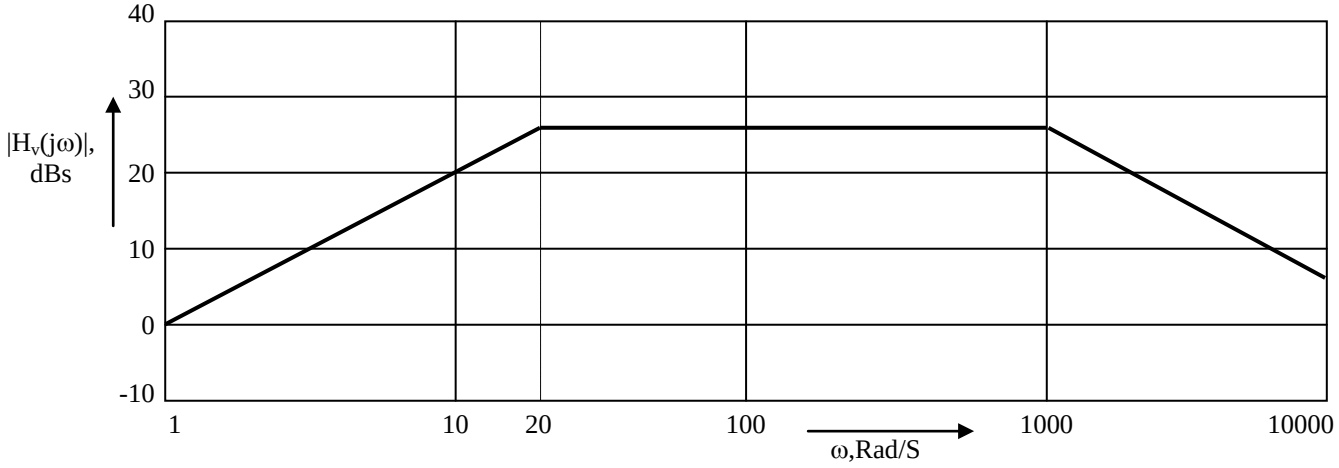


Fig. (b)

c) Sketch the Bode Diagram of the voltage transfer function: $H_v(s)=\frac{20000\,s}{(s+20)(s+1000)}$ (6 Marks)



Question 4:

a) Find the s-domain expression of the input impedance seen looking into the terminals a, b of the circuit of Fig.(a). Find also the poles and zeros of that impedance. (10 Marks)

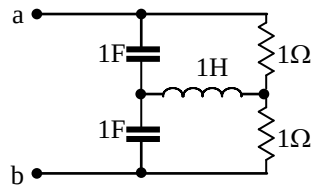


Fig.(a)

$Z_{in}(s) = \dfrac{2s^2 + 3s + 1}{2s(s^2 + s + 1)}$

Poles 0, (-0.5 + j 0.866), (-0.5 - j 0.866)

Zeros -0.5, -1, ∞

b) The switch in the circuit of Fig. (b) is moved from (a) to (b) at t = 0. Find the following currents and voltages: (12 Marks)

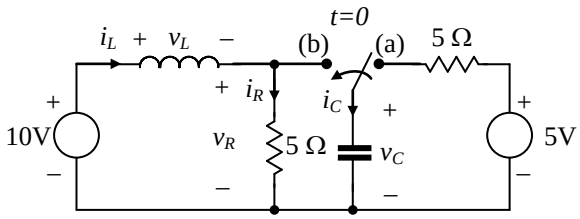


Fig. (b)

$i_R(0^-)$ **2 A**

$i_R(0^+)$ **1 A**

$i_c(0^+)$ **1 A**

$i_L(0^+)$ **2 A**

$v_L\ (0^+)$ **5 V**

$v_R(\infty)$ **10 V**

c) The *a*-parameters of a certain two-port are a_{11}= 3, a_{12}= 10 Ω, a_{21}= 0.5 S, a_{22}= 2. Find the *h*-parameters. (8 Marks)

$h_{11} =$ **5 Ω** $h_{12} =$ **-0.5**

$h_{21} =$ **0.5** $h_{22} =$ **0.25 S**

********** أطيب التمنيات بالتوفيق **********

أ.د. مجدى مفيد دوس

ASSIUT UNIVERSITY
FACULTY OF ENGINEERING
DEPT. OF ELECTRICAL ENG.

E222 CIRCUIT THEORY

First Term Examination, 2011/2012

2nd Year Elect.
جميع الطلبة (لائحة ١٩٩٧، ٢٠٠٤)
Time: 3 Hours

الامتحان مكون من أربع صفحات، الإجابة فى نفس ورقة الأسئلة، النهاية العظمى ١٠٠ درجة.
الإجابة النهائية يجب أن تكون مكتوبة فى المكان المخصص لها ولن يلتفت لغير ذلك.

Question 1:

a) The op-amp in the non-inverting amplifier of Fig.a is ideal. Find the i_1, i_2, v_1, i_3, v_o, and i_o.

(12 Marks)

$i_1 = 0.1$ mA

$i_2 = 0.2$ mA

$v_1 = 4$ V

$i_3 = 0.2$ mA

$v_o = 8$ V

$i_o = 0.4$ mA

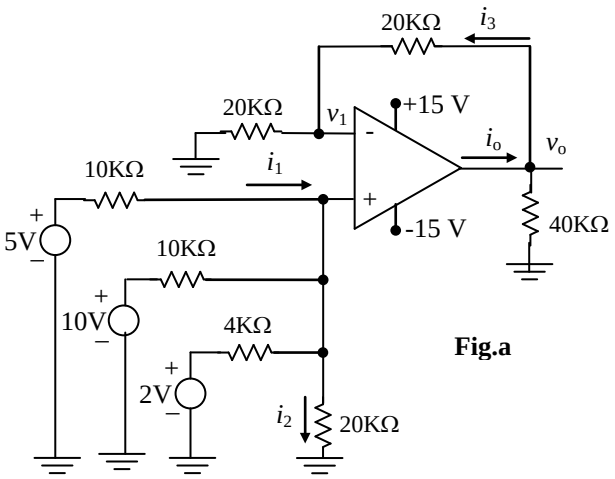


Fig.a

b) The switch in the circuit shown in Fig.b has been in position (a) for a long time before it moves to (b) at t = 0. After 5 mSec, the inductance current i_L dropped to 80% of its initial value. Find the value of L.

(12 Marks)

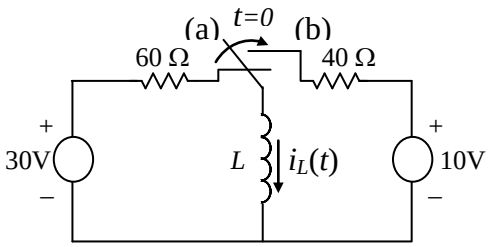


Fig. b

$i_L(0^+) =$ 0.5 A

$i_L(\infty) =$ 0.25 A

$$i(t) = 0.25 + 0.25e^{-t/\tau}$$

$$i(5\text{mS}) = 0.25\left(1 + e^{-\frac{5}{\tau}}\right) = 0.4 \text{ A}$$

$\tau =$ 9.788 mS

$L =$ 392 mH

Question 2:

a) A three-phase Δ-connected +ve sequence source having the phase voltage V_{ab}=220∠0°V. The source resistance is 1 Ω / Phase. The source supplies an unbalanced Δ-connected resistive load having R_{ab} = 10Ω, R_{bc} = 9Ω and R_{ca} = 21Ω. The three lines connecting the source to the load have negligible resistance. The load power is measured using the two wattmeter method. The first wattmeter W_1 is connected between lines A and B, while the second one W_2 is connected between lines C and B. Find the following: (12 Marks)

The phase current $\overline{I_{AB}}$ at the load =	**20∠0° A**
The Line current $\overline{I_A}$ =	**26.46∠-19.1° A**
The line voltage $\overline{V_{AB}}$ at the load =	**200∠0° V**
The reading of W_1 =	**5 KW**
The reading of W_2 =	**5.35 KW**
The total power dissipated in the load =	**10.35 KW**

b) i) Find the voltage transfer function of the circuit of Fig.(b). (6 Marks)

ii) Find the poles and zeros of the transfer function. (4 Marks)

iii) Find the magnitude of the transfer function at ω = 5 Rad/Sec. (2 Marks)

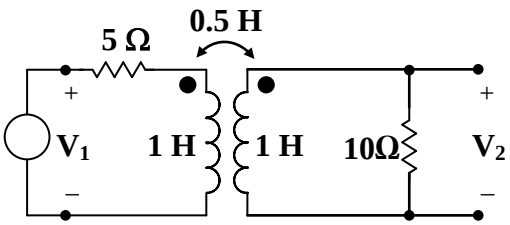


Fig. (b)

$(2s + 10)I_1 + s\,I_2 = 2\,V_1$

$s\,I_1 + (2s + 20)I_2 = 0$

$$H_v(s) = \frac{20s}{3s^2 + 60s + 200}$$

Poles: **- 4.23 , - 15.77 S^{-1}**

Zeros: **0, ∞**

$|H_v(j5)|$ = **0.308**

Question 3:

a) Find the first four non-zero terms of the Fourier series of the periodic voltage waveform shown in Fig.(a). (8 Marks)

$$b_n(t) = \frac{2}{T}\int_{-\frac{T}{2}}^{\frac{T}{2}} 5t.sin(n\omega_o t)dt = -\frac{10}{n\omega_o T}\int_{-\frac{T}{2}}^{\frac{T}{2}} t.dcos(n\omega_o t)$$

$$= -\frac{5}{n\pi}\left[t.cos(n\omega_o t) - \frac{1}{n\omega_o}sin(n\omega_o t)\right]_{-\frac{T}{2}}^{\frac{T}{2}}$$

$$= -\frac{5}{n\pi}\left[t.cos(n\omega_o t) - \frac{1}{n\omega_o}sin(n\omega_o t)\right]_{-\frac{T}{2}}^{\frac{T}{2}} = -\frac{20}{n\pi}cos(n\pi)$$

$b_1 = 20/\pi$, $b_2 = -10/\pi$, $b_3 = 20/3\pi$, $b_4 = -5/\pi$,

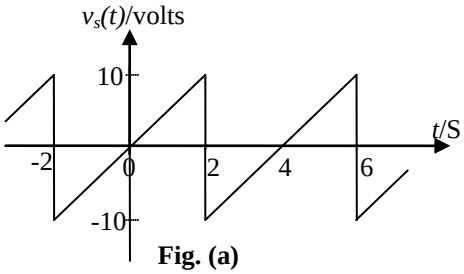


Fig. (a)

b) There is no energy stored in the circuit of Fig.b at the time the switch is closed:

i) Write the two mesh equations of the circuit. (4 Marks)

ii) Find $I_1(s)$ and $I_2(s)$. (4 Marks)

iii) Find $i_1(t)$ and $i_2(t)$. (4 Marks)

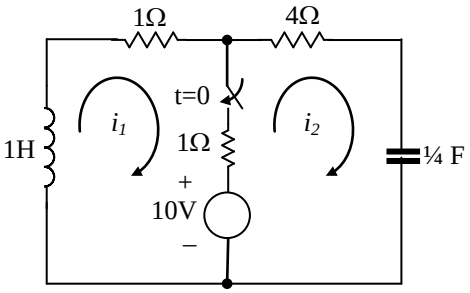


Fig. (b)

The first s-domain mesh equation:

$(s^2 + 2s)\,I_1 - s\,I_2 = -10$

The second s-domain mesh equation:

$-s\,I_1 + (5s + 4)\,I_2 = 10$

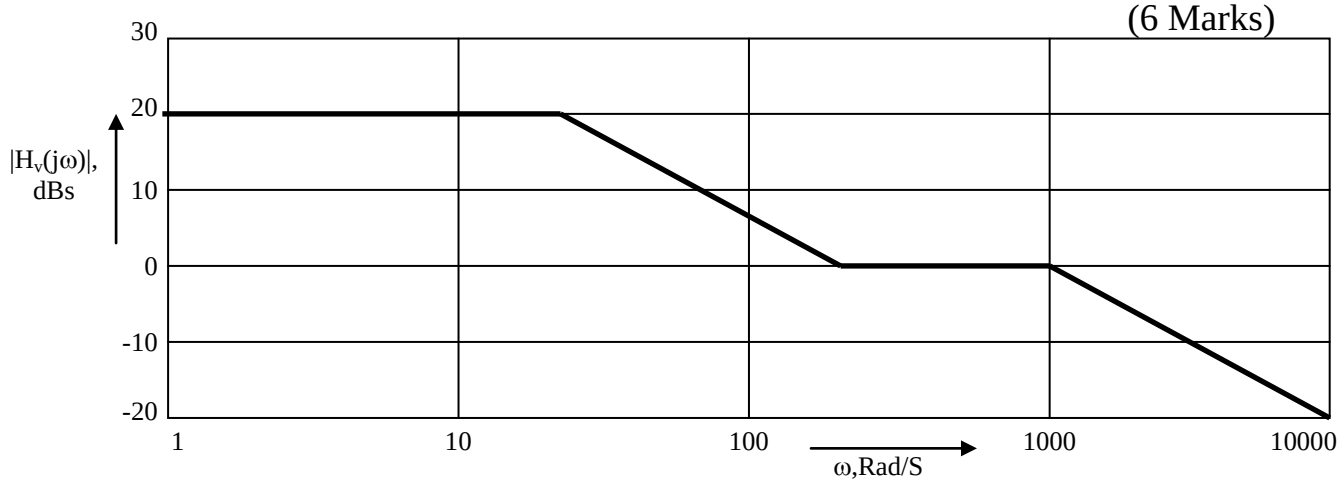
$$I_1(s) = \frac{-8}{s(s+1.6)} = \frac{5}{s+1.6} - \frac{5}{s}$$

$$I_2(s) = \frac{2}{s+1.6}$$

$$i_1(t) = [-5 + 5e^{-1.6t}]u(t)\,\text{A}$$

$$i_2(t) = 2e^{-1.6t}u(t)\,\text{A}$$

c) Sketch the Bode Diagram of the voltage transfer function: $H_v(s) = \dfrac{1000\,(s+200)}{(s+20)(s+1000)}$ (6 Marks)



Question 4:

a) The switch in the circuit of Fig. (a) has been open a long time before closing at $t = 0$.

i) Find $i_L(0^+)$, $i_L(\infty)$, $v_L(0^+)$, $\frac{di_L}{dt}(0^+)$. (8 Marks)

ii) Write the differential equation of $i_L(t)$. (2 Marks)

iii) Write the characteristic equation and find its roots. (4 Marks)

iv) The constants in the solution for $i_L(t)$. (2 Marks)

v) Find $i_L(t)$ for $t \geq 0$. (2 Marks)

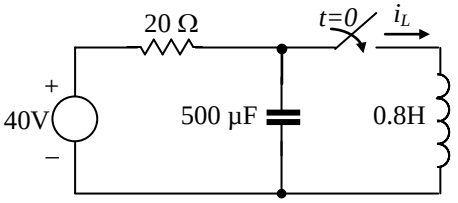


Fig. (a)

$i_L(0^+)$ **0**

$i_L(\infty)$ **2 A**

$v_L(0^+)$ **40 V**

$\frac{di_L}{dt}(0^+)$ $\frac{V_L(0^+)}{L} = 50$ **A/S**

the differential equation of $i_L(t)$

$$\frac{d^2i}{dt^2} + \frac{1}{RC}.\frac{di}{dt} + \frac{1}{LC}.i = \frac{2}{LC}$$

the characteristic equation

$$s^2 + 100\,s + 2500 = 0$$

roots of the characteristic equation

$$s_1 = s_2 = -50$$

The constants

$$D_1 = -50,\ D_2 = -2$$

$$i_L(t) = 2 - (50\,t + 2)\,e^{-50t}$$

b) Find the *h* parameters of the circuit shown in Fig.(b). (8 Marks)

$h_{11} =$ **60 Ω** $h_{12} =$ **0.333**

$h_{21} =$ **-0.21** $h_{22} =$ **8.8 mS**

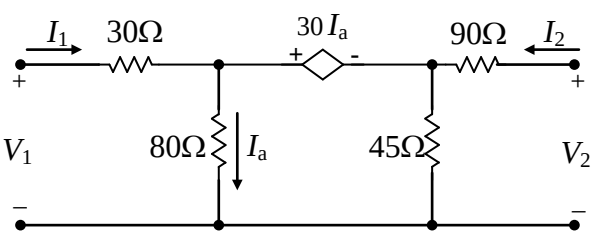


Fig.(b)

********** أطيب التمنيات بالتوفيق **********

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ASSIUT UNIVERSITY
FACULTY OF ENGINEERING
DEPT. OF ELECTRICAL ENG.

E222 CIRCUIT THEORY

2nd Year Elect.

First Term Examination, 2012/2013

Time: 3 Hours

الامتحان مكون من أربع صفحات، الإجابة فى نفس ورقة الأسئلة، النهاية العظمى ١٠٠ درجة.
الإجابة النهائية يجب أن تكون مكتوبة فى المكان المخصص لها وخطوات الحل تكون فى الصفحة المقابلة.

Question #1: (12 Points)

The two op amps in the circuit in Fig.1 are ideal. Calculate v_{o1}, v_{o2}, i_{o1} and i_{o2}.

$v_{o1} = 2.125$ V

$v_{o2} = 2.5$ V

$i_{o1} = 0.25$ mA

$I_{o2} = 1.75$ mA

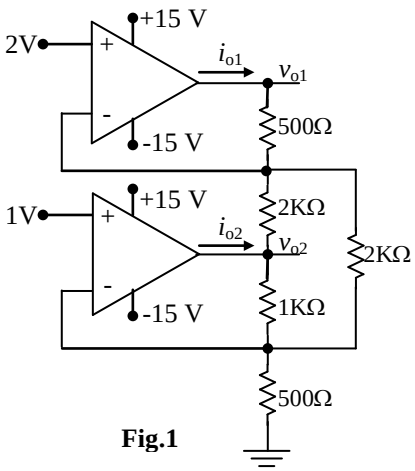


Fig.1

Question #2: (16 Points)

The voltage waveform shown in Fig.2(a) is applied to the circuit of Fig.2(b). The initial voltage on the capacitor is zero. Calculate and sketch $v_o(t)$.

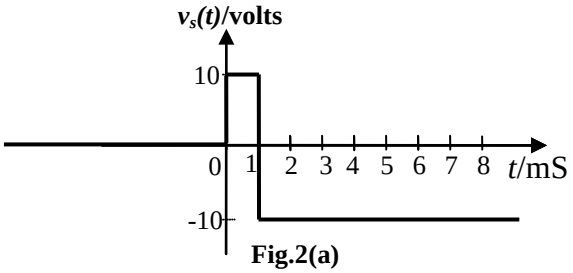


Fig.2(a)

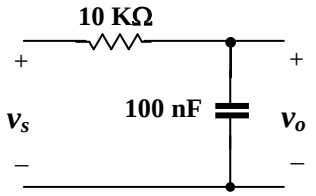


Fig.2(b)

$v_o(0^+) = 0$

$v_o(\infty)_1 = 10$ V

$\tau = 1$ mS

$v_o(t) = 10(1 - e^{-t})$ V

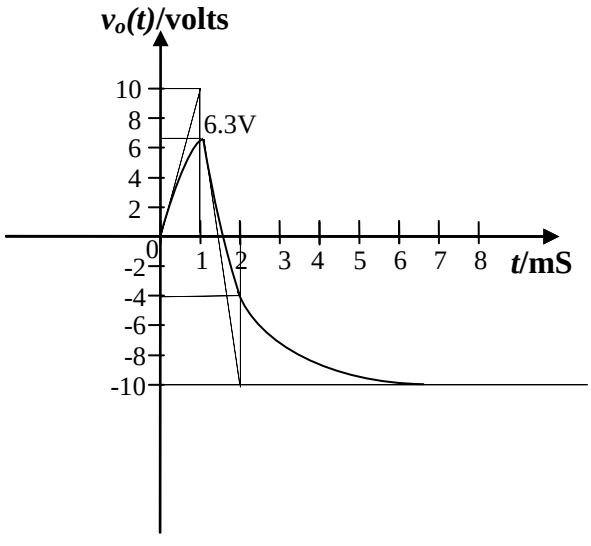
0 <= t <= 1 mS

$v_o(1\text{mS}) = 6.3$ V

$v_o(\infty) = -10$ V

$v_o(t) = -10 + 16.3\, e^{-(t-1)}$ V

1mS <= t <= ∞



Question #3: (10 Points)

The voltage response for the circuit in Fig.3 is known to be $v(t) = D_1te^{-500t} + D_2e^{-500t}$, $t \geq 0$.
The initial current in the inductor (I_o) is -10 mA, and the initial voltage on the capacitor (V_o) is 8 V. The inductor has an inductance of 4 H.

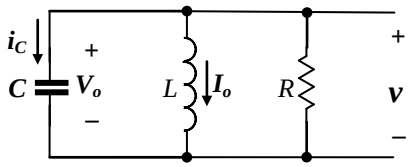


Fig.3

a) Find the values of R, C, D_1 and D_2.
b) Find $i_C(t)$ for $t \geq 0^+$.

R = 1 KΩ
C = 1 μF
D_1 = 6000 V/S
D_2 = 8 V
$i_C(t) = -3\,t\,e^{-500t} + 2\text{x}10^{-3}\,e^{-500t}$ A

Question #4: (12 Points)

A three-phase Y-connected +ve sequence source having the phase voltage $\boldsymbol{V_a}$=260∠0°V. The source resistance is 1 Ω/Phase. The source supplies a balanced Δ-connected load having an impedance of (27 + j15) Ω/Phase. The three lines connecting the source to the load have a resistance of 2 Ω/Line. Find the following:

The Line current $\overline{\boldsymbol{I_A}}$ =	20∠-22.6° A
The phase current $\overline{\boldsymbol{I_{AB}}}$ at the load =	11.55∠7.4° A
The line voltage $\overline{\boldsymbol{V_{AB}}}$ at the load =	356.7∠36.4° V
The phase voltage $\overline{\boldsymbol{V_a}}$ at the source terminals =	241.7∠1.8° V
The line voltage $\overline{\boldsymbol{V_{ab}}}$ at the source terminals =	418.6∠31.8° V
The total power dissipated in the load =	10.8 KW

Question #5: (12 Points)

The sinusoidal voltage source in the circuit of Fig.5 is operating at a frequency of 200 Krad/s. The coefficient of coupling is adjusted until the peak amplitude of i_1 is pure real.

a) What is the value of k?

b) What is the peak amplitude of i_1 if $v_g = 112 \cos(2 \times 10^5 t)$ V ?

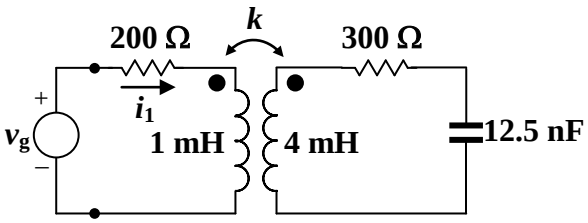


Fig.5

$Z_r = 64\,k^2(3 - j4)$

$$i_1 = \frac{v_g}{200 + j200 + 64k^2(3 - j4)}$$

$4 \times 64\,k^2 = 200$

k = 0.88

$i_{1(peak)}$ = 0.32 A

Question #6: (12 Points)

Find the voltage transfer function and its poles and zeros for the circuit of Fig.6. If we consider this circuit as a bandpass filter, find approximate values for its magnitude transfer function at ω = 0 and at its central frequency. Find also the value of its bandwidth.

