Tanta University | Department: Electronics & Comm. Engineering | Total Marks: 40 Marks | Faculty of Engineering

Course Title: Technical Reports	Course Code: EEC21H3	Year: 2rd
Date: January 2012 (First term)	Allowed time: 2 hrs	No. of Pages: (1)

Remarks: (answer the following questions… assume any missing data… answers should be supported by sketches…etc)

Question number (1)

(a) Explain the checklist items you might use to guide revisions for completing a final report draft.

(b) Write a short note about collaborative writing in technical writing.

Question number (2)

a) (i) Explain the factors that help you judge the value of information you find on the web site
(ii) What type of information that might be included in an appendix of a technical report

b) Create a checklist for the following types of documents:
(i) Internal and External Proposals
(iii) Resume

Question number (3)

(a) Explain the basic rules to use when you include graphics within documentation.

(b) Explain with drawing a flowcharts illustrating an organizational charts in a project management structure.

Good Luck

Course Coordinator: Prof. Mustafa Mahmoud Abd Elnaby

Question (3)

(a) Compare between common mode and differential mode, support your answer with sketches.

(b) Prove an expression for the closed loop input impedance of the circuit shown in Figure (3).