$H_v(s)$ = $\dfrac{10^4 s}{s^2 + 10^4 s + 10^{10}}$

Poles: $-5 \pm j\,99.87$ Krad/s

Zeros: 0, ∞

$|H_v(0)|$ = 0

$|H_v(j\omega_o)|$ = 1

BW = 10^4 rad/s

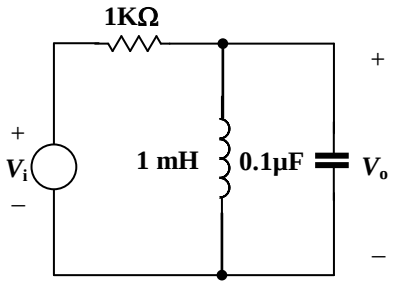


Fig.6

Question #7: (12 Points)

There is no energy stored in the circuit of Fig.7 at the time the current source is energized. Use the Laplace Transform to find the nodal voltages.

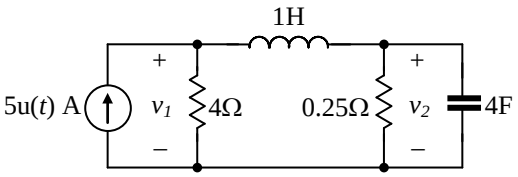


Fig.7

Eq. (1): $(s+4)V_1 - 4V_2 = 20$

Eq. (2): $-V_1 + (4s^2 + 4s + 1)V_2 = 0$

$V_1(s) = \dfrac{20(s^2 + s + 0.25)}{s(s^2 + 5s + 4.25)}$ $\qquad$ $V_2(s) = \dfrac{5}{s(s^2 + 5s + 4.25)}$

$v_1(t) = 1.18 - 16.38e^{-1.09t} + 35.2e^{-3.91t}$ $\qquad$ $v_2(t) = 1.18 - 1.63e^{-1.09t} + 0.45e^{-3.91t}$

Question #8: (6 Points)

A periodic voltage having a period of 10π μS is given by the following Fourier series:

$$v_g = 150\sum_{n=1,3,5,\ldots}^{\infty} \frac{1}{n}\sin\frac{n\pi}{2}\cos n\omega_o t \text{ V}$$

This periodic voltage is applied to the circuit shown in Fig.8. Find the amplitude and phase angle of the first three components of v_o.

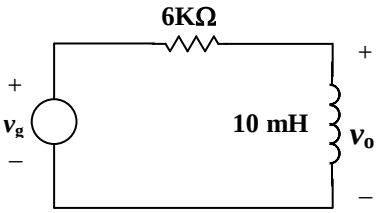


Fig.8

$\omega_o = 2\pi/T = 200$ Krad/s

$v_g = 150\cos\omega_o t - 50\cos 3\omega_o t + 30\cos 5\omega_o t$

$$v_o = \frac{j2n}{6 + j2n}v_g$$

$V_{o1} = 47.43\angle 71.6°$ V $\qquad$ $V_{o3} = 35.34\angle -135°$ V $\qquad$ $V_{o5} = 25.73\angle 31°$ V

Question #9: (8 Points)

Find the s-domain expressions for the *a* parameters of the two-port circuit shown in Fig.9.

$a_{11} = 1 + \dfrac{1}{4s}$ $\qquad$ $a_{12} = s + \dfrac{1}{4} + \dfrac{1}{s}$

$a_{21} = \dfrac{1}{4}$ $\qquad$ $a_{22} = \dfrac{s}{4} + 1$

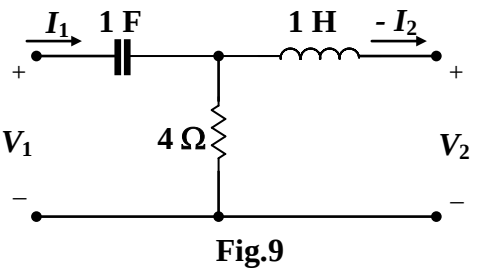


Fig.9

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FACULTY OF ENGINEERING
DEPT. OF ELECTRICAL ENG.

E222 CIRCUIT THEORY

2nd Year Elect.

First Term Examination, 2013/2014

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Attempt all questions, full mark: 100 Points **Time: 3 Hours**

Question #1: (12 Points)

The nonlinear device (*D*) used in the circuit of Fig.1 has a characteristic given by:

$i_d = Ie^{\alpha v_d}$, where $v_d > 0$ and $i_d > 0$.

Assuming ideal operational amplifier, and that the nonlinear device is operating with positive values of v_d and i_d,

a) find an expression relating v_{out} to v_{in}. (8 Points)

b) if $I = 0.5\ \mu A$, $\alpha = 40\ V^{-1}$ and $R = 1\ K\Omega$, find v_{out} for $v_{in} = 5$ V. (4 Points)

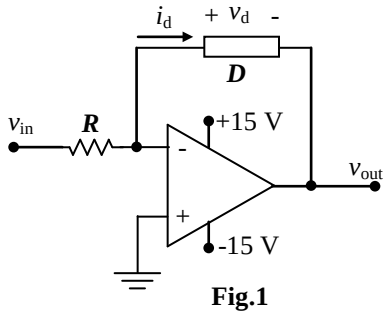


Fig.1

$$v_{out} = -\frac{1}{\alpha}\ln\frac{v_{in}}{RI}$$

v_{out} (for v_{in} = 5 V) = - 230 mV

Question #2: (14 Points)

The two switches (a) and (b) in the circuit of Fig.2 operate simultaneously. Prior to t=0 switch (a) was open and switch (b) was close for a long time. At t=0, switch (a) is closed and switch (b) is opened.

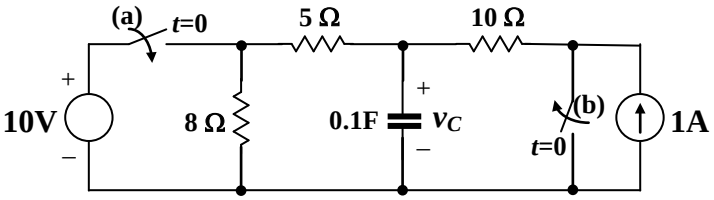


Fig.2

a) Find $v_C(0^+)$, $i_C(0^+)$, $v_C(\infty)$, $i_C(\infty)$, and the time constant τ. (10 Points)

b) Find $v_C(t)$ and $i_C(t)$ for $t \geq 0$. (4 Points)

Hint: use the superposition theorem.

$v_C(0^+) = 0$

$v_C(\infty) = 15$ V

$i_C(0^+) = 3$ A

$i_C(\infty) = 0$

$\tau = 0.5$ S

$v_C(t) = 15(1 - e^{-2t})$ V

$i_C(t) = 3\,e^{-2t}$ A

Question #3: (12 Points)

Consider the circuit in Fig.3 with two inputs $v(t)=4\delta(t)$ V and $i(t)= 2\delta(t)$ A. The inductor and capacitor have zero initial state, i.e. $v_C\,(t=0^-) = 0$ and $i_L(t=0^-) = 0$.

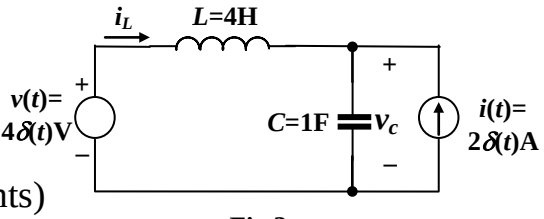


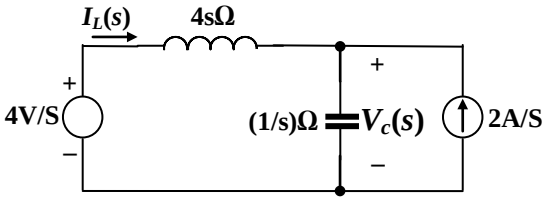
Fig.3

a) Draw the s domain equivalent circuit. (2 Points)
b) Find the capacitor voltage $v_c(t)$, for $t \geq 0$. (6 Points)
c) What are the inductor current i_L and the capacitor voltage v_C at t =0+? (4 Points)

$$\boldsymbol{V_C\left(s+\frac{1}{4s}\right)=2+\frac{1}{s}}$$

$$\boldsymbol{V_C(s)=\frac{2s+1}{s^2+0.25}}$$

$$\boldsymbol{v_C(t)=2\cos 0.5t+2\sin 0.5t}$$



$$\boldsymbol{v_C(t)=2\sqrt{2}\cos(0.5t+45°)}$$

$v_C(0^+) = 2$ V

$i_L(0^+) = 1$ A

Question #4: (12 Points)

a) A three-phase Y-connected +ve sequence source having the phase voltage $\boldsymbol{V_a}$=240∠0°V and negligible source resistance. The source supplies a balanced Δ-connected load having an impedance of 60∠30° Ω/phase. The three lines connecting the source to the load have negligible resistance. The load power is measured using the two wattmeter method. The first wattmeter W_1 is connected between lines A and B, while the second one W_2 is connected between lines C and B. Find the following:

The phase current $\overline{\boldsymbol{I_{AB}}}$ at the load =	**6.928∠0° A**
The Line current $\overline{\boldsymbol{I_A}}$ =	**12∠-30° A**
The line voltage $\overline{\boldsymbol{V_{AB}}}$ at the load =	**415.69 ∠30° V**
The reading of W_1 =	**2.494 KW**
The reading of W_2 =	**4.988 KW**
The total power dissipated in the load =	**7.482 KW**

Question #5: (14 Points)

Consider the circuit of Fig.5, the operational amplifier is ideal. It is required to:

a) Find an expression for the voltage transfer function $H_v(s) = V_{out}(s)/V_{in}(s)$. (6 points)
b) Compute the numerical values of poles and zeros of the transfer function. (4 points)
c) If the input is a sinusoidal waveform given by: $v_{in}(t) = 10\cos(10^4 t + 30°)$ V; give the expression for the output $v_{out}(t)$. (4 points)

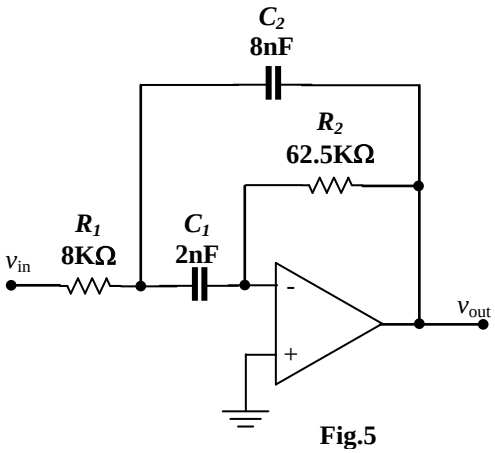


Fig.5

$H_v(s)$ = $\dfrac{-\frac{1}{R_1C_2}s}{s^2+\frac{1}{R_2}\left(\frac{1}{C_1}+\frac{1}{C_2}\right)s+\frac{1}{R_1R_2C_1C_2}} = \dfrac{-1.5625\times10^4 s}{s^2+10^4 s+1.25\times10^8}$

Poles: **- 5 – *j* 10 Krad/S, - 5 + *j* 10 Krad/S**

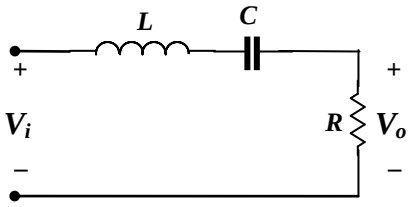
Zeros: **0, ∞**

$V_{out}(t)$ = **15.1585 cos(10^4 t - 135.96°) V**

Question #6: (12 Points)

a) A series *RLC* band-pass filter has a center, or resonant, frequency of 50 kHz and a quality factor of 4. Find the band-width, the upper cutoff frequency, and the lower cut-off frequency. (6 Points)
b) Use a 5 nF capacitor to design the filter. Draw the circuit diagram and specify the values of *R* and *L*. (6 Points)

The circuit diagram



BW = **12.5 KHz** **f_1 =** **44.14 KHz** **f_2 =** **56.64 KHz**

R = **159.2 Ω** **L =** **2.026 mH**

Question #7: (12 Points)

a) Find the first four Fourier coefficients of the voltage waveform of Fig.7(a). (4 Marks)

b) The voltage waveform of Fig.7(a) is applied to the circuit of Fig.7(b). Find the Fourier coefficients of the output voltage v_{ld}. (4 Marks)

c) Find the *RMS* values of the source voltage and the load voltage. (4 Marks)

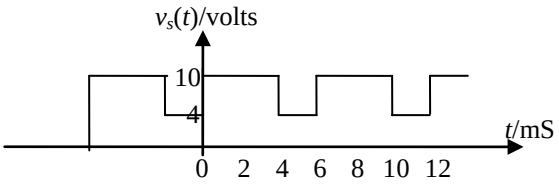


Fig.7(a)

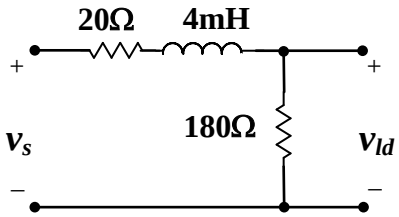


Fig.7(b)

a_o =	**8 V**	V_{ldo} =	**7.2 V**
C_1 =	**3.308∠120° V**	V_{ld1} =	**2.377∠83° V**
C_2 =	**1.645∠60° V**	V_{ld2} =	**0.8227∠3.55° V**
C_3 =	**0**	V_{ld3} =	**0**
$V_{s(RMS)}$ =	**8.49 V**	$V_{ld(RMS)}$ =	**7.42 V**

Question #8: (12 Points)

a) Find the transmission parameters of the two-port network of Fig.8. (8 Points)

b) A voltage source V_s = 75∠0° V and source impedance Z_s = 1∠0° Ω is applied to the input port, and a load Z_L = 10∠0° Ω is connected to the output port, find V_2. (4 Points)

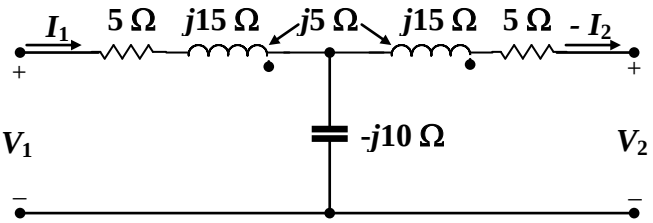


Fig.8

a_{11} =	**- 1/3 + *j*(1/3)**	a_{12} =	**- 10/3 + *j*5 Ω**
a_{21} =	***j*(1/15) S**	a_{22} =	**- 1/3 + *j*(1/3)**
V_2 =	**8.01∠-85.7° V**		

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E222 CIRCUIT THEORY

2nd Year Elect.

First Term Examination, 2014/2015

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Attempt all questions, full mark: 100 Points **Time: 3 Hours**

Question #1: (12 Points)

The circuit shown in Fig.1 is used to measure the change in resistance experienced by strain gages.

a) Derive an expression for the output voltage V_{out} in terms of the resistance values and the reference voltage V_{ref}, assuming ideal op-amp and neglecting ΔR^2 w.r.t. R^2. (8 Points)

b) If $R = 160\ \Omega$, $\Delta R = 1\ \Omega$, $R_f = 1.2\ K\Omega$, and $V_{ref} = 8$ V; find the value V_{out}. (4 Points)

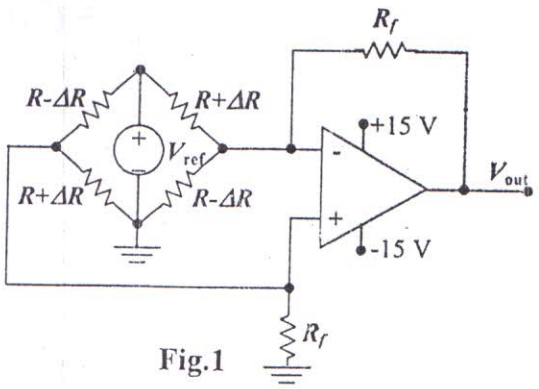


Fig.1

Expression for V_{out}:

$V_{out} =$

Value of V_{out}:

$V_{out} =$

Question #2: (16 Points)

In the circuit shown in Fig.2, the initial currents in inductors L_1 and L_2 are 8A and 1A respectively. The switch is opened at $t = 0$.

a) Find $i(t)$, for $t \geq 0$. (8 Points)

b) Find $v(t)$, for $t \geq 0$. (2 Points)

c) Find $i_1(t)$ and $i_2(t)$, for $t \geq 0$. (4 Points)

d) Determine the total energy stored in the inductors as $t \rightarrow \infty$. (2 Points)

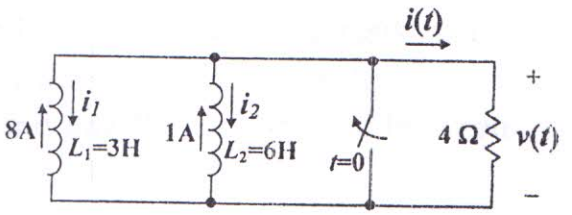


Fig.2

$i(0^+) =$ | $i(\infty) =$ | $\tau =$

$i(t) =$

$v(t) =$

$i_1(t) =$

$i_2(t) =$

Energy stored in the inductors as $t \rightarrow \infty =$

Question #3: (12 Points)

The switch in the circuit shown in Fig.3 has been in position (a) for a long time. At $t = 0$, it moves to position (b). Find $i(0^+)$, $v_c(0^+)$, $di(0^+)/dt$, the roots of the characteristic equation s_1, s_2 and $i(t)$ for $t \geq 0$.

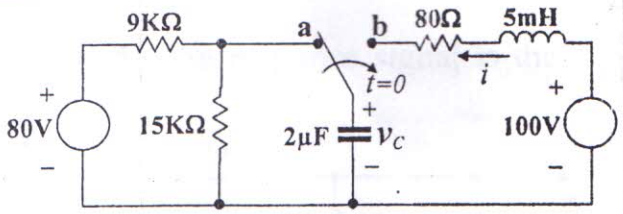


Fig. 3

$i(0^+)$ =	$v_C(0^+)$ =
$di(0^+)/dt$ =	
s_1 =	s_2 =
$i(t)$ =	

Question #4: (12 Points)

A three-phase Δ-connected -ve sequence source having the phase voltage V_{ab}=240∠0°V and negligible source resistance. The source supplies a resistive unbalanced Δ-connected load having impedances: R_{AB}= 60 Ω, R_{BC}= 40 Ω, and R_{CA}= 80 Ω. The three lines connecting the source to the load have negligible resistances. The load power is measured using the two wattmeter method. The first wattmeter W_1 is connected between lines A and B, while the second one W_2 is connected between lines C and B. Find the following:

The phase current $\overline{I_{AB}}$ at the load =	
The Line current $\overline{I_A}$ =	
The Line current $\overline{I_C}$ =	
The reading of W_1 =	
The reading of W_2 =	
The total power dissipated in the load =	

Question #5: (14 Points)

The voltage source v_g drives the circuit shown in Fig.5. The response signal is the voltage across the capacitor, v_o.

a) Calculate the numerical expression for the voltage transfer function $H_v(s) = V_o(s)/V_g(s)$. (6 points)

b) Calculate the numerical values for the poles and zeros of the transfer function. (4 points)

c) The circuit is driven by a step voltage source, namely, $v_g = 50u(t)$, find $v_o(t)$. (4 points)

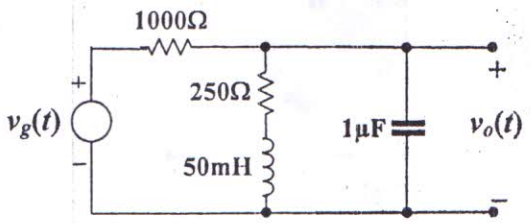


Fig.5

$H_v(s)$ =

Poles:

Zeros:

$V_{out}(t)$ =

Question #6: (12 Points)

The ideal transformer used in the circuit of Fig.6 has a turns ratio $N_2/N_1 = 3$.

a) Find the reflected impedance at terminals a-b of that transformer. (6 Points)

b) Calculate the value of the currents I_1, I_2, I_3, and I_4. (6 Points)

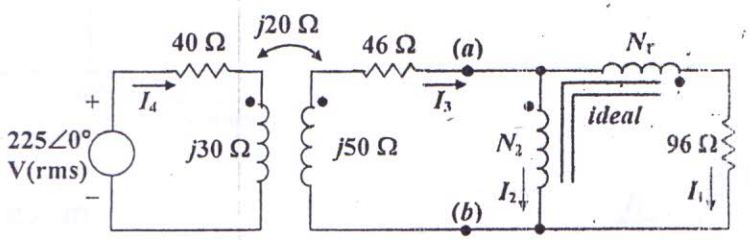


Fig.6

Z_R =

I_1 =

I_2 =

I_3 =

I_4 =

Question #7: (6 Points)

a) Calculate the impedance of the circuit shown in Fig.7 at radian frequency of 2 Krad/S. (2 Points)

b) At what finite frequency (ω_r) does the impedance of the circuit become purely resistive? What is the impedance at that frequency? (4 Points)

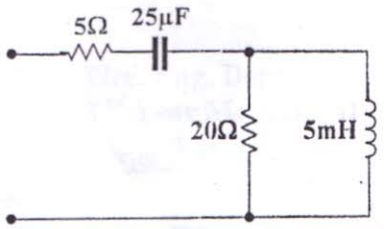
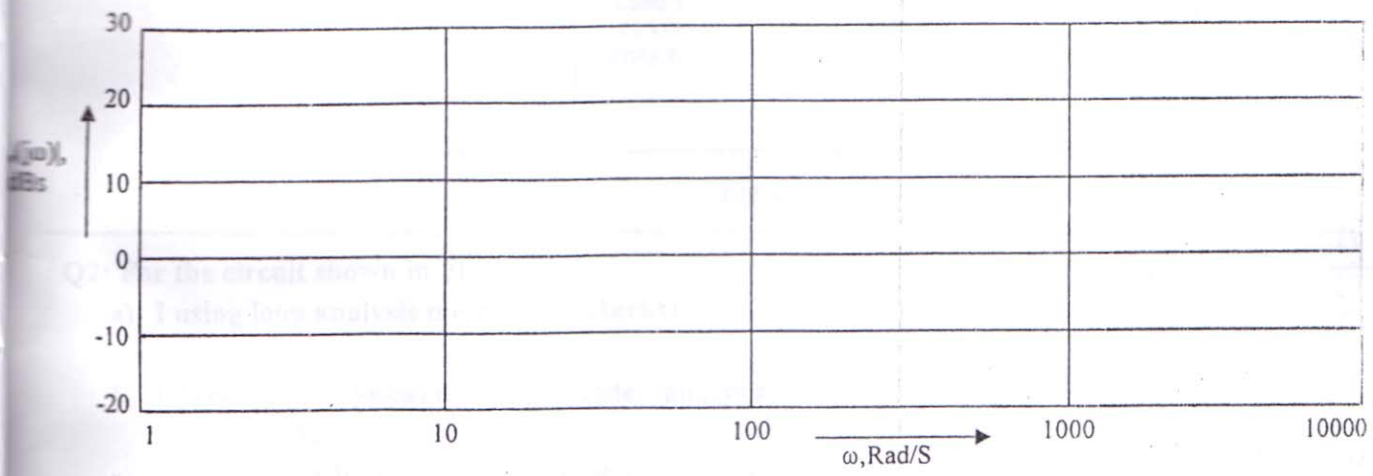


Fig.7

Z(2Krad) =	ω_r =	$Z(\omega_r)$ =

Question #8: (8 Points)

Sketch the Bode Diagram of the voltage transfer function: $H_v(s) = \dfrac{1000(s+100)}{(s+10)(s+1000)}$



Question #9: (8 Points)

The y parameters for the two-port network in Fig.9 are: y_{11}= 2mS, y_{12} = -0.2 mS, y_{21} = 10 mS, and y_{22} = -0.5 mS. Find V_1, V_2, I_1, and I_2.

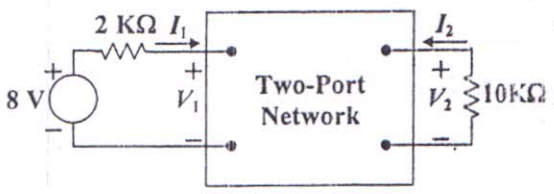


Fig.9

V_1 =	V_2 =
I_1 =	I_2 =

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DEPT. OF ELECTRICAL ENG.

CIRCUIT THEORY

2nd Year Elect.
جميع الطلبة (لائحة ٢٠٠٤، ١٩٩٧)

First Term Examination, 2009/2010

Time: 3 Hours

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Question 1:

a) The op-amp in the circuit of Fig.a is ideal. Calculate the following: (10 Marks)

I_1	**0.4 mA**
I_2	**0**
I_3	**0.5 mA**
I_4	**0.9 mA**
V_o	**- 3.7 V**

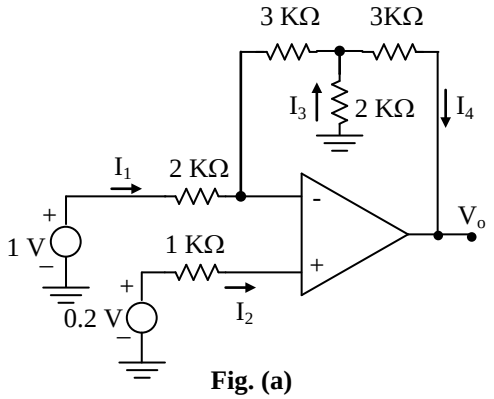


Fig. (a)

b) The switch in the circuit of Fig. (b) has been in position a for a long time. At t=0 it moves to position b. Calculate the following: (10 Marks)

$v_C(0^+)$	**26 V**
$i_L(0^+)$	**0.5 mA**
$v_o(0^-)$	**20 V**
$v_o(0^+)$	**22 V**
$i_c(0^+)$	**- 0.5 mA**

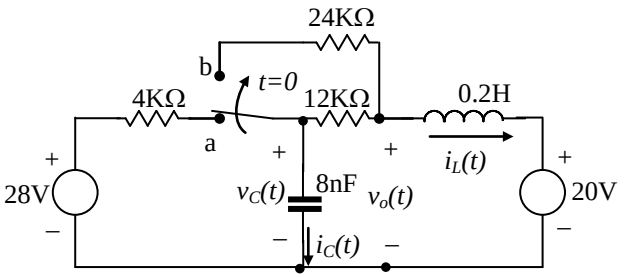


Fig. (b)

c) The circuit of Fig. (c) operates at radian frequency ω = 100 rad/sec. Find the mutual inductance *M*, the reflected impedance $\boldsymbol{Z_r}$ and the input impedance at port a-b. (6 Marks)

M	**1.5 H**
Z_r	**27-j36 = 45∠-53.1°Ω**
Z_{in}	**154.4∠30.3°Ω**

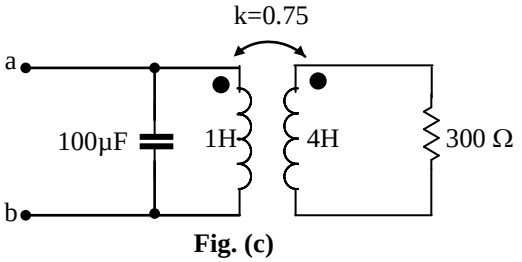


Fig. (c)

Question 2:

a) The switch in the circuit shown in Fig.a has been closed for a long time before it opens at $t = 0$. Find $v(t)$ for $0 \le t \le \infty$. (10 Marks)

$i_L(0^+)$ = **2 A**

$v(0^+)$ = **- 12 V**

$v(\infty)$ = **0**

τ = **30 mS**

$v(t)$ = $\mathbf{-12e^{-\frac{t}{30}}}$ **V**

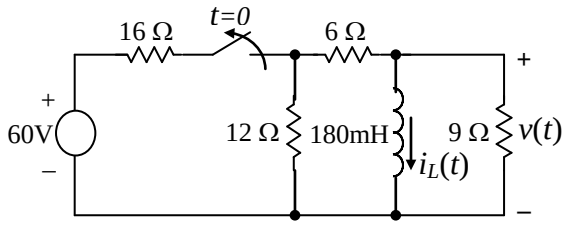


Fig. a

b) A balanced Y-connected load having an impedance of 18Ω/phase is connected in parallel with a balanced Δ-connected load having an impedance of 36Ω/phase. The parallel loads are fed from lines having an impedance of 2Ω/line. The magnitude of the line-to-neutral voltage at the Y-load is 720 V. Calculate the following: (10 Marks)

The magnitude of the line current **100 A**

The magnitude of the phase current in the Δ- load **$20\sqrt{3}$ = 34.6 A**

The magnitude of the phase current in the Y- load **40 A**

The magnitude of the line voltage at the sending end **$920\sqrt{3}$= 1593.5 V**

The total power dissipated in the loads **216 KW**

c)For the two-port of Fig. (c), Calculate: (8 Marks)

z_{11} = **6.8 Ω**

a_{21} = **0.714 S**

h_{12} = **0.3**

y_{22} = **0.378 S**

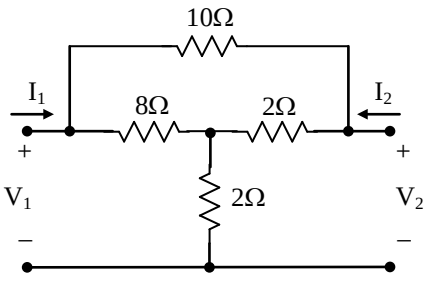


Fig. (c)

Question 3:

a) Find the first four Fourier coefficients of the voltage waveform of Fig.(a). (8 Marks)

a_o = **6.7**

C_1 = **5.5 ∠150°**

C_2 = **2.76 ∠30°**

C_3 = **0**

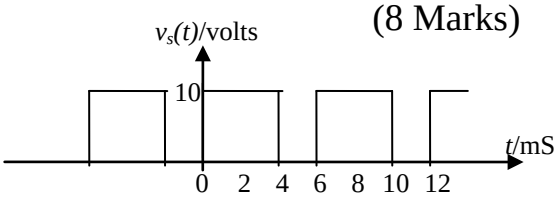


Fig. (a)

b) The voltage waveform of Fig.(a) is applied to the circuit of Fig. (b). Find the Fourier coefficients of the output voltage v_{ld}. (8 Marks)

V_{ldo} = **6 V**

V_{ld1} = **4.85 ∠138.2° V**

V_{ld2} = **2.29 ∠7.3° V**

V_{ld3} = **0**

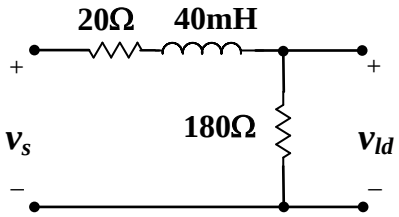
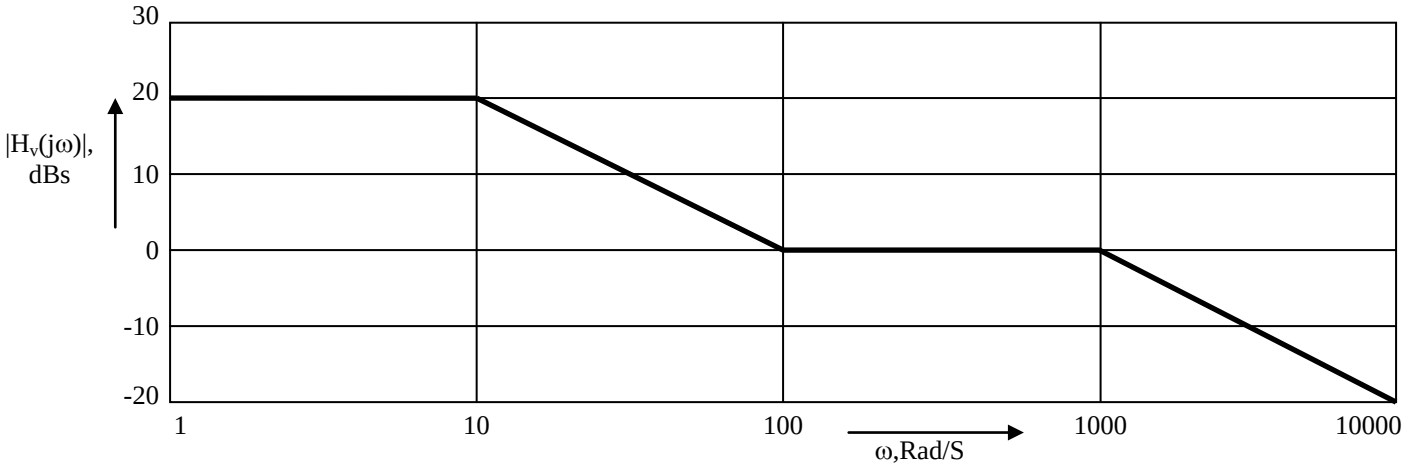


Fig. (b)

c) Sketch the Bode Diagram of the voltage transfer function: $H_v(s) = \dfrac{1000(s+100)}{(s+10)(s+1000)}$ (8 Marks)



Question 4:

a) Find the voltage transfer function and its poles and zeros for the circuit of Fig.a. (10 Marks)

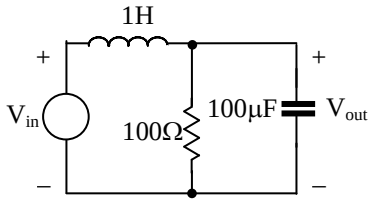


Fig.(a)

$$\boldsymbol{H_v(s) = \frac{10^4}{s^2 + 100s + 10^4}}$$

Poles: -50 + j 86.6, -50 - j 86.6

Zeros: ∞, ∞

b) The switch in the circuit shown in Fig.b has been opened for a long time before it closes at $t = 0$. Find $v_c(t)$ for $t \geq 0$. (12 Marks)

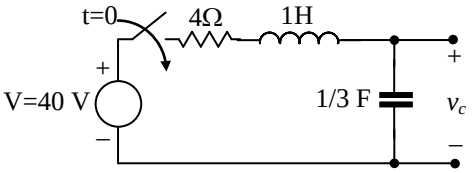


Fig. (b)

$$\boldsymbol{V_C(s) = \frac{120}{s(s^2 + 4s + 3)}}$$

$$\boldsymbol{= \frac{120}{s(s+1)(s+3)}}$$

$$\boldsymbol{= \frac{40}{s} - \frac{60}{s+1} + \frac{20}{s+3}}$$

$$\boldsymbol{v_C(t) = [40 - 60e^{-t} + 20e^{-3t}]u(t)\ V}$$

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E222 CIRCUIT THEORY

2nd Year Elect.
جميع الطلبة (لائحة ٢٠٠٤، ١٩٩٧)

First Term Examination, 2010/2011

Time: 3 Hours

الامتحان مكون من أربع صفحات، الإجابة فى نفس ورقة الأسئلة، النهاية العظمى ١٠٠ درجة.
الإجابة النهائية يجب أن تكون مكتوبة فى المكان المخصص لها ولن يلتفت لغير ذلك.

Question 1:

a) The voltage waveform v_g shown in Fig.(a-1) is applied to the circuit of Fig.(a-2). Sketch v_o and v_1 versus t, assuming ideal op-amp. (10 Marks)

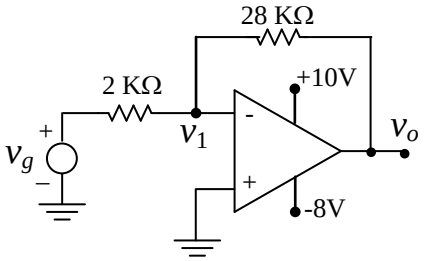


Fig. (a-2)

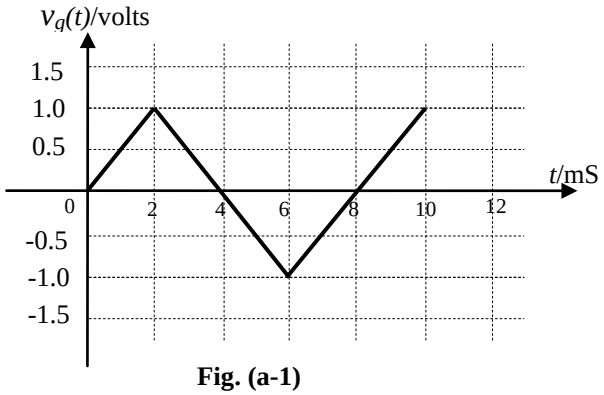
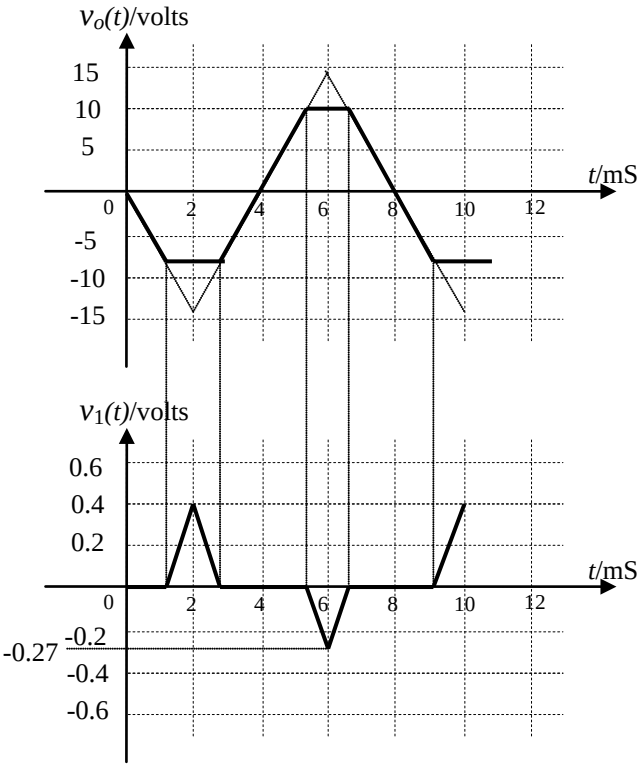


Fig. (a-1)



b) The switch in the circuit shown in Fig.b has been opened for a long time before it closes at $t = 0$. Find $i_o(t)$ for $0 \le t \le \infty$. (10 Marks)

$i_L(0^+)$ = **1 A**

$i_o(0^+)$ = **0.5 A**

$i_o(\infty)$ = **1.5 A**

τ = **0.5 S**

$i_o(t)$ = **$1.5 - e^{-2t}$ A, $0 \le t \le \infty$**

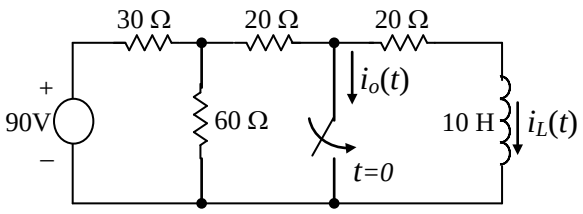


Fig. b

Question 2:

a) i) Write the two mesh equations for the circuit of Fig.(a) and solve them to find I_1, I_2, and the power dissipated in R_L. (10 Marks)

ii) Find the Thevenin equivalent circuit at the output port, hence find the value of R_L that consumes maximum power, and the value of this power. (6 Marks)

The first mesh equation

$80\ I_1 - 20\ I_2 + V_1 = 400$

The second mesh equation

$-20\ I_1 + 105\ I_2 - V_2 = 0$

I_1 = **0.25 A**

I_2 = **1A**

P_L = **85 W**

R_{Th} = **15Ω**

V_{Th} = **100 V**

P_{max} = **166.7 W**

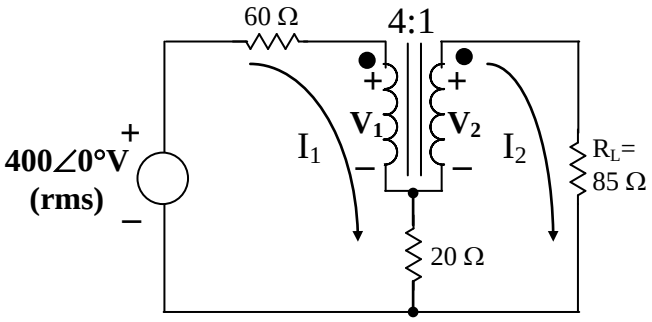


Fig. (a)

b) A three-phase Y-connected +ve sequence source having the phase voltage $\boldsymbol{V_a}$=220∠0°V. The source resistance is 2 Ω/Phase. The source supplies a balanced Δ-connected load having a load impedance of 36∠30°Ω/Phase. The three lines connecting the source to the load have a resistance of 1 Ω/Line. Find the following: (10 Marks)

The magnitude of the line current	**15 A**
The magnitude of the phase current in the Δ- load	**8.66 A**
The magnitude of the line voltage at the sending end	**334.5 V**
The magnitude of the line voltage at the load	**312 V**
The total active power dissipated in the load	**7015 W**

Question 3:

a) Find the mean value, RMS value, period, and fundamental frequency in Hz, for the voltage waveform of Fig.(a). (8 Marks)

Mean value =	**6.67 V**
RMS value =	**8.165 V**
Period =	**6 mS**
Fundamental frequency =	**166.7 Hz**

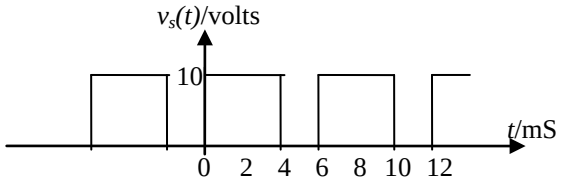


Fig. (a)

b) i) What is the type of filter shown Fig.(b)? (2 Marks)
ii) Write the voltage transfer function $H_v(s)$ of that filter. (2 Marks)
iii) Find the filter cut-off frequency f_c. (2 Marks)
iv) What is the maximum value of $H_v(s)$? (2 Marks)
v) At what frequency will $|H_v(s)|$ equals half its maximum value? (2 Marks)

type of filter	**High pass filter**
$H_v(s)=$	$\frac{0.9}{s+10^4}$
$f_c =$	**1592 Hz**
$H_v(s)\|_{max}=$	**0.9**
Frequency of ½ max value =	**919 Hz**

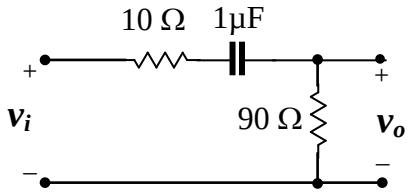
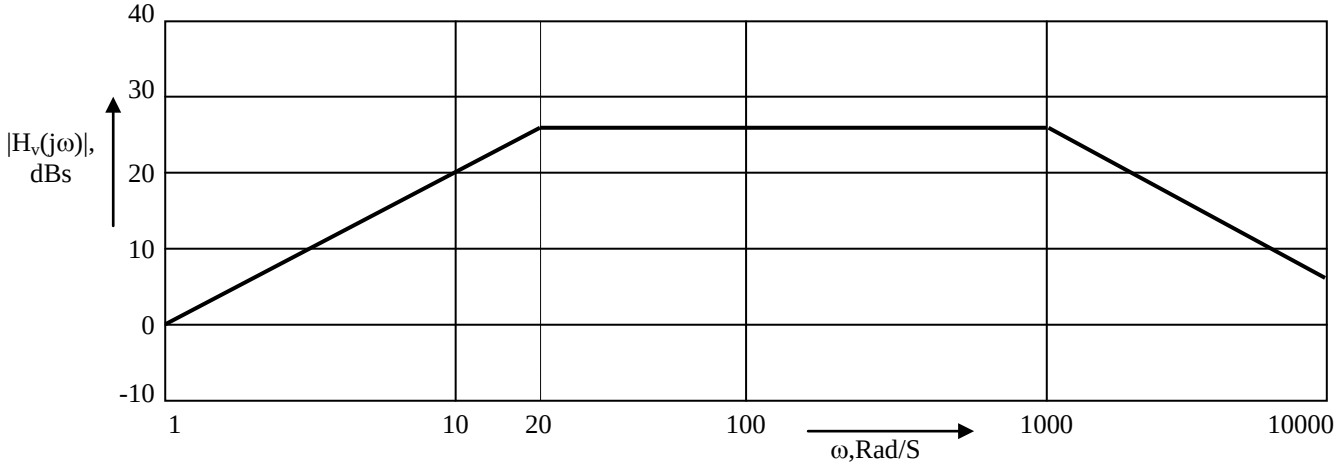


Fig. (b)

c) Sketch the Bode Diagram of the voltage transfer function: $H_v(s)=\frac{20000\,s}{(s+20)(s+1000)}$ (6 Marks)



Question 4:

a) Find the s-domain expression of the input impedance seen looking into the terminals a, b of the circuit of Fig.(a). Find also the poles and zeros of that impedance. (10 Marks)

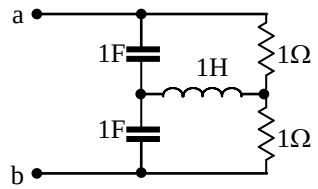


Fig.(a)

$Z_{in}(s) = \dfrac{2s^2 + 3s + 1}{2s(s^2 + s + 1)}$

Poles 0, (-0.5 + j 0.866), (-0.5 - j 0.866)

Zeros -0.5, -1, ∞

b) The switch in the circuit of Fig. (b) is moved from (a) to (b) at t = 0. Find the following currents and voltages: (12 Marks)

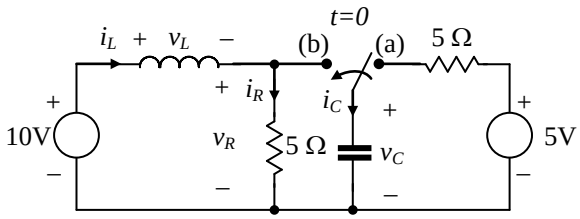


Fig. (b)

$i_R(0^-)$ **2 A**

$i_R(0^+)$ **1 A**

$i_c(0^+)$ **1 A**

$i_L(0^+)$ **2 A**

$v_L\ (0^+)$ **5 V**

$v_R(\infty)$ **10 V**

c) The *a*-parameters of a certain two-port are a_{11}= 3, a_{12}= 10 Ω, a_{21}= 0.5 S, a_{22}= 2. Find the *h*-parameters. (8 Marks)

$h_{11} =$ **5 Ω** $h_{12} =$ **-0.5**

$h_{21} =$ **0.5** $h_{22} =$ **0.25 S**

********** أطيب التمنيات بالتوفيق **********

أ.د. مجدى مفيد دوس

ASSIUT UNIVERSITY
FACULTY OF ENGINEERING
DEPT. OF ELECTRICAL ENG.

E222 CIRCUIT THEORY

First Term Examination, 2011/2012

2nd Year Elect.
جميع الطلبة (لائحة ١٩٩٧، ٢٠٠٤)
Time: 3 Hours

الامتحان مكون من أربع صفحات، الإجابة فى نفس ورقة الأسئلة، النهاية العظمى ١٠٠ درجة.
الإجابة النهائية يجب أن تكون مكتوبة فى المكان المخصص لها ولن يلتفت لغير ذلك.

Question 1:

a) The op-amp in the non-inverting amplifier of Fig.a is ideal. Find the i_1, i_2, v_1, i_3, v_o, and i_o.

(12 Marks)

$i_1 = 0.1$ mA

$i_2 = 0.2$ mA

$v_1 = 4$ V

$i_3 = 0.2$ mA

$v_o = 8$ V

$i_o = 0.4$ mA

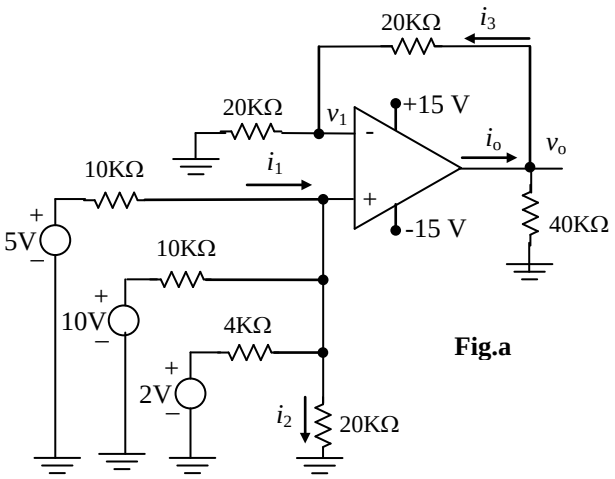


Fig.a

b) The switch in the circuit shown in Fig.b has been in position (a) for a long time before it moves to (b) at t = 0. After 5 mSec, the inductance current i_L dropped to 80% of its initial value. Find the value of L.

(12 Marks)

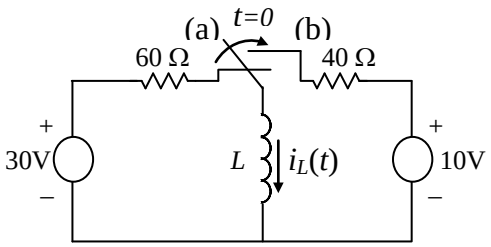


Fig. b

$i_L(0^+) =$ 0.5 A

$i_L(\infty) =$ 0.25 A

$$i(t) = 0.25 + 0.25e^{-t/\tau}$$

$$i(5\text{mS}) = 0.25\left(1 + e^{-\frac{5}{\tau}}\right) = 0.4 \text{ A}$$

$\tau =$ 9.788 mS

$L =$ 392 mH

Question 2:

a) A three-phase Δ-connected +ve sequence source having the phase voltage V_{ab}=220∠0°V. The source resistance is 1 Ω / Phase. The source supplies an unbalanced Δ-connected resistive load having R_{ab} = 10Ω, R_{bc} = 9Ω and R_{ca} = 21Ω. The three lines connecting the source to the load have negligible resistance. The load power is measured using the two wattmeter method. The first wattmeter W_1 is connected between lines A and B, while the second one W_2 is connected between lines C and B. Find the following: (12 Marks)

The phase current $\overline{I_{AB}}$ at the load =	**20∠0° A**
The Line current $\overline{I_A}$ =	**26.46∠-19.1° A**
The line voltage $\overline{V_{AB}}$ at the load =	**200∠0° V**
The reading of W_1 =	**5 KW**
The reading of W_2 =	**5.35 KW**
The total power dissipated in the load =	**10.35 KW**

b) i) Find the voltage transfer function of the circuit of Fig.(b). (6 Marks)

ii) Find the poles and zeros of the transfer function. (4 Marks)

iii) Find the magnitude of the transfer function at ω = 5 Rad/Sec. (2 Marks)

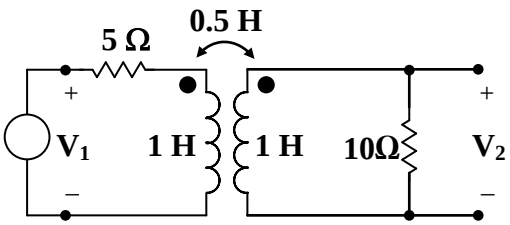


Fig. (b)

$(2s + 10)I_1 + s\,I_2 = 2\,V_1$

$s\,I_1 + (2s + 20)I_2 = 0$

$$H_v(s) = \frac{20s}{3s^2 + 60s + 200}$$

Poles: **- 4.23 , - 15.77 S^{-1}**

Zeros: **0, ∞**

$|H_v(j5)|$ = **0.308**

Question 3:

a) Find the first four non-zero terms of the Fourier series of the periodic voltage waveform shown in Fig.(a). (8 Marks)

$$b_n(t) = \frac{2}{T}\int_{-\frac{T}{2}}^{\frac{T}{2}} 5t.sin(n\omega_o t)dt = -\frac{10}{n\omega_o T}\int_{-\frac{T}{2}}^{\frac{T}{2}} t.dcos(n\omega_o t)$$

$$= -\frac{5}{n\pi}\left[t.cos(n\omega_o t) - \frac{1}{n\omega_o}sin(n\omega_o t)\right]_{-\frac{T}{2}}^{\frac{T}{2}}$$

$$= -\frac{5}{n\pi}\left[t.cos(n\omega_o t) - \frac{1}{n\omega_o}sin(n\omega_o t)\right]_{-\frac{T}{2}}^{\frac{T}{2}} = -\frac{20}{n\pi}cos(n\pi)$$

$b_1 = 20/\pi$, $b_2 = -10/\pi$, $b_3 = 20/3\pi$, $b_4 = -5/\pi$,

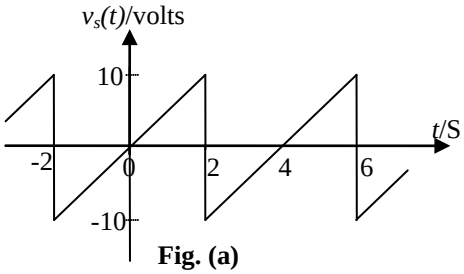


Fig. (a)

b) There is no energy stored in the circuit of Fig.b at the time the switch is closed:

i) Write the two mesh equations of the circuit. (4 Marks)

ii) Find $I_1(s)$ and $I_2(s)$. (4 Marks)

iii) Find $i_1(t)$ and $i_2(t)$. (4 Marks)

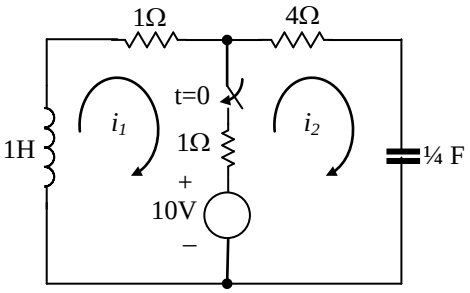


Fig. (b)

The first s-domain mesh equation:

$(s^2 + 2s)\,I_1 - s\,I_2 = -10$

The second s-domain mesh equation:

$-s\,I_1 + (5s + 4)\,I_2 = 10$

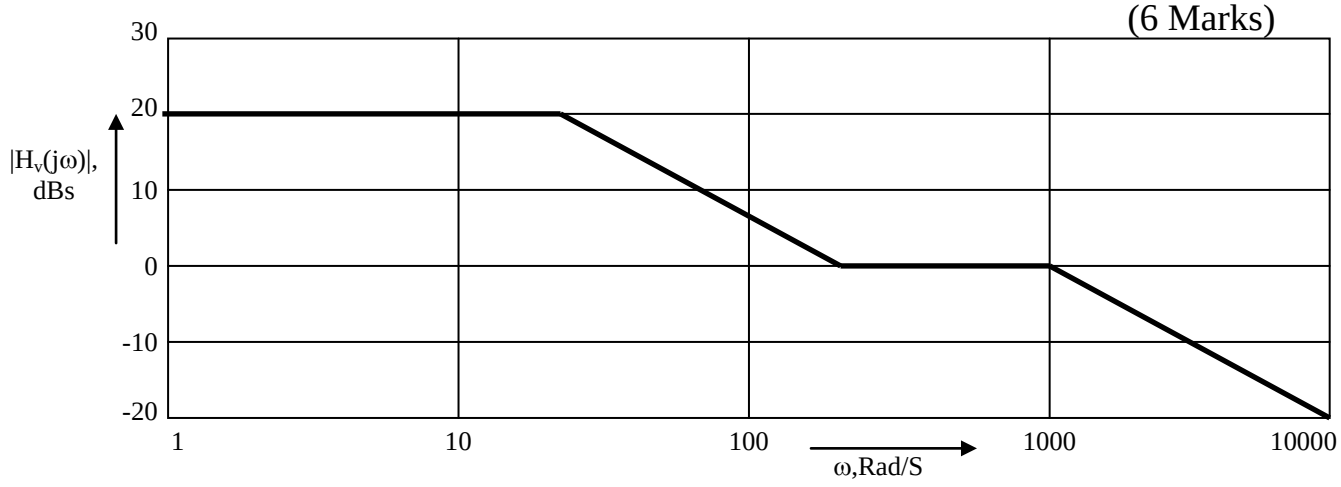
$$I_1(s) = \frac{-8}{s(s+1.6)} = \frac{5}{s+1.6} - \frac{5}{s}$$

$$I_2(s) = \frac{2}{s+1.6}$$

$$i_1(t) = [-5 + 5e^{-1.6t}]u(t)\,\text{A}$$

$$i_2(t) = 2e^{-1.6t}u(t)\,\text{A}$$

c) Sketch the Bode Diagram of the voltage transfer function: $H_v(s) = \dfrac{1000\,(s+200)}{(s+20)(s+1000)}$ (6 Marks)



Question 4:

a) The switch in the circuit of Fig. (a) has been open a long time before closing at $t = 0$.

i) Find $i_L(0^+)$, $i_L(\infty)$, $v_L(0^+)$, $\frac{di_L}{dt}(0^+)$. (8 Marks)

ii) Write the differential equation of $i_L(t)$. (2 Marks)

iii) Write the characteristic equation and find its roots. (4 Marks)

iv) The constants in the solution for $i_L(t)$. (2 Marks)

v) Find $i_L(t)$ for $t \geq 0$. (2 Marks)

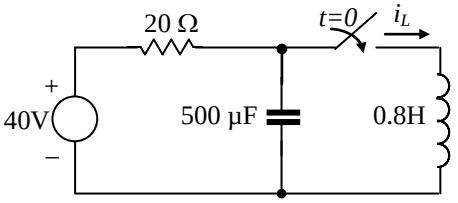


Fig. (a)

$i_L(0^+)$ **0**

$i_L(\infty)$ **2 A**

$v_L(0^+)$ **40 V**

$\frac{di_L}{dt}(0^+)$ $\frac{V_L(0^+)}{L} = 50$ **A/S**

the differential equation of $i_L(t)$

$$\frac{d^2i}{dt^2} + \frac{1}{RC}.\frac{di}{dt} + \frac{1}{LC}.i = \frac{2}{LC}$$

the characteristic equation

$$s^2 + 100\,s + 2500 = 0$$

roots of the characteristic equation

$$s_1 = s_2 = -50$$

The constants

$$D_1 = -50,\ D_2 = -2$$

$$i_L(t) = 2 - (50\,t + 2)\,e^{-50t}$$

b) Find the *h* parameters of the circuit shown in Fig.(b). (8 Marks)

$h_{11} =$ **60 Ω** $h_{12} =$ **0.333**

$h_{21} =$ **-0.21** $h_{22} =$ **8.8 mS**

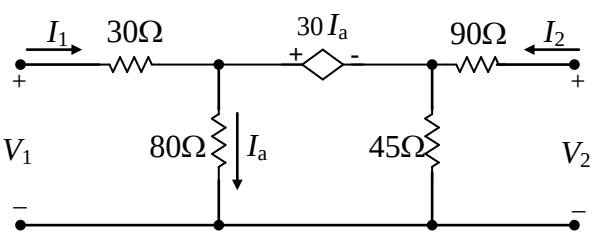


Fig.(b)

********** أطيب التمنيات بالتوفيق **********

أ.د. مجدى مفيد دوس

ASSIUT UNIVERSITY
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DEPT. OF ELECTRICAL ENG.

E222 CIRCUIT THEORY

2nd Year Elect.

First Term Examination, 2012/2013

Time: 3 Hours

الامتحان مكون من أربع صفحات، الإجابة فى نفس ورقة الأسئلة، النهاية العظمى ١٠٠ درجة.
الإجابة النهائية يجب أن تكون مكتوبة فى المكان المخصص لها وخطوات الحل تكون فى الصفحة المقابلة.

Question #1: (12 Points)

The two op amps in the circuit in Fig.1 are ideal. Calculate v_{o1}, v_{o2}, i_{o1} and i_{o2}.

$v_{o1} = 2.125$ V

$v_{o2} = 2.5$ V

$i_{o1} = 0.25$ mA

$I_{o2} = 1.75$ mA

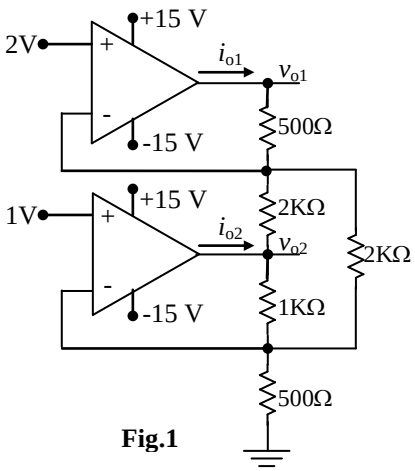


Fig.1

Question #2: (16 Points)

The voltage waveform shown in Fig.2(a) is applied to the circuit of Fig.2(b). The initial voltage on the capacitor is zero. Calculate and sketch $v_o(t)$.

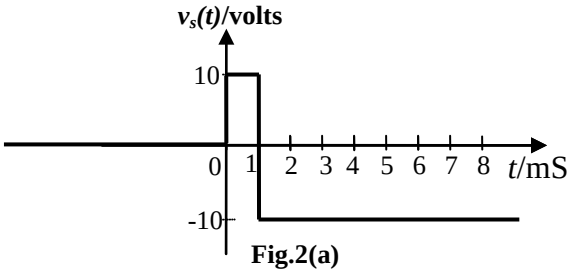


Fig.2(a)

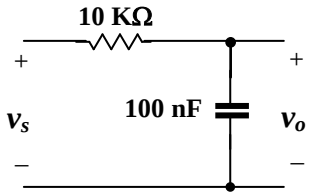


Fig.2(b)

$v_o(0^+) = 0$

$v_o(\infty)_1 = 10$ V

$\tau = 1$ mS

$v_o(t) = 10(1 - e^{-t})$ V

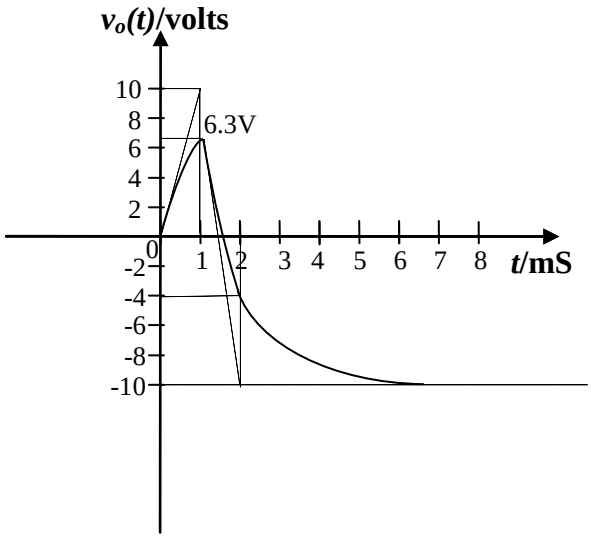
0 <= t <= 1 mS

$v_o(1\text{mS}) = 6.3$ V

$v_o(\infty) = -10$ V

$v_o(t) = -10 + 16.3\, e^{-(t-1)}$ V

1mS <= t <= ∞



Question #3: (10 Points)

The voltage response for the circuit in Fig.3 is known to be $v(t) = D_1te^{-500t} + D_2e^{-500t}$, $t \geq 0$.
The initial current in the inductor (I_o) is -10 mA, and the initial voltage on the capacitor (V_o) is 8 V. The inductor has an inductance of 4 H.

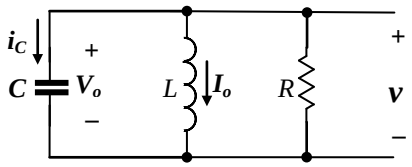


Fig.3

a) Find the values of R, C, D_1 and D_2.
b) Find $i_C(t)$ for $t \geq 0^+$.

R = 1 KΩ
C = 1 μF
D_1 = 6000 V/S
D_2 = 8 V
$i_C(t) = -3\,t\,e^{-500t} + 2\text{x}10^{-3}\,e^{-500t}$ A

Question #4: (12 Points)

A three-phase Y-connected +ve sequence source having the phase voltage $\boldsymbol{V_a}$=260∠0°V. The source resistance is 1 Ω/Phase. The source supplies a balanced Δ-connected load having an impedance of (27 + j15) Ω/Phase. The three lines connecting the source to the load have a resistance of 2 Ω/Line. Find the following:

The Line current $\overline{\boldsymbol{I_A}}$ =	20∠-22.6° A
The phase current $\overline{\boldsymbol{I_{AB}}}$ at the load =	11.55∠7.4° A
The line voltage $\overline{\boldsymbol{V_{AB}}}$ at the load =	356.7∠36.4° V
The phase voltage $\overline{\boldsymbol{V_a}}$ at the source terminals =	241.7∠1.8° V
The line voltage $\overline{\boldsymbol{V_{ab}}}$ at the source terminals =	418.6∠31.8° V
The total power dissipated in the load =	10.8 KW

Question #5: (12 Points)

The sinusoidal voltage source in the circuit of Fig.5 is operating at a frequency of 200 Krad/s. The coefficient of coupling is adjusted until the peak amplitude of i_1 is pure real.

a) What is the value of k?

b) What is the peak amplitude of i_1 if $v_g = 112 \cos(2 \times 10^5 t)$ V ?

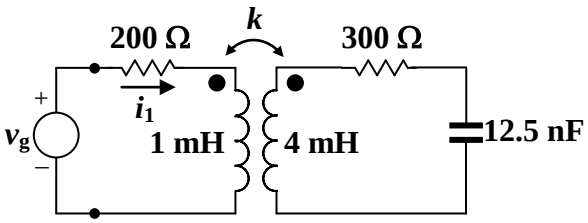


Fig.5

$Z_r = 64\,k^2(3 - j4)$

$$i_1 = \frac{v_g}{200 + j200 + 64k^2(3 - j4)}$$

$4 \times 64\,k^2 = 200$

k = 0.88

$i_{1(peak)}$ = 0.32 A

Question #6: (12 Points)

Find the voltage transfer function and its poles and zeros for the circuit of Fig.6. If we consider this circuit as a bandpass filter, find approximate values for its magnitude transfer function at ω = 0 and at its central frequency. Find also the value of its bandwidth.

$H_v(s)$ = $\dfrac{10^4 s}{s^2 + 10^4 s + 10^{10}}$

Poles: $-5 \pm j\,99.87$ Krad/s

Zeros: 0, ∞

$|H_v(0)|$ = 0

$|H_v(j\omega_o)|$ = 1

BW = 10^4 rad/s

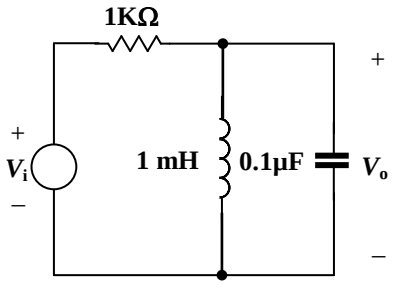


Fig.6

Question #7: (12 Points)

There is no energy stored in the circuit of Fig.7 at the time the current source is energized. Use the Laplace Transform to find the nodal voltages.

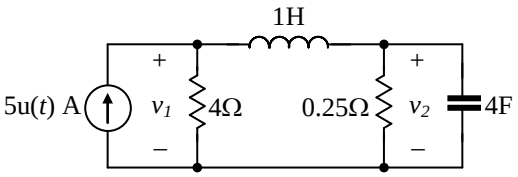


Fig.7

Eq. (1): $(s+4)V_1 - 4V_2 = 20$

Eq. (2): $-V_1 + (4s^2 + 4s + 1)V_2 = 0$

$V_1(s) = \dfrac{20(s^2 + s + 0.25)}{s(s^2 + 5s + 4.25)}$ $\qquad$ $V_2(s) = \dfrac{5}{s(s^2 + 5s + 4.25)}$

$v_1(t) = 1.18 - 16.38e^{-1.09t} + 35.2e^{-3.91t}$ $\qquad$ $v_2(t) = 1.18 - 1.63e^{-1.09t} + 0.45e^{-3.91t}$

Question #8: (6 Points)

A periodic voltage having a period of 10π μS is given by the following Fourier series:

$$v_g = 150\sum_{n=1,3,5,\ldots}^{\infty} \frac{1}{n}\sin\frac{n\pi}{2}\cos n\omega_o t \text{ V}$$

This periodic voltage is applied to the circuit shown in Fig.8. Find the amplitude and phase angle of the first three components of v_o.

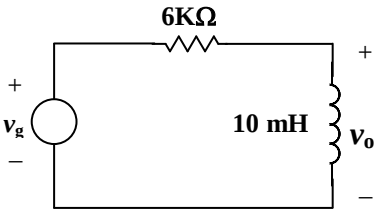


Fig.8

$\omega_o = 2\pi/T = 200$ Krad/s

$v_g = 150\cos\omega_o t - 50\cos 3\omega_o t + 30\cos 5\omega_o t$

$$v_o = \frac{j2n}{6 + j2n}v_g$$

$V_{o1} = 47.43\angle 71.6°$ V $\qquad$ $V_{o3} = 35.34\angle -135°$ V $\qquad$ $V_{o5} = 25.73\angle 31°$ V

Question #9: (8 Points)

Find the s-domain expressions for the *a* parameters of the two-port circuit shown in Fig.9.

$a_{11} = 1 + \dfrac{1}{4s}$ $\qquad$ $a_{12} = s + \dfrac{1}{4} + \dfrac{1}{s}$

$a_{21} = \dfrac{1}{4}$ $\qquad$ $a_{22} = \dfrac{s}{4} + 1$

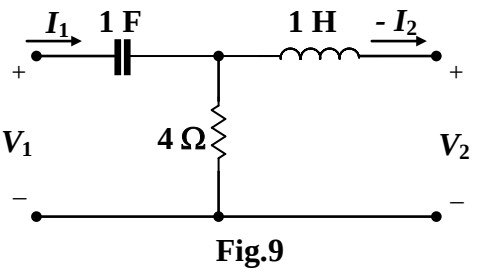


Fig.9

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E222 CIRCUIT THEORY

First Term Examination, 2014/2015

2nd Year Elect.

Model Answer

Attempt all questions, full mark: 100 Points **Time: 3 Hours**

Question #1: (12 Points)

The circuit shown in Fig.1 is used to measure the change in resistance experienced by strain gages.

a) Derive an expression for the output voltage V_{out} in terms of the resistance values and the reference voltage V_{ref}, assuming ideal op-amp and neglecting ΔR^2 w.r.t. R^2. (8 Points)

b) If R = 160 Ω, ΔR = 1 Ω, R_f = 1.2 KΩ, and V_{ref} = 8 V; find the value V_{out}. (4 Points)

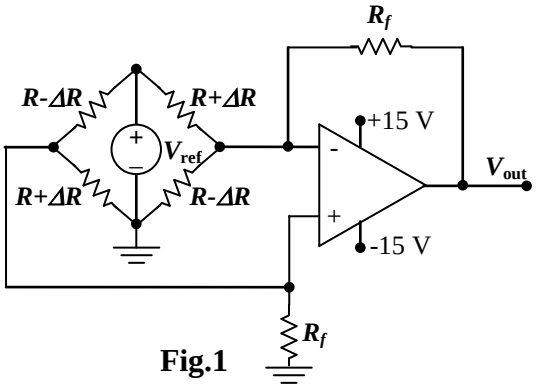


Fig.1

Expression for V_{out} :

$$V_{out} = \frac{2R_f \Delta R}{R^2} \cdot V_{ref}$$

Value of V_{out} :

V_{out} = 0.75 V

Question #2: (16 Points)

In the circuit shown in Fig.2, the initial currents in inductors L_1 and L_2 are 8A and 1A respectively. The switch is opened at t = 0.

a) Find $i(t)$, for $t \geq 0$. (8 Points)

b) Find $v(t)$, for $t \geq 0$. (2 Points)

c) Find $i_1(t)$ and $i_2(t)$, for $t \geq 0$. (4 Points)

d) Determine the total energy stored in the inductors as $t \to \infty$. (2 Points)

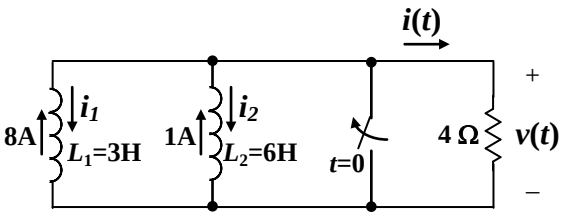


Fig.2

$i(0^+)$ = 9 A

$i(\infty)$ = 0

τ = 0.5 S

$i(t) = 9\, e^{-2t}$ A

$v(t) = 36\, e^{-2t}$ V

$i_1(t) = -2 - 6\, e^{-2t}$ A

$i_2(t) = 2 - 3\, e^{-2t}$ A

Energy stored in the inductors as $t \to \infty$ = 18 J

Question #3: (12 Points)

The switch in the circuit shown in Fig.3 has been in position (a) for a long time. At $t = 0$, it moves to position (b). Find $i(0^+)$, $v_c(0^+)$, $di(0^+)/dt$, the roots of the characteristic equation s_1, s_2 and $i(t)$ for $t \geq 0$.

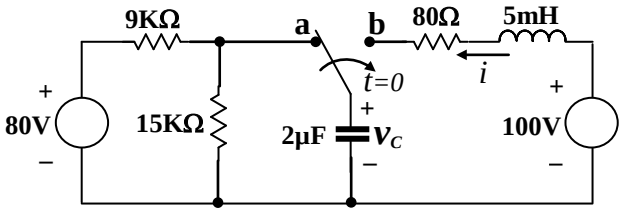


Fig. 3

$i(0^+) = 0$

$v_C(0^+) = 50$ V

$di(0^+)/dt = 10^4$ A/S

$s_1 = -8000 + j\,6000$

$s_2 = -8000 - j\,6000$

$i(t) = 1.6736\, e^{-8000t} \sin(6000t)$ A

Question #4: (12 Points)

A three-phase Δ-connected -ve sequence source having the phase voltage V_{ab}=240∠0°V and negligible source resistance. The source supplies a resistive unbalanced Δ-connected load having impedances: R_{AB}= 60 Ω, R_{BC}= 40 Ω, and R_{CA}= 80 Ω. The three lines connecting the source to the load have negligible resistances. The load power is measured using the two wattmeter method. The first wattmeter W_1 is connected between lines A and B, while the second one W_2 is connected between lines C and B. Find the following:

The phase current $\overline{I_{AB}}$ at the load =	4∠0° A
The Line current $\overline{I_A}$ =	6.08∠25.3° A
The Line current $\overline{I_C}$ =	7.94∠79.1° A
The reading of W_1 =	1.32 KW
The reading of W_2 =	1.8 KW
The total power dissipated in the load =	3.12 KW

Question #5: (14 Points)

The voltage source v_g drives the circuit shown in Fig.5. The response signal is the voltage across the capacitor, v_o.

a) Calculate the numerical expression for the voltage transfer function $\boldsymbol{H_v(s) = V_o(s)/V_g(s)}$. (6 points)

b) Calculate the numerical values for the poles and zeros of the transfer function. (4 points)

c) The circuit is driven by a step voltage source, namely, $\boldsymbol{v_g = 50u(t)}$, find $\boldsymbol{v_o(t)}$. (4 points)

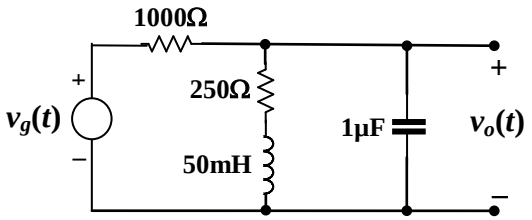


Fig.5

$\boldsymbol{H_v(s) =}$ $\dfrac{1000(s + 5000)}{s^2 + 6000s + 25 \times 10^6}$

Poles: **- 3000 + *j*4000, - 3000 - *j*4000**

Zeros: **- 5000, ∞**

$\boldsymbol{V_{out}(t) =}$ $\boldsymbol{[10 + 11.18\, e^{-3000t} \cos(4000t - 153.4°)]u(t)}$ **V**

Question #6: (12 Points)

The ideal transformer used in the circuit of Fig.6 has a turns ratio $\boldsymbol{N_2/N_1 = 3}$.

a) Find the reflected impedance at terminals a-b of that transformer. (6 Points)

b) Calculate the value of the currents $\boldsymbol{I_1, I_2, I_3,}$ and $\boldsymbol{I_4}$. (6 Points)

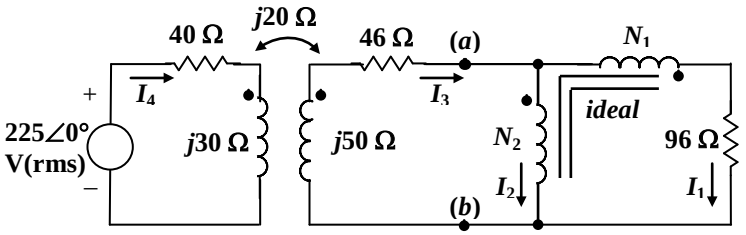


Fig.6

$$\boldsymbol{Z_R = \left(\frac{a}{1+a}\right)^2 R_L = 54\Omega}$$

$\boldsymbol{I_1 = 0.584\angle 30.1°}$ **A**

$\boldsymbol{I_2 = 0.195\angle 30.1°}$ **A**

$\boldsymbol{I_3 = 0.779\angle 30.1°}$ **A**

$\boldsymbol{I_4 = 4.35\angle -33.3°}$ **A**

Question #7: (6 Points)

a) Calculate the impedance of the circuit shown in Fig.7 at radian frequency of 2 Krad/S. (2 Points)

b) At what finite frequency (ω_r) does the impedance of the circuit become purely resistive? What is the impedance at that frequency? (4 Points)

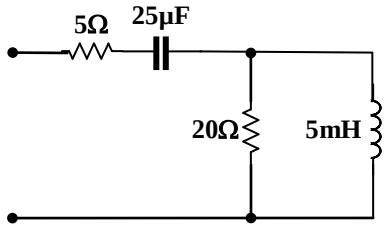
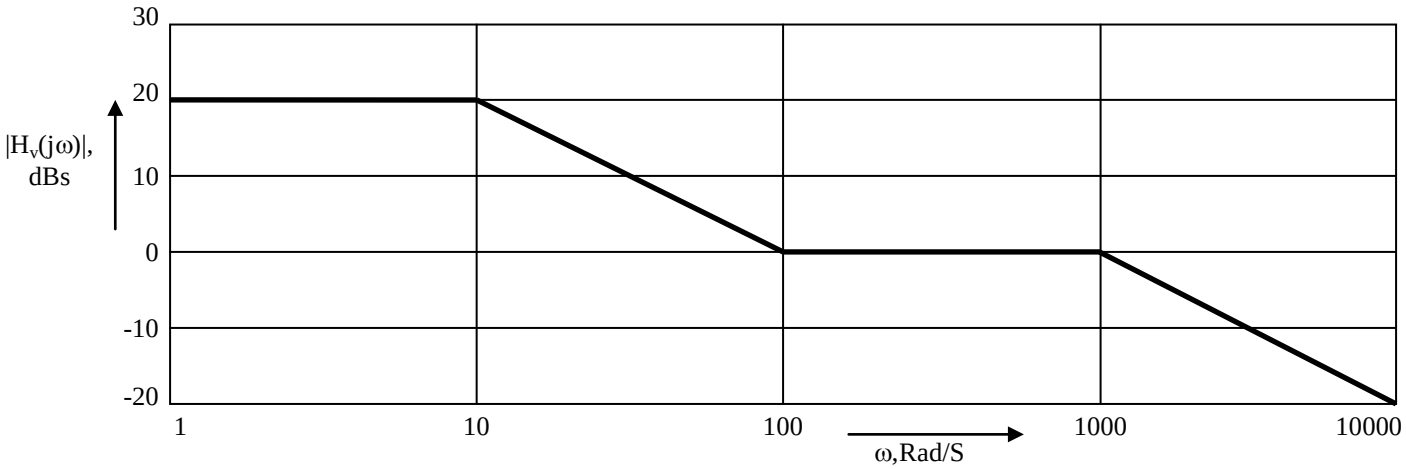


Fig.7

Z(2Krad) = 9 – j12 Ω	ω_r = 4 Krad/S	$Z(\omega_r)$ = 15 Ω

Question #8: (8 Points)

Sketch the Bode Diagram of the voltage transfer function: $H_v(s) = \dfrac{1000(s+100)}{(s+10)(s+1000)}$



Question #9: (8 Points)

The y parameters for the two-port network in Fig.9 are: y_{11}= 2mS, y_{12} = -0.2 mS, y_{21} = 10 mS, and y_{22} = -0.5 mS. Find V_1, V_2, I_1, and I_2.

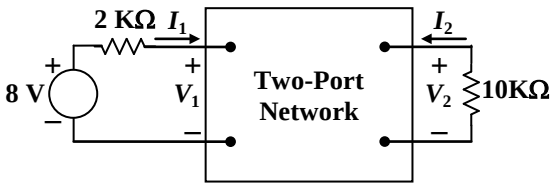


Fig.9

V_1 = - 1.6 V	V_2 = - 40 V
I_1 = 4.8 mA	I_2 = 4 mA

********** **Best Wishes, Prof. Magdy M. Doss** **********

ASSIUT UNIVERSITY
FACULTY OF ENGINEERING
DEPT. OF ELECTRICAL ENG.

E222 CIRCUIT THEORY(2)

2nd Year Elect.

First Term Examination, 2015/2016

الامتحان مكون من أربع صفحات، الإجابة فى نفس ورقة الأسئلة، النهاية العظمى ١٠٠ درجة.
الإجابة النهائية يجب أن تكون مكتوبة فى المكان المخصص لها وخطوات الحل تكون فى الصفحة المقابلة.

Attempt all questions, full mark: 100 Points **Time: 3 Hours**

Question #1: (12 Points)

The feedback resistance R_f in the circuit of Fig.1 is variable. Assuming ideal op-amp find:

a) The range of values for R_f in which the op-amp does not saturate. (2 Points)
b) V_{out}, I_o, I_1, and I_2 for R_f = 50 KΩ. (4 Points)
c) V_{out}, V_1, I_o, I_1, and I_2 for R_f = 360 KΩ. (6 Points)

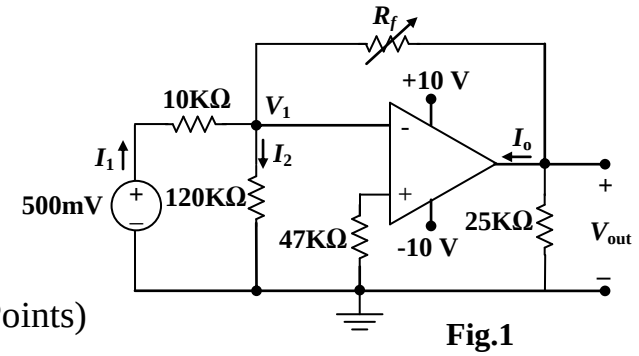


Fig.1

a) $0 \le R_f \le 200$ KΩ

b) V_{out} = -2.5 V | I_o = 150 μA | I_1 = 50 μA | I_2 = 0

c) V_{out} = -10 V | V_1 = 200 mV | I_o = 428.3 μA | I_1 = 30 μA | I_2 = 1.67 μA

Question #2: (16 Points)

Both switches in the circuit in Fig.2 have been closed for a long time. At t = 0, both switches open simultaneously.

a) Find $i_o(t)$ for $t \ge 0^+$. (8 Points)
b) Find $v_o(t)$ for $t \ge 0^+$. (4 Points)
c) Calculate the energy (in micro joules) trapped in the circuit. (4 Points)

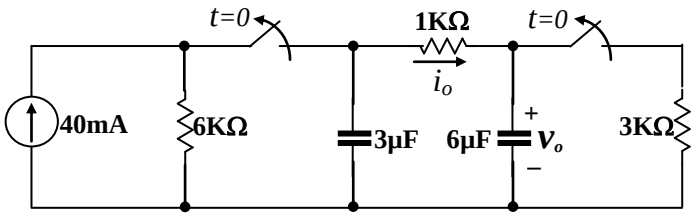


Fig. 2

$i_o(0^+)$ = 24 mA | $i_o(\infty)$ = 0 | τ = 2mS

$i_o(t) = 24\, e^{-500t}$

$v_o(t) = 80 - 8\, e^{-500t}$

Energy trapped in the circuit = 28800 μJ

Question #3: (12 Points)

The switch in the circuit shown in Fig.3 has been closed for a long time. The switch opens at $t = 0$. Find $v_c(0^+)$, $i_L(0^+)$, $[dv_c/dt]_{0+}$, the roots of the characteristic equation s_1, s_2 and $v_c(t)$ for $t \geq 0$.

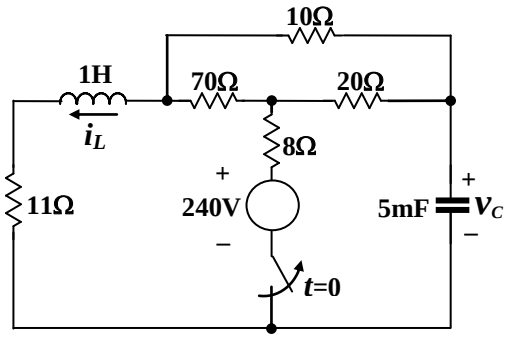


Fig. 3

$v_C(0^+) = 108$ V

$i_L(0^+) = 6$ A

$[dv_c/dt]_{0+} = -1200$ V/S

$s_1 = -10 - j10$ $\quad$ $s_2 = -10 + j10$

$$v_c(t) = (108\cos 10t - 12\sin 10t)e^{-10t} \text{volts}$$

Question #4: (12 Points)

A three-phase Y-connected +ve sequence source having the phase voltage V_a=220∠0°V. The source resistance is 1 Ω/Phase. The source supplies a balanced Δ-connected load having an impedance of (30 + j12) Ω/Phase. The three lines connecting the source to the load have an impedance of 1+j1 Ω/Line. Find the following:

The Line current $\overline{I_B}$ =	**16.9 ∠-142.6° A**
The phase current $\overline{I_{AB}}$ at the load=	**9.77 ∠7.4° A**
The Line voltage $\overline{V_{BC}}$ =	**315.6 ∠-90.8° V**
The phase voltage $\overline{V_a}$ at the source terminals=	**204.5 ∠1.8° V**
The Line voltage $\overline{V_{ab}}$ at the source terminals=	**354.2 ∠31.8° V**
The total power dissipated in the load =	**8.592 KW**

Question #5: (12 Points)

Use the Laplace transform to find v_o and v_1 in the circuit shown in Fig.5 if $i_g = 10u(t)$ **mA** and $\alpha = 75$ **mA/V**. There is no energy stored in the circuit at t=0.

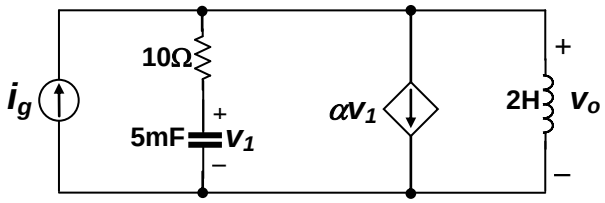


Fig.5

$$V_o(s) = \frac{0.1(s+20)}{s^2+20s+100} = \frac{0.1}{s+10} + \frac{1}{(s+10)^2}$$

$$V_1(s) = \frac{2}{(s+10)^2}$$

$$v_o(t) = (t+0.1)e^{-10t} \text{ volts}$$

$$v_1(t) = 2te^{-10t} \text{ volts}$$

Question #6: (12 Points)

The linear transformer used in the circuit of Fig.6 has a coupling coefficient k = 0.5.

a) Calculate the impedance reflected into the primary winding Z_r. (4 Points)

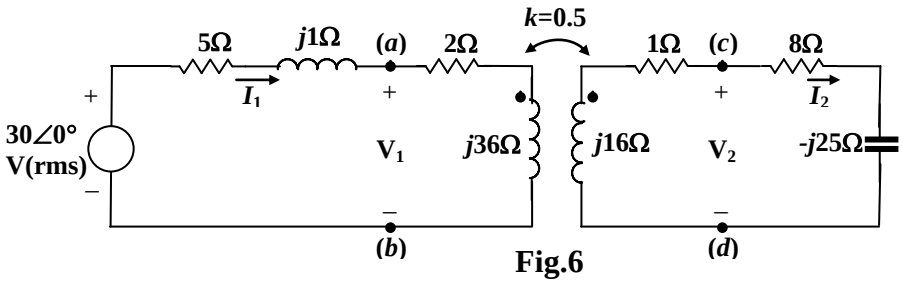


Fig.6

b) Calculate the impedance seen looking into the primary terminals of the transformer Z_{ab}. (2 Points)

c) Calculate the Thevenin equivalent with respect to the terminals c,d. (6 Points)

$Z_r = 8 + j8 = 11.31\angle 45°\ \Omega$

$Z_{ab} = 10 + j44 = 45.12\ \angle 77.2°\ \Omega$

$Z_{Th} = 1.71 + j12.24 = 12.36\angle 82°\ \Omega$

$V_{Th} = 9.39 + j1.77 = 9.56\angle 10.7°$ V

Question #7: (8 Points)

Fig.7 shows an ***R-L*** high pass filter.

a) What is the transfer function, $H(s) = V_o(s)/V_i(s)$, of this filter? (4 Points)
b) What is the cutoff frequency of this filter? (2 Points)
c) What is the maximum value of the transfer function; and at what frequency does it occur? (2 Points)

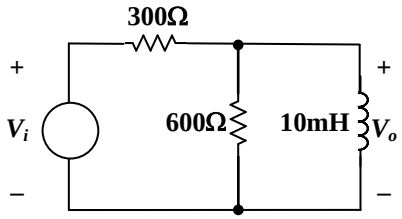


Fig.7

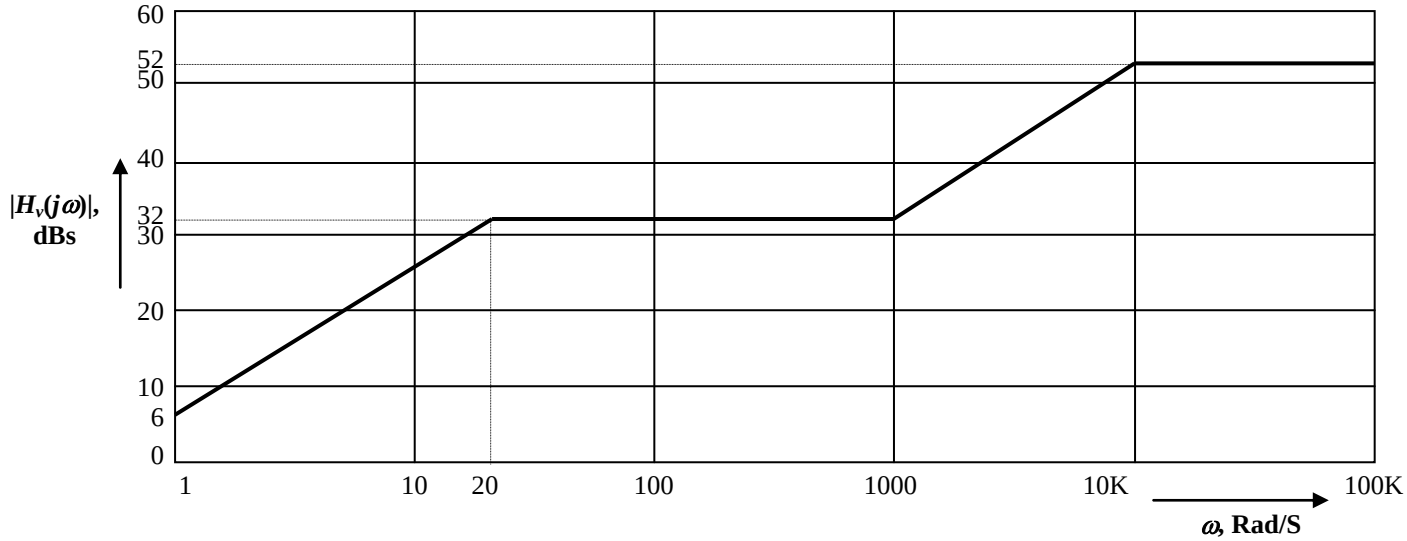
$$H(s) = \frac{2s}{3s + 6 \times 10^4}$$

$\omega_c = 2 \times 10^4$ Rad/Sec

$H_{max} = 2/3$ at $\omega = \infty$

Question #8: (8 Points)

Sketch the Bode Diagram of the voltage transfer function: $H_v(s) = \dfrac{400s(s+1000)}{(s+20)(s+10000)}$



Question #9: (8 Points)

Find the ***h*** parameters of the two-port circuit shown in Fig.9.

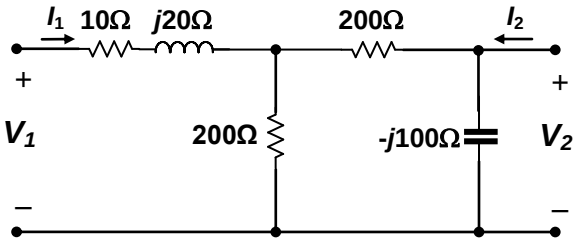


Fig.9

$h_{11} = 110 + j20\ \Omega$

$h_{12} = 0.5$

$h_{21} = -0.5$

$h_{22} = 2.5 + j10$ mS

Assiut University	Planning & Design of Transportation	3rd year
Faculty of Eng.	Infrastructure (Elective Course)	Time: 1 hr.
Civil Eng. Dept.	Year-Work Exam: May 2008	

Answer All Questions, assume any missing data you may need.

1. a) Draw a neat sketch showing a double railway?
   b) What are the types of sleepers which are used in railroad, describe the advantage of each type?
   c) A railway line of Max. speed 140 km/hr, with normal track width, wooden sleeper and distance from centerline to centerline is 60 cm, the Max. axial load is 26 ton, and distance between axis is more than 3.0 m.
   It is required to:
   i) Design cross section of Vignole Rail from first assumption.
   ii) Draw Vignole Rail with scale 1:1.
   iii) Bending and normal stress in sleeper which cross section is 26x16 cm, if the plate width under rail is 150 mm

2. a) Draw a flow chart showing the main stages in transportation planning procedure.
   b) State the main factors affecting highways design.
   c) It is proposed to widen a two-way highway because of traffic congestion, where counts show that the ADT (2007) is 3500 vehicle/day of which 15% trucks. A traffic development due to improvements on land adjacent to the highway by the end of the design period (2027) is expected to be 600 pcu's/hour.
   Average normal traffic growth 5% /year,
   (DHV/ADT) =0.15,
   Directional distribution factor (D) = 70%,
   Practical lane capacity = 600 pcu's/hour.
   It is required to:
   i) Design the cross section of the proposed new highway.
   ii) Draw your designed cross section showing all dimensions, where the original ground level = (11.00) m and the road level = (13.00) m.

Examiners
Dr. Mahmoud Enieb
Dr. Ghada S. Moussa

كليـــة الهندســـة
جـــامعـــة أسيـــوط
إمتحان نهاية الفصل الدراسي الثانى
2014 / 2015

قسم الهندسة المعمارية
مقرر شق الضوء- هم ٢٢٢
ثانية عمارة – لائحة ٢٠٠٤
الزمن: ٣ ساعات مع الصوت ولنكف
الدرجة: ٢٠ درجة

ملاحظات هامة
- الإمتحان يقيس مهارات أ.١. ١، ب.١٥. ٤، ج.٢. ٢.
- الإمتحان مكون من١ صفحة – ٢ أسئلة + ٢جداول

أجب عن الأسئلة التالية

السؤال الأول (١٢ درجة) :

المطلوب: اجب عن الأسئلة الأتية:

أ. ماهي أنواع الإبهار طبقا للآتي: لطبيعة المصدر- كيفية النظر- ظروف الرؤية، وكيف يمكن تلافيه. (٣درجة)

ب. سطح عمل ابعاده ٤*٤ م والمطلوب حساب نوع توزيع الإضاءة لكي يتم تحقيق شدة استضاءة قدرها ٥٠٠ lux في حالات تركيب أجهزة إضاءة الفيض الكلى بالليومن لها كالأتي: ٢٠٨٠٠- ٢٠٨٠٠٠- ١٠٩٤٧- ١٣٨٦٦- ٤١٦٠٠ (٥درجة)

ج. فراغ على شكل منشور سداسي ناقص ضلع القاعدة ٢٠ م ، والارتفاع عند اعلي نقطة ٩ م واقل نقطة ٦ م ، قارن بين شدة الاستضاءة في نقطتين بالأرضية، الأولى في مركز الأرضية السداسية ، والنقطة الثانية على المحيط مقابلة لأقل نقطة في السقف وذلك في حالة تعليق نجفة بمركز السقف قوتها ٤٠٠٠ شمعة قياسية منخفضة عن المركز بمقدار ٣متر (٤ درجة)

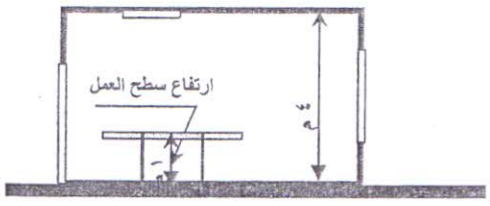
السؤال الثاني: (٨ درجة)

المطلوب اجب عن الأسئلة الآتية:

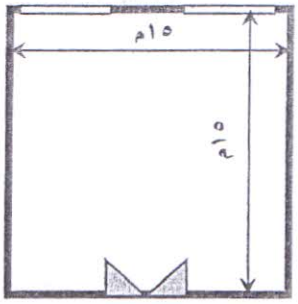
أ- ماذا تعرف عن نظام الإضاءة SOLAR TUBE و متى يمكن تطبيقه في المباني (٢ درجة)

ب- احسب عدد الأجهزة وتوزيعها فى فراغ مكتبة مدرسية- أبعادها موضحة بالرسم – والتى تكفل تحقيق مستوى شدة استضاءة على مناضد القراءة قدرها ٥٥٠ Lux لوكس بحيث يكون معامل الانعكاس للسقف Ceiling reflection ٥٠%، وللجدران Wall reflection ٣٠%، ومعامل الصيانة ٠,٧٥ .

- يستعمل مصباح الفلورسنت ٤٠ وات طولة ٦٠ سم والفيض التصميمي له ١٧٠٠ Lumen ليومن، و الأجهزة من النوع المركز ذات العواكس المرأوية. (٦ درجة)



قطاع رأسي



مسقط أفقي

----------إنتهت الأسئلة----------

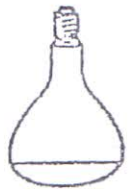
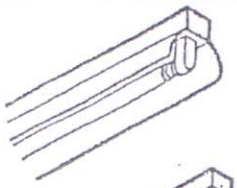
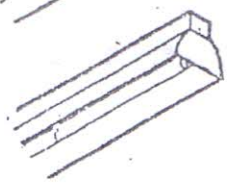
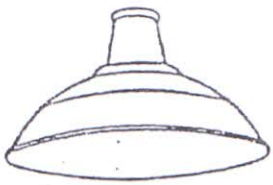
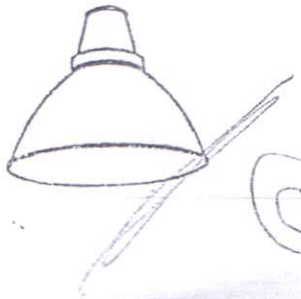
مع اطيب الدعاء بالتوفيق،،،،،

د.محمد عبد الوهـ

+ اللجنة

ppendix 3 continued
ilization factors

جدول ٣-١-٠
معامل الاستغلاة

Luminaire, and Typical Light Output Ratio %	Typical Outline	Basic DLOR	Ceiling	Reflectance % عامل انعكاس								
				70			50			30		
			Walls	50	30	10	50	30	10	50	30	10
		%	Room Index									
...d colour-corrected mercury lamp		85	0·6	0·4	0·34	0·3	0·39	0·33	0·29	0·37	0·32	0·29
			0·8	0·53	0·46	0·41	0·51	0·45	0·4	0·49	0·43	0·4
			1	0·62	0·55	0·49	0·58	0·52	0·48	0·56	0·51	0·46
			1·25	0·68	0·6	0·55	0·64	0·58	0·53	0·61	0·56	0·51
			1·5	0·72	0·65	0·59	0·68	0·62	0·57	0·65	0·59	0·54
			2	0·81	0·73	0·67	0·75	0·69	0·64	0·69	0·65	0·61
			2·5	0·85	0·78	0·72	0·79	0·73	0·69	0·73	0·68	0·65
			3	0·9	0·83	0·78	0·83	0·78	0·75	0·77	0·73	0·7
			4	0·94	0·89	0·84	0·87	0·83	0·8	0·8	0·77	0·75
			5	0·97	0·92	0·89	0·9	0·87	0·84	0·83	0·79	0·77
...enamel trough (75–85)		75	0·6	0·36	0·31	0·28	0·35	0·31	0·28	0·35	0·31	0·28
			0·8	0·45	0·4	0·37	0·44	0·4	0·37	0·44	0·4	0·37
			1	0·49	0·45	0·4	0·49	0·44	0·4	0·48	0·43	0·4
			1·25	0·55	0·49	0·46	0·53	0·48	0·45	0·52	0·48	0·45
			1·5	0·58	0·54	0·49	0·57	0·53	0·49	0·55	0·52	0·49
			2	0·64	0·59	0·55	0·61	0·58	0·55	0·6	0·56	0·54
			2·5	0·68	0·63	0·6	0·65	0·62	0·59	0·64	0·61	0·58
			3	0·7	0·65	0·62	0·67	0·64	0·61	0·65	0·63	0·61
...enamel trough (65–83)			4	0·73	0·7	0·67	0·7	0·67	0·65	0·67	0·65	0·64
			5	0·75	0·72	0·69	0·73	0·7	0·67	0·7	0·68	0·66
...dispersive industrial reflector (77)												
...industrial reflector (72–76)		70	0·6	0·39	0·36	0·33	0·39	0·36	0·33	0·39	0·35	0·3
			0·8	0·48	0·43	0·4	0·48	0·43	0·4	0·48	0·43	0·4
			1	0·52	0·49	0·45	0·52	0·48	0·45	0·52	0·48	0·4
...ray reflector, aluminium (72) or			1·25	0·56	0·53	0·5	0·56	0·53	0·49	0·55	0·52	0·4
			1·5	0·6	0·57	0·54	0·59	0·57	0·53	0·59	0·55	0·5
			2	0·65	0·62	0·59	0·63	0·6	0·58	0·63	0·59	0·5
			2·5	0·67	0·64	0·62	0·65	0·62	0·61	0·65	0·62	0·6
			3	0·69	0·66	0·64	0·67	0·64	0·63	0·67	0·64	0·6
			4	0·71	0·68	0·67	0·69	0·67	0·65	0·69	0·66	0·6
			5	0·72	0·7	0·69	0·71	0·69	0·67	0·71	0·67	0·6

مصابيح التوهج ومصابيح الفلورسنت

مصابيح التوهج

القدرة واط	الطول مم	القطر مم	الفيض التضيئي باللومن: ١١٠ فولت لمفرد	١٢٠ فولت لمفرد	٢٤٠ فولت ملف مزدوج
٢٥	١٠٥	٦٠	٢٢٥	٢٠٠	—
٤٠	١٠٥	٦٠	٤٤٥	٣٢٥	٣٩٠
٦٠	١٠٥	٦٠	٧٧٠	٥٧٥	٦٦٥
١٠٠	١٠٥	٦٠	١٤٢٠	١١٦٠	١٣٦٠
١٢٥		٦٨	—	—	٢٠٤٠
١٥٠	١٣٦٫٥	٦٨	—	—	٢٠٤٠
—	١٦٠	٨٠	٥٢٦٠	١٩٦٠	—
٢٠٠	١٦٦٫٥	٨٠	٣٢٥٠	٢٧٢٠	—
٣٠٠	٢٣٣	١١٠	٥٠٥٠	٤٢٠٠	—
٥٠٠	٢٣٣	١١٠	٨٩٠٠	٧٧٠٠	—
٧٥٠	٣٠٠	١٥٠	—	١٢٤٠٠	—
١٠٠٠	٣٠٠	١٥٠	—	١٧٣٠٠	—
١٥٠٠	٣٣٥	١٧٠	—	٢٧٥٠٠	—

القدرة الاسمية واط	طول الأنبوبة مم	قطر الأنبوبة مم	القدرة الضغطية واط	الفيض التضيئي باللومن (للأبيض الدافئ)
٤	١٥٠	١٥	١٠	١٢٥
٦	٢٢٥	١٥	١٢	٢٤٥
٨	٣٠٠	١٥	١٥	٣٦٠
١٢	٥٢٥	١٥	٢١	٧٢٩
١٥	٤٥٠	٢٥	٤٠*	٨٠٠
١٥	٤٥٠	٣٨	٤٠*	٧٥٠
٢٠	٦٠٠	٣٨	٥٠*	١١٠٠
٣٠	٩٠٠	٢٨	٤٠	٢١٤٠
٣٠	٩٠٠	٣٨	٤٠	١٨٥٠
٤٠	٦٠٠	٣٨	٩٥*	١٧٠٠
٤٠	١٤٠٠	٣٨	٥٠	٢٧٠٠
٥٠	١٥٠٠	٣٨	٧٠	٣٤٥٠
٦٥	١٥٠٠	٣٨	٨٠	٤٦٥٠
٧٥	١٨٠٠	٣٨	٨٨	٥٦٠٠
٨٠	١٥٠٠	٣٨	٩٥	٥٧٠٠
٨٥	١٨٠٠	٣٨	٩٥	٦١٠٠
٨٥	٢٤٠٠	٣٨	١٠٠	٦٧٠٠
١٢٥	٢٤٠٠	٣٨	٦٤٠	٨٦٠٠

* للصاميه على التوالي.

الفيض التضيئي لباقي أنواع الفلورسنت

تحليل الحصول على هذه القيم بضرب الفيض التضيئي للأبيض الدافئ في المعاملات التالية:

WHITE	1
WARM WHITE	1
DAYLIGHT	0.95
NATURAL	0.75
HOME-LITE	0.7
DELUXE WARM WHITE	0.65
KOLOR-RITE	0.65
COLOUR MATCHING (Northlight)	0.6
GRAPHIC A 47	0.6
DELUXE NATURAL	0.55
SOFTONE	0.55
TRUCOLOUR	0.5
ARTIFICIAL DAYLIGHT	0.4

جامعة أسيوط
كلية الهندسة
قسم الهندسة المعمارية
امتحان نهاية الفصل الدراسى الثاني
٢٠١٤/٢٠١٥ – يونيو ٢٠١٥

برنامج الهندسة المدنية
مقرر الانشاء المعمارى (A١٠١)
الفرقة الاولى – لائحة ٢٠٠٤
الزمن: ٣ ساعات
النهاية العظمى: ١٠٠ درجة

ملاحظات هامة:
- الإمتحان يقيس مهارات [٣ & أ١٤ & ج١٠ & ج١٤ & ج١٥]
- الاجابة تتم فى ورقة الاسئله ويجب مراعاة الدقة ونظافة الرسومات.
- وضح إجابتك باسكتشات كلما أمكن.
- الامتحان فى أربعة ورقات مقاس B٣.
- الدقة فى الرسم ونظافة اللوحة عامل مؤثر فى الدرجة.

السـؤال الأول: (٢٠ درجة)

أ- ذكر الفرق بين (مع توضيح اجابتك بالرسم كلما أمكن ذلك): (١٠ درجات)

- أنواع المبانى سابقة التجهيز الخطية والمستوية والصندوقية.

- مصطلح الكمرات المعتبة والكمرات المخدمة.

ب- اشرح طريقة عمل الارضيات التراتزو مع توضيح إجابتك باسكتشات. (١٠ درجات)

السـؤال الثاني: (٣٠ درجة)

أ-عرف المصطلحات الآتية: (١٠ درجات)

الطية: _____

_____

بئر السلم: _____

_____

مفتاح العقد: _____

_____

تنفيخ العقد: _____

_____

الفانوس: _____

_____

ب-ماهى اشتراطات البناء بالاحجار: (١٠ درجات)

١- _____

_____

٢- _____

_____

٣- _____

_____

٤- _____

_____

٥- _____

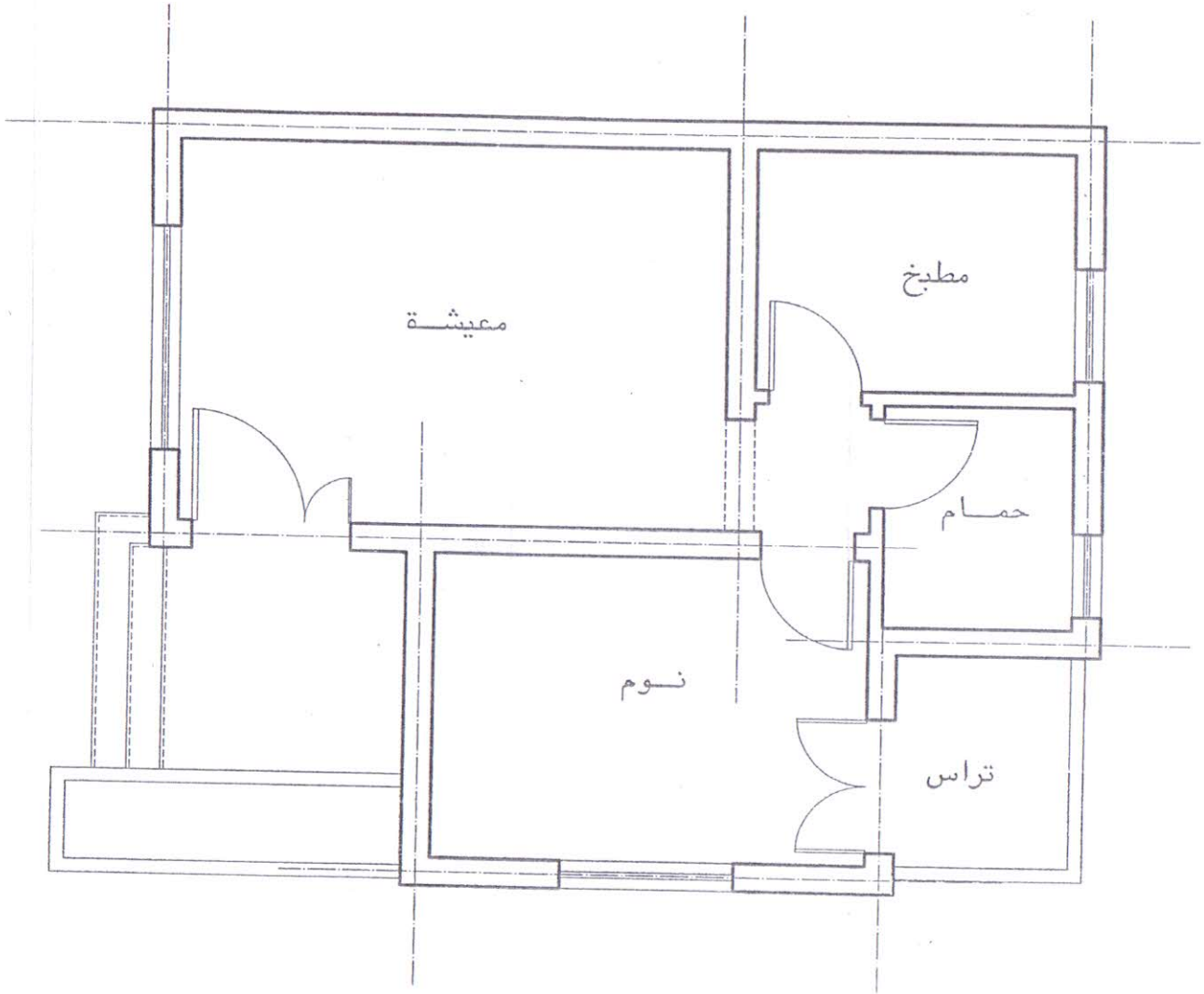
_____

ج- اذكر مع الرسم بكروكيات: (١٠ درجات)

- أنواع الاساسات السطحية (لكل نوع رسمة واحدة فقط)
- أنواع الطبقات العازلة.

السؤال الثالث:

يبين الرسم التالى مسقطا افقيا لشاليه مكون من دور واحد - والمطلوب اكمال المسقط الافقى التالى ليصبح رسما تنفيذيا. (مقياس الرسم ١/ ٥٠) (٢٥ درجة)

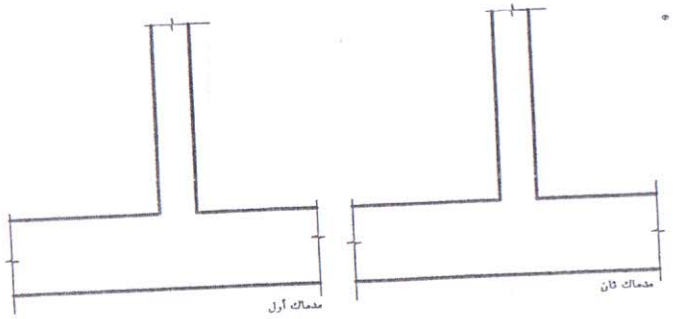


٣٥

(أ) ارسم الواجهة الامامية للشـــاليه مبينـــا عليهـا كافـة الابعـاد والبيانـــات بمقيـــاس رسم ١/ ٥٠) (١٠ درجات)

(ب) ارسم تفصـــيلة لفاصـــل إنشـــائى بيـــن مبنيـــن احدهما مســـتمر والاخر منتهـى علـى أن تحتـــوى التفصـــيلة علـى الســـقف النهـــائى لأحدهما والســـقف الاوسـط للمبـــنى الآخر مع إظهار كافـة الطبقـــات علـى الرسـم و كتابـــة انواعها ومقاســـاتها. (مقيـاس الرسـم ٢٠/١) (١٠ درجات)

ج- يبيـــن الرسـم التـــالى مسـقطا افقيـــا لمـــدماكين متتـــاليين فـــى حـائط ـ والمطلـوب اســـتكمال رسم المســـقطين. (مقيـاس الرسـم ٢٠/١) (٥ درجات)



حائطين متعامدين سمك طوبة على نصف طوبة

مع خالص تمنياتنا لكم بالتوفيق والنجاح ,,,,,,,

د/ نادى مصطفى عبد الكريم - د/محمد عبد الوهاب العزازى واللجنة

قسم الهندسة المعمارية
كليـــة الهندســـة
جـــامعـــة أسيـــوط
إمتحان نهاية الفصل الدراسى الثاني
٢٠١٤- ٢٠١٥م - دور مايو ٢٠١٥م

برنامج الهندسة المعمارية
مقرر الظل والمنظور
هـعـم ١٢٦ ٨
الفرقة الأولى – لائحة ٢٠٠٤
الزمن: ٤ ساعات
الدرجة: ٧٠ درجة

ملاحظات هامة

الإمتحان يقيس مهارات أ.١ مفاهيم ونظريات الرياضيات والعلوم الملائمة لتخصص الهندسة المعمارية. أ.٢٠ النمذجة المادية، والتخيل متعدد الأبعاد ، وتطبيقات الوسائط المتعددة ، والتصميم بمساعدة الحاسب . ب.١٤ التفكير ثلاثى الأبعاد وربط صور الأماكن والأوقات مع الابتكار والإبداع في اعداد التصميم. جـ.٦ إستخدام مدى واسع من الأدوات التحليلية والتقنيات والتجهيزات والحزم البرمجية المرتبطة بالهندسة المعمارية وتطوير برمجيات الحاسوب المطلوبة. ج.١٨ اظهار الخيال والإبداع. د.٢ العمل في بيئة ضاغطة وضمن قيود

- الإمتحان مكون من ثلاثة أسئلة في أربعة ورقات (ورقة الأسئلة وثلاثة لوحات).
- الدقة فى الرسم ونظافة اللوحة عامل مؤثر فى الدرجة وللطالب الحرية في استخدام الألوان والأوراق الملونة والخامات.

.الصق الورقة رقم (٣) الخاصة بالانعكاس والورقة رقم (٤) والخاصة بالظل في المستويات ثنائية البعد وثلاثية الأبعاد بعد رسم المطلوب فيها في لوحة الاجابة.

أجب عن الأسئلة التالية

السؤال الأول (٣٥ درجة) :

أمامك رسم معماري لمبنى كما هو موضح بالورقة رقم (٢). والمطلوب رسم المنظور الخارجي من الجهة المبينة بالشكل وبارتفاع خط النظر المناسب.

السؤال الثانى (١٥ درجة):

أمامك في الورقة رقم (٣) منظور لمبنى يطل على بحيرة، والمطلوب رسم انعكاس هذا المبنى على مستوى سطح الماء.

السؤال الثالث: (٢٠ درجة):

في الورقة رقم (٤) المطلوب رسم ما يلي ثم لصق الورقة في لوحة الاجابة:

أ- الظل على المستويات الأفقية والرأسية للتمرين رقم (س) (١٠ درجات)

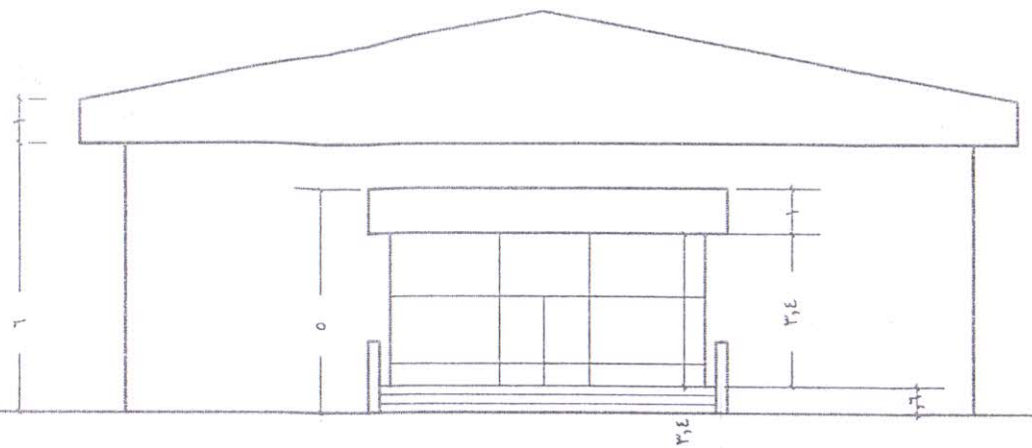
ب- الظل على المجسمات الأربعة الموضحة رقم (ص) (١٠ درجات)

ورقة رقم (١)

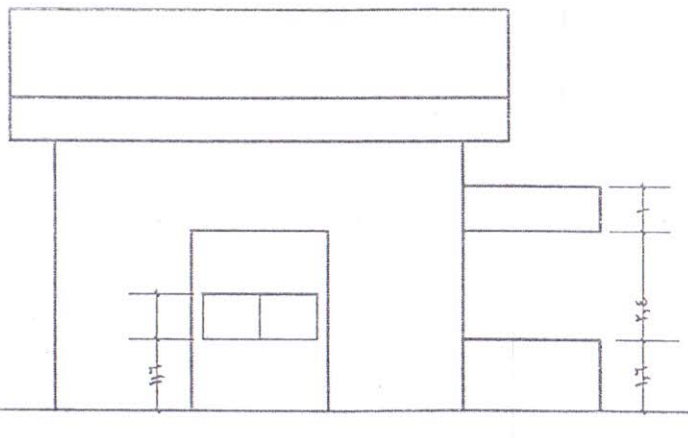
----------إنتهت الأسئلة----------

مع تمنياتنا بالنجاح والتوفيق،،،،،

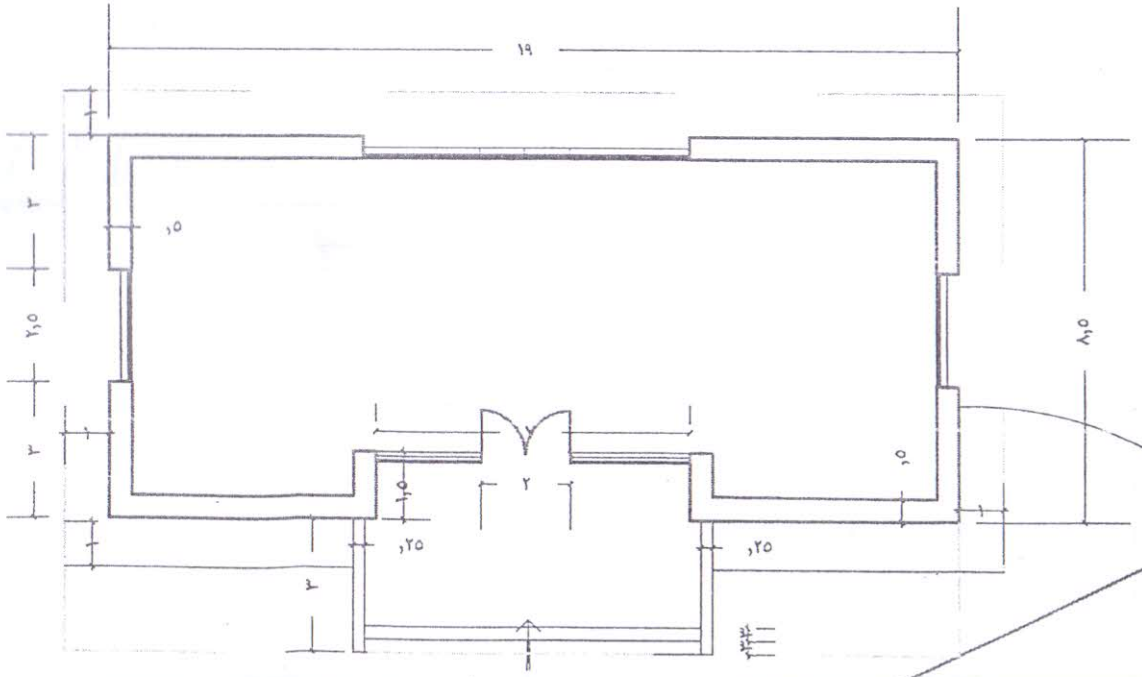
د.م. ممدوح علي يوسف + اللجنة



الواجهة الامامية



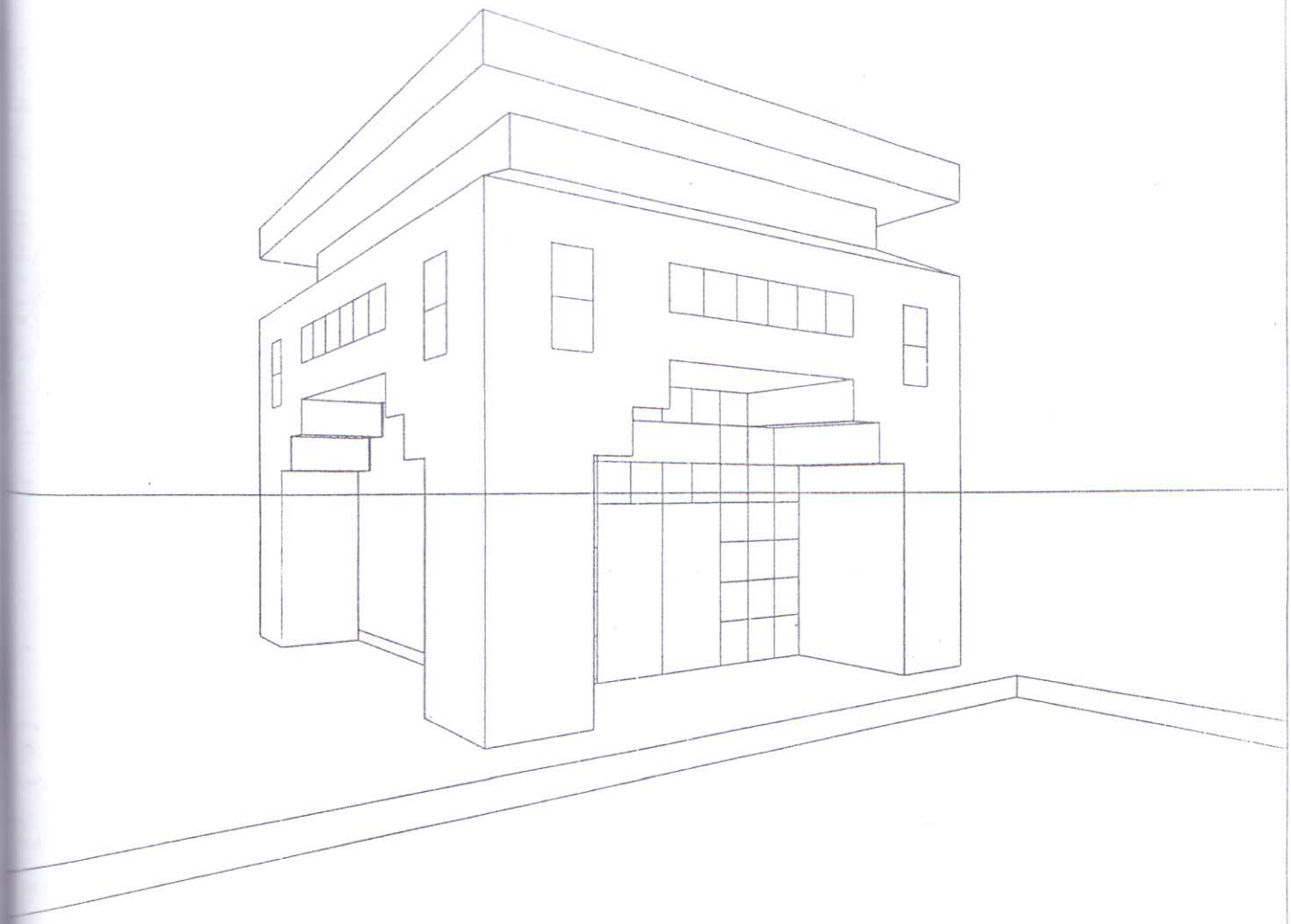
الواجهة الجانبية



المطلوب رسم المنظور للمبنى
وتخير ارتفاع خط النظـــــر

مستوى الصورة يميل
بزاويـــة ٦٠ درجة

كلية الهندســـة ـ جامعة اسيوط
قســم الهندســـة المعماريـــة

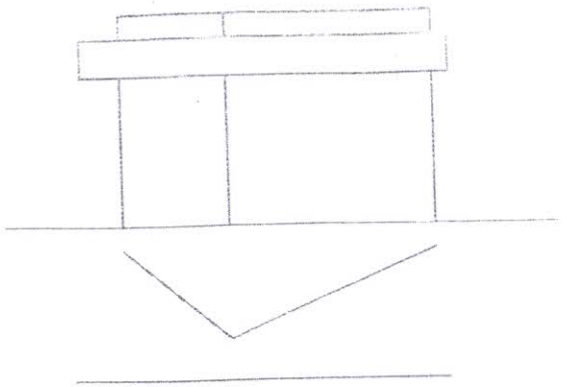


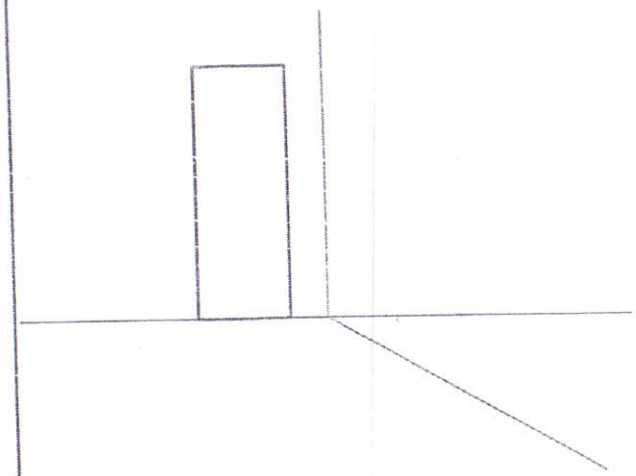
مادة الظل والمنظور

المطلوب رسم الانعكاس

ورقـــة رقم (٣)

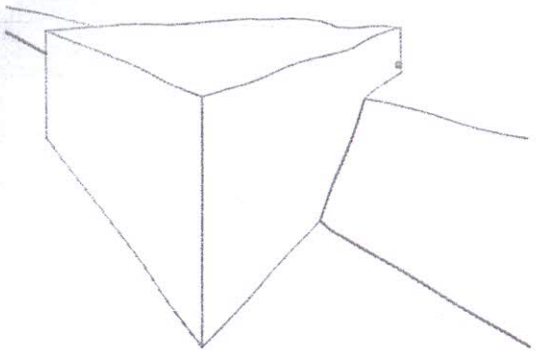
كلية الهندســـة ـ جامعة اسيوط
قســم الهندســـة المعماريـــة
امتحان دور مايو ٢٠١٢

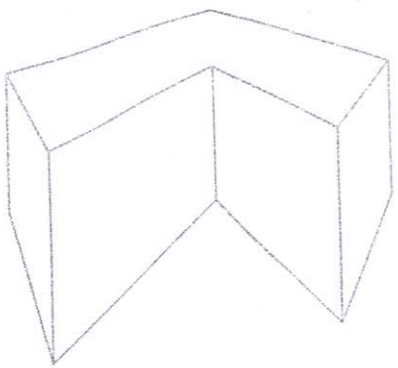


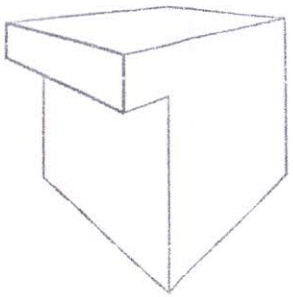


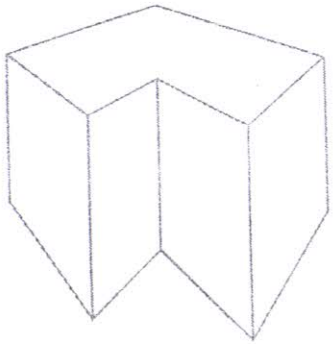
المطلوب رسم الظل (س)

كلية الهندسة - جامعة اسيوط
قسم الهندسة المعمارية









Assiut University
Faculty of Eng.
Electrical Eng. Dept.

2nd Semester-Final Exam
E102: Computer
Marks: 60
26/05/2015

1st year – Mining and Metallurgical Eng.
bylaw 2004
Time: 3 Hours

Important remarks
- The Exam consists of **5 questions** on **6 pages plus two white pages.**
- Answers should be in the specified area **only.**
- You can use the white page for drafts
- Read the questions carefully.

Question no. 1 (19 points).

a) **(6 pt)** Determine whether the following statements are true or false. (In the box write just "√" or "X")

1	The ≫ ***clc*** command erases all variables in the workspace while the ≫ ***clear*** command clears all commands from the command window.	
2	The following is acceptable as a variable name: *2x.*	
3	In an input prompt: ≫ *x = input('What is your name ?')*You Must enter your name as a letters.	
4	For any vector*A*, *(A * A)* will give the same results as *(A .* A)*.	
5	Workspace variables cannot be saved and they are deleted completely when ending the MATLAB session and cannot be retrieved.	
6	The symbol % designates a comment which is not executed by MATLB.	
7	The "for" loop is used when the looping process must terminate when a specified condition is satisfied and thus the number of passes is not known in advance.	
8	The semicolon (,) suppresses output when used with MATLAB commands and (;) terminates the MATLB line.	
9	The Transpose command (***trans***) interchanges the rows and columns of a matrix and (***inv)*** produces the inverse of the matrix.	
10	The ***disp*** command displays string during program execution while ***echo*** command displays array or string.	
11	The ≫ ***eye(2,5)*** produces an identity matrix with 2 rows and 5 columns.	
12	The ≫***repmat(3,3,3)*** produces a square matrix with 3 rows and 3 columns and all elements value is 3.	

b) **(7 pt)** For $a = 2, b = 3, c = 4$ *and* $d = 5$ Determine which of the following statements will correctly execute and provide the result. If the command will not correctly execute, state why it will not.).

Statement	Correct or incorrect	Result: if it is correct or Why if it is incorrect
X1=2*b*sin(c*d)*cos(a*b)		
X2=a*b*tan(c*d)*exp(ab)		
X3=log(a*b)*ln(a*b)*sqrt(2*a)		
X4=2*c*d*tanh(a)*acos(b)*b*sin(a)		
X5=a*b*s*d*(sqrt(c*d+a+b)		
X6=a*d*c*asin(1/b)*acos(1/b)*d		
X7=a^2*b^3*d^4*C^5		

c) **(6 pt)** For the vector X=[5 1 3 2 6 8 9 7]. Find the value of the following Logical Expression.

Logical Expression	Value
X1=X(X<=9)	
X2=X([2:end-2])	
X3=X(X ~=8)	
X4=[X(1:4) X (end-2:end)]	
X5=[X(2:-1:1) X (end-1:end]	
X6=X(X<=3)	

Question no. 2 (12 points).

a) **(7 pt)** (Let x = [1 4 8], y = [2 1 5] ,A = [3 1 6; 5 2 7] and B=[3;6;4]. Determine which of the following statements will correctly execute and provide the result. If the command will not correctly execute, state why it will not.).

Statement	Correct or incorrect	Result: if it is correct or Why if it is incorrect
$x + y$		
$x + \dot{y}$		
$x .* y$		
$x .* \dot{y}$		
$x * B$		
$A * B$		
$y * B$		

b) **(5 pt)** Write a MATLAB code to plot the function $T = 6\ln(t) - 7e^{0.2t}$ over the interval $1 \leq t \leq 5$. Put a title on the plot and properly label the axis where T represents the temperature, °C and t represents time, min.

Question no. 3 (10 points).

a) **(5 pt)** Write a script file using conditional statements to evaluate the following assuming scalar x has a value;

$$y = \begin{cases} x^2 & x < -1 \\ 2 & -1 \le x \le 1 \\ x + 5 & 1 < x \end{cases}$$

b) **(5 pt)** Write a MATLB code to create a square matrix (NxN). The matrix has diagonal elements equal N^3 and all the other elements equal N^2. The input to the code is the number of element N and the output is the matrix in the matrix form.

Question no. 4 (10 points).

a) **(5 pt)** Use a MATLAB code to solve the following set of equations:-

$$3x + 2y - z = 1$$
$$2x - 2y + 4z = -2$$
$$-x + 0.5y - z = 0$$

b) **(5 pt)** Write a MATLB code to find the factorial of any number (N). The input to the program is the number N and the output is the factorial of the number (do not use the factorial commands).

Question no. 5 (9 points).

For the following two polynomials $F_1 = 2x^4 - 5x^2 + 12x - 73$ and $F_2 = x^2 + 3x - 9$ Write a MATLAB commands to;

i. Find the roots of F_1 and F_2.

ii. $F_3 = F_1 * F_2$

iii. The derivative of F_3.

Best Wishes

Dr: Ali Younis

٧

كلية الآداب
قسم الهندسة

المادة: تاريخ مصر الاقتصادي
الفرقة: الأولى (جميع الشعب)
الزمن : ساعتان
النهاية العظمى: ٤٠ درجة

امتحان الفصل الدراسي الثاني ٢٠١٤ – ٢٠١٥ م

أجب عن سؤالين فقط مما يأتي:

السؤال الأول: اكتب ما تعرفه عن سياسة الاحتكار في عهد محمد علي.

السؤال الثاني: تناول بالعرض والتحليل السياسة الاقتصادية في العهد العثماني في مصر .

السؤال الثالث: اشرح السياسة الاقتصادية للخديو إسماعيل.

السؤال الرابع: تناول بالشرح الاقتصاد المصري في العهد الملكي .

انتهت الأسئلة

مع تمنياتي بالتوفيق والنجاح

د. محمد سعد الدين

د. حامد مشهور

٧

جامعة أسيوط

كلية الآداب

قسم الهندسة

المادة: تاريخ مصر الاقتصادي

الفرقة: الأولى (جميع الشعب)

الزمن : ساعتان

النهاية العظمى: ٦٠ درجة

امتحان الفصل الدراسي الثاني ٢٠١٤ – ٢٠١٥ م

أجب عن سؤالين فقط مما يأتي:

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السؤال الرابع: تناول بالشرح الاقتصاد المصري في العهد الملكي .

انتهت الأسئلة

مع تمنياتي بالتوفيق والنجاح

د. محمد سعد الدين

د. حامد مشهور

Assiut University
Faculty of Engineering
Mechatronics Program

EE0513-ELECTRONIC CIRCUITS

Mid Term Exam

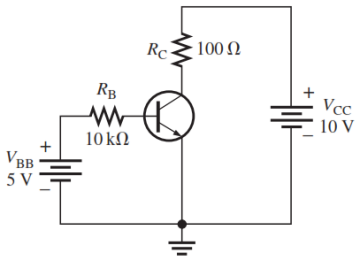
Time: 1.5 Hours

Model Answer

Attempt all questions, full mark: 20

Question #1 [6 Points]

Choose the right answer:



1) If a transistor with higher β_{dc} is used in the circuit shown, The base current will

C (A) increase (B) decrease (C) not change

2) In a certain voltage-divider biased *npn* transistor, V_B is 2.95 V. The dc emitter voltage is approximately

B (A) 0.7 V (B) 2.25 V (C) 2.95 V (D) 3.65 V

3) For operation as an amplifier, the base of an *npn* transistor must be

A (A) positive with respect to the emitter (B) negative with respect to the emitter (C) positive with respect to the collector (D) 0 V

4) For a common-emitter amplifier, R_C = 1 KΩ, R_E is completely bypassed at the operating frequency, r_e'= 15 Ω, and β_{ac}= 75. The magnitude of the voltage gain is

A (A) 66.7 (B) 2.56 (C) 2.47 (D) 75

5) For a common-collector amplifier, R_E = 100 Ω, r_e'= 10 Ω, and β_{ac}= 150. The ac input resistance at the base is

D (A) 1500 Ω (B) 15 Ω (C) 110 Ω (D) 16.5 KΩ

6) In a voltage-divider biased *npn* transistor, if the upper voltage-divider resistor (the one connected to V_{CC}) opens,

A (A) the transistor goes into cutoff (B) the transistor goes into saturation (C) the transistor burns out (D) the collector current will decrease

Question #2 [4 Points]

Give the right answer:

a) In a Darlington pair configuration, each transistor has β_{ac} = 80. If R_E is 330 Ω. Find the input resistance.

$R_{in} = \beta_{ac}^2 . R_E$
= 2.1 MΩ

b) A differential amplifier stage has collector resistors of 5.1 KΩ each. If I_{C1} = 1.35 mA and I_{C2} = 1.29 mA, what is the differential output voltage?

$V_o = (I_{C1} - I_{C2}) R_C$
=0.306 V

Model Answer

Question #3 [5 Points]

The silicon npn transistor used in the common emitter amplifier in Fig.3 has $\beta_{dc} = \beta_{ac} = 100$.

a) Find I_{CQ} and V_{CEQ}. (2 Points)
b) Find r_e'. (1 Point)
c) Find the voltage gain and input impedance of the amplifier. (2 Points)

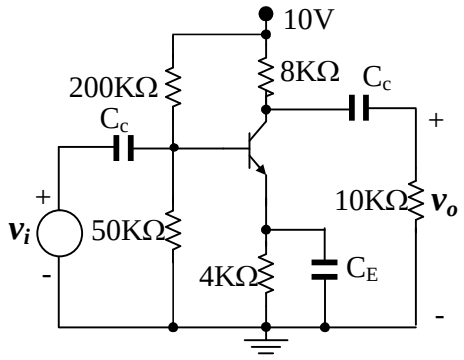


Fig.3

I_{CQ}= 0.3 mA	V_{CEQ}= 6.5 V	r_e'= 83 t
A_v= -54	Z_{in}= 6.9 K t	

Question #4 [5 Points]

The silicon ***npn*** transistor used in the common base amplifier of Fig.4 has $\beta_{dc} = \beta_{ac}$ =200 and $r'_e = 2.4\ \Omega$ at the operating point.

a) Draw the r-parameter ac-equivalent circuit of the amplifier. (2 Points)
b) Find the voltage gain, current gain and input impedance of the amplifier. (3 Points)

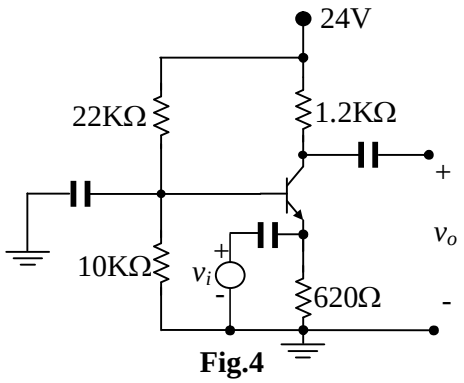
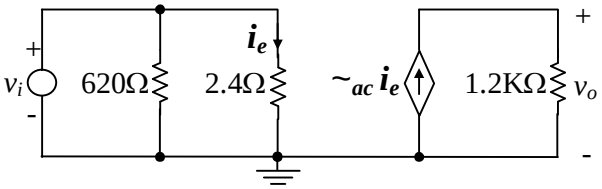


Fig.4

The ac-equivalent circuit



A_v = **500** A_i = **0.995** Z_{in} = **2.39** t

********** أطيب التمنيات بالتوفيق **********

أ.د. مجدى مفيد دوس

Assiut University
Faculty of Engineering

EE0513-ELECTRONIC CIRCUITS
First Term Final Exam
January 2014

Mechatronics Program

Attempt all questions, full mark: 40 Points **Time: 3 Hours**

Question #1: (10 Points)

Choose the right answer:

1) The overall voltage gain of three identical cascaded voltage amplifiers each has a no load voltage gain A_V = -10, Z_i = 1 kΩ, and Z_o = 1 kΩ is:

C

(A) 1000 (B) -1000
(C) -250 (D) -125

2) In cutoff, V_{CE} is

C

(A) 0 V (B) minimum
(C) equal to V_{CC} (D) equal to V_{CC} – 0.7V

3) In saturation, V_{CE} is

B

(A) 0.7 V (B) minimum
(C) equal to V_{CC} (D) maximum

4) The peak current a class A power amplifier can deliver to a load depends on the

B

(A) maximum rating of the power supply (B) quiescent current
(C) current in the bias resistors (D) size of the heat sink

5) Crossover distortion is a problem for

C

(A) class A amplifiers (B) class AB amplifiers
(C) class B amplifiers (D) all of these amplifiers

6) For maximum output, a class A power amplifier must maintain a value of quiescent current that is

A

(A) one-half the peak load current (B) twice the peak load current
(C) just above the cutoff value (D) at least as large as the peak load current

7) At cutoff, the JFET channel is

B

(A) at its widest point (B) completely closed by the depletion region
(C) extremely narrow (D) reverse-biased

8) A MOSFET differs from a JFET mainly because

C

(A) of the power rating (B) the MOSFET has two gates
(C) the JFET has a *pn* junction (D) MOSFETs do not have a physical channel

9) A JFET always operates with

B

(A) the drain connected to ground (B) the gate-to-source *pn* junction reverse-biased
(C) the gate connected to the source (D) the gate-to-source *pn* junction forward-biased

10) A certain D-MOSFET is biased at V_{GS} = 0 V. Its datasheet specifies I_{DSS} = 20 mA and $V_{GS(off)}$ = -5 V. The value of the drain current

C

(A) **is 0 A** (B) **is 10 mA**
(C) **is 20 mA** (D) **cannot be determined**

Question #2: (10 Points)

a) Assume that you wish to bias the transistor in Fig.a with I_C= 8 mA. Find R_B.

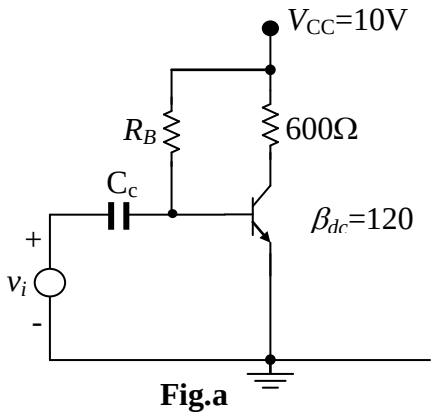


Fig.a

$I_B = I_C/\beta_{dc}$ **= 66.7 µA**

$R_b = (V_{CC} - V_{BE})/I_B$ **= 139.5 KΩ**

b) In a common-emitter amplifier with voltage-divider bias, $R_{in(base)}$= 68 KΩ, R_1= 60 KΩ, R_2= 30 KΩ. Find the total ac input resistance

$R_{in} = R_{in(base)} // R_1 // R_2$

= 15.45 KΩ

c) A differential amplifier has a differential mode gain A_d= 80 and a common mode gain A_c= 0.5. Calculate the CMRR in dBs.

CMRR = 20 log (A_d/A_c)

= 44 dBs

d) An n-channel E-MOSFET has $I_{D(on)}$ = 18 mA at V_{GS} = 4 V, and $V_{GS(th)}$ = 2.5 V. Find I_D when V_{GS} = 3.25 V.

$I_D = k\,(V_{GS} - V_{th})^2$
k **= 8 mA/V**^{2}
I_D **= 4.5 mA**

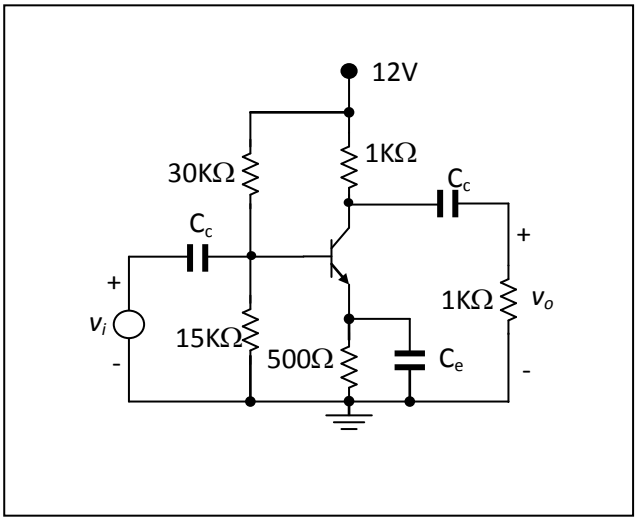
e) In a certain common-source (*CS*) amplifier, R_D = 1.0 kΩ, R_S = 560 Ω, V_{DD} = 10 V, and g_m = 4500 μS. If the source resistor is completely bypassed. Find the voltage gain.

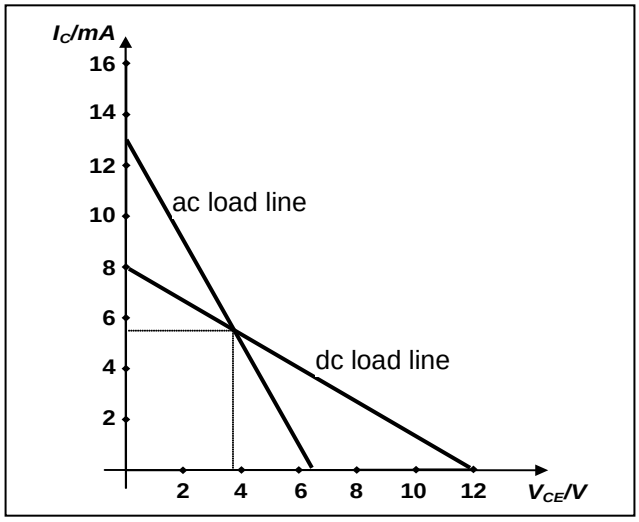
$A_v = -\,g_m R_D$ **= - 4.5**

Question #3: (8 Points)

A *CE* amplifier uses a silicon npn-transistor having $\beta_{dc} = \beta_{ac} = 100$ and has $R_C = 1$ kΩ, $R_E = 500$ Ω and $V_{CC} = 12$ volts, is biased by a voltage divider with $R_1 = 30$ kΩ and $R_2 = 15$ kΩ. A 1 kΩ resistive load is connected through coupling capacitor to the collector terminal, and R_E is bypassed by C_E.

a) Draw the amplifier circuit diagram (1 Point)
b) Find $\boldsymbol{I_{CQ}}$ and $\boldsymbol{V_{CEQ}}$. (2 Points)
c) Find $\boldsymbol{r'_e}$. (1 Point)
d) Find the voltage gain, current gain and input impedance of the circuit. (2 Points)
e) Sketch the dc and ac load lines (2 Points)





I_{CQ} =	**5.5 mA**	V_{CEQ} =	**3.75 V**	r'_e =	**4.55 Ω**
A_v =	**- 110**	A_i =	**100**	Z_{in} =	**439 Ω**

Question #4: (4 Points)

The class *AB* amplifier in Fig.4 is operating with a single power supply.

a) Assuming the input peak-to-peak voltage is 10 V; determine the power delivered to the load resistor and the amplifier efficiency. (2 Marks)
b) What is the maximum power that could be delivered to the load resistor? (1 Mark)
c) Assume the power supply voltage is raised to 30 V. What is the new maximum power that could be delivered to the load resistor? (1 Mark)

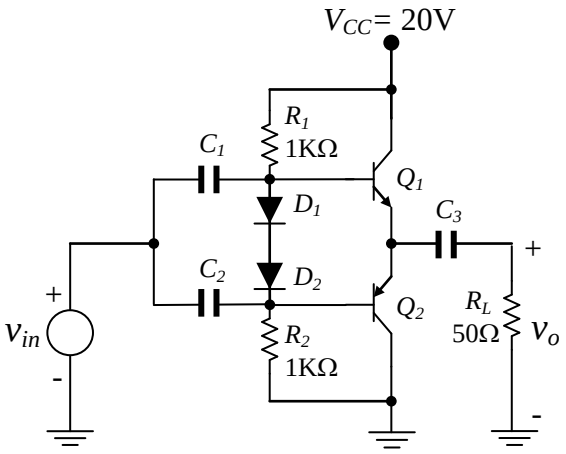


Fig.4

a) $\boldsymbol{P_{LD}}$ = **0.25 W** **Efficiency =** **39.27 %**

b) $\boldsymbol{P_{LD(max)}}$ = **1 W**

c) $\boldsymbol{P_{LD(max)}}$ = **2.25 W**

Question #5: (8 Points)

The JFET used in the circuit shown in Fig.5 has I_{DSS} = 4 mA, and $V_{GS(off)}$ = -2 volts. Find:

a) The Q-point parameters (V_{GSQ}, I_{DQ}, and V_{DSQ}). (3 points)

b) The forward transconductance g_m at the Q-point. (1 point)

c) The voltage gain, input and output resistances. (2 points)

d) If it is desired to bias the above FET at the midpoint of its transfer characteristics ($I_D = I_{DSS}/2$) and at $V_{DS} = V_{DD}/2$. Find the new values of R_s and R_d. (2 points)

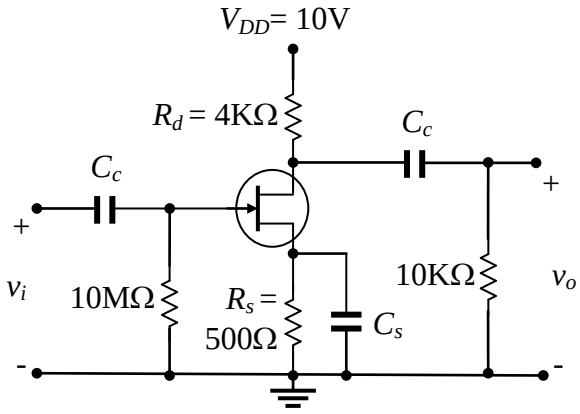


Fig.5

a) V_{GSQ} = **- 0.76 V** I_{DQ} = **1.53 mA** V_{DSQ} = **3.12 V**

b) g_m = **2.47 mS**

c) A_v = **- 7.1** Z_{in} = **10 MΩ** Z_{out} = **4 KΩ**

d) R_s = **294 Ω** R_d = **2.2 KΩ**

********** **Best Wishes** **********

Prof. Magdy M. Doss

Assiut University
Faculty of Engineering

EE0513-ELECTRONIC CIRCUITS
First Term Final Exam
January 2015

Mechatronics Program

Attempt all questions, full mark: 40 Points **Time: 3 Hours**

Question #1: (10 Points)

Choose the right answer:

1) If a sinusoidal voltage is applied to the base of a biased npn transistor and the resulting sinusoidal collector voltage is clipped near zero volts, the transistor is

A

(A) being driven into saturation (B) being driven into cutoff
(C) operating nonlinearly

2) The input resistance of a common-base amplifier is

A

(A) very low (B) very high
(C) the same as a CE (D) the same as a CC

3) The voltage gain of a common-base amplifier is

C

(A) very low (B) very high
(C) the same as a CE (D) the same as a CC

4) The input resistance at the base of a biased transistor depends mainly on

D

(A) β (B) R_E
(C) R_B (D) β and R_E

5) A differential amplifier

D

(A) is used in op-amps (B) has one input and one output
(C) has two outputs (D) answers (A) and (C)

6) The maximum efficiency of a class A power amplifier is

A

(A) 25% (B) 50%
(C) 75% (D) 78.5%

7) Crossover distortion is a problem for

C

(A) class A amplifiers (B) class AB amplifiers
(C) class B amplifiers (D) all of these amplifiers

8) For V_{GS}= 0, the drain current in a JFET becomes constant when V_{DS} exceeds

C

(A) cutoff (B) V_{DD}
(C) V_P (D) 0 V

9) A certain n-channel E-MOSFET has a $V_{GS(th)}$= 2V. If V_{GS}= 0 V, the drain current is

A

(A) 0 A (B) $I_{D(ON)}$
(C) maximum (D) I_{DSS}

10) Which of the following characteristics does not necessarily apply to an op-amp?

B

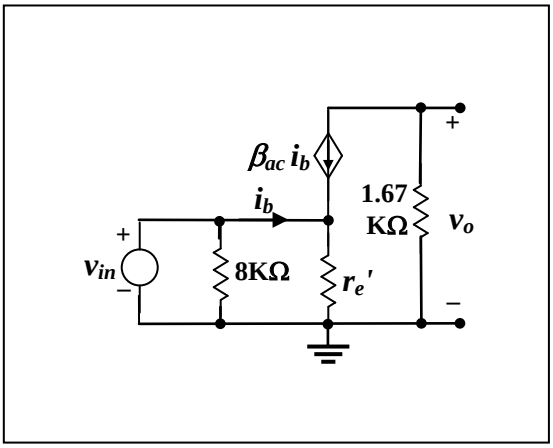
(A) High gain (B) Low power
(C) High input impedance (D) Low output impedance

Question #2: (5 Points)

a) A certain transistor has α_{DC}= 0.99. If the dc base current is 10 μA, determine r_e'.

$\beta = \alpha/(1-\alpha) = 99$
$I_E = (\beta + 1)I_B = 1$ mA
$r_e' = 25/I_E = 25\ \Omega$

b) Draw the ac equivalent circuit for the amplifier in Fig.b



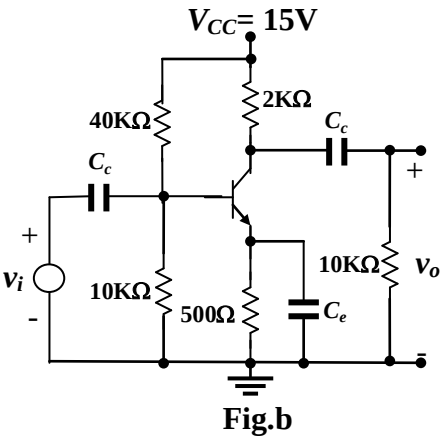


Fig.b

c) An n-channel JFET has I_{DSS} = 5 mA and $V_{GS(off)}$ = -8 V. What value of V_{GS} is required to set up a drain current of 2.25 mA.

$I_D = 5[1 - V_{GS}/(-8)]^2 = 2.25$

$V_{GS} = -2.63$ V

d) A certain class A power amplifier has V_{CEQ}= 12 V and I_{CQ}= 1A. Find the maximum signal power output.

$P_{out(max)} = V_{CEQ}I_{CQ}/2$
$= 6$W

e) Find V_o in the circuit of Fig.(e).

$V_o = -18$ V

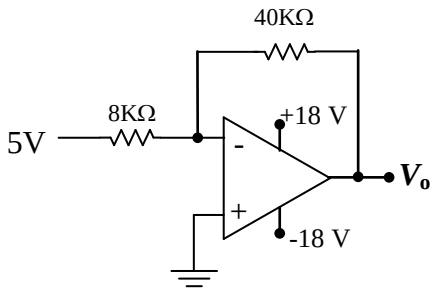


Fig.(e)

Question #3: (5 Points)

The silicon npn transistor used in the swamped amplifier shown in Fig.3 has $\beta_{dc} = \beta_{ac} = 100$.

a) Find I_{CQ} and V_{CEQ}.
b) Find r_e'.
c) Find the voltage gain and input impedance of the amplifier.

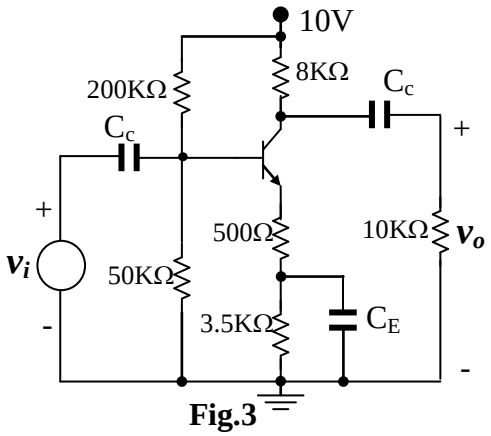


Fig.3

I_{CQ}= 0.295 mA	V_{CEQ}= 6.45 V	r_e'= 84.6 Ω
A_v= -7.6	Z_{in}= 23.75 KΩ	

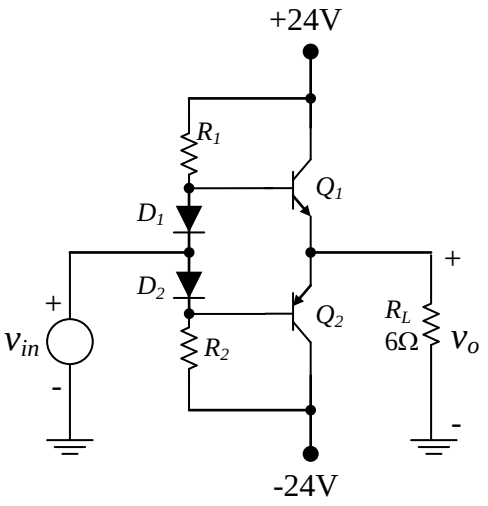
Question #4: (5 Points)

A class-*AB* complementary-symmetry push-pull power amplifier is connected to a 6 Ω load. The supply voltages are ±24 V.

a) Draw the amplifier circuit diagram. (1 Point)
b) Find the peak value of the collector current, the DC power delivered by the source, and the amplifier efficiency if the ac power delivered to the load is 27 W. (3 Points)
c) What would be the maximum allowable output power? (1 Point)

I_{Cp} = 3 A	
P_{DC} = 45.83 W	
Efficiency = 58.9%	
$P_{out(max)}$ = 48 W	

The Circuit Diagram



Question #5: (5 Points)

The JFET used in the common source amplifier of Fig.5 has $V_{GS(off)}$ = -5V and I_{DSS} = 10 mA.

a) Determine the operating point I_{DQ}, V_{GSQ} and V_{DSQ}. (3 Points)

b) Calculate the value of the transconductance g_m at the *Q*-point. (1 Point)

c) Determine the amplifier voltage gain. (1 Point)

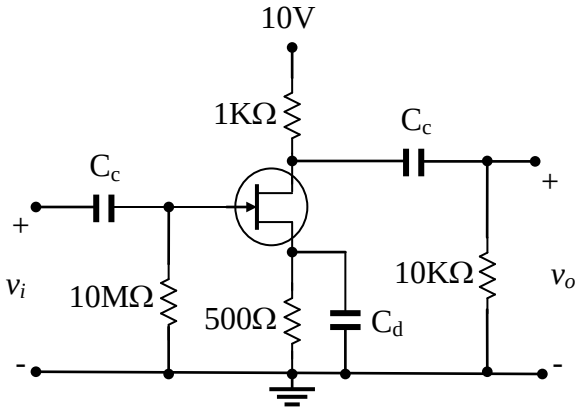


Fig.5

I_{DQ}= 3.82 mA	V_{GSQ}= -1.91 V	V_{DSQ}= 4.27 V
g_m= 2.47 mS	A_v= -2.247	

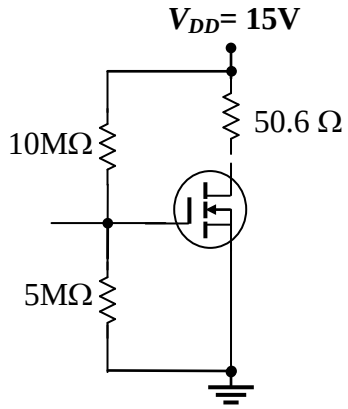
Question #6: (3 Points)

a) The data sheet for a 2N7008 E-MOSFET gives $I_{D(on)}$ = 500 mA at V_{GS} = 10 V and $V_{GS(th)}$ = 1 V. Determine the drain current for V_{GS} = 5 V. (1 Point)

b) The transistor is to operate at: V_{GSQ} = 5 V, V_{DSQ} = 10V. Draw a suitable circuit to bias this transistor giving suitable resistances values, assuming that V_{DD} =15 V. (2 Points)

I_D = 98.765 mA

The Circuit Diagram



Question #7: (3 Points)

a) Find the output voltage when the indicated input voltages are applied to the scaling adder of Fig.7. (2 Points)

b) What is the value of the current through R_f? (1 Point)

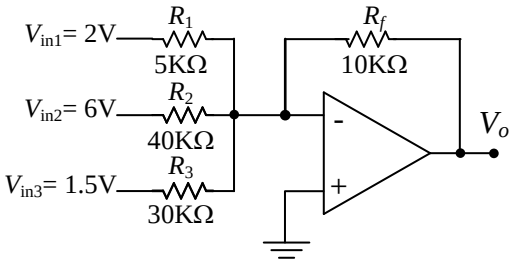


Fig.7

V_o= -6 V	I_f = 0.6 mA

Question #8: (4 Points)

The voltage waveform v_g shown in Fig.(8-a) is applied to the circuit of Fig.(8-b). Sketch v_o versus t, assuming ideal op-amp.

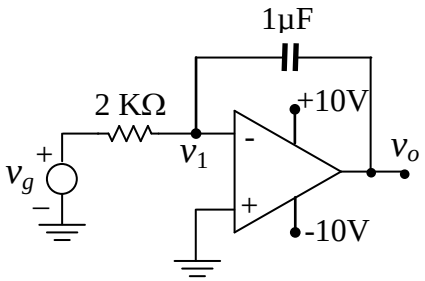


Fig. (8-b)

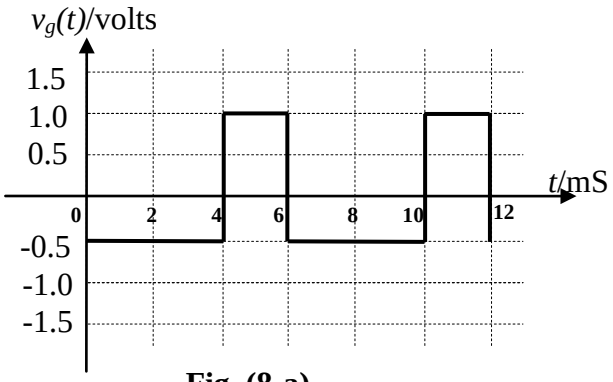


Fig. (8-a)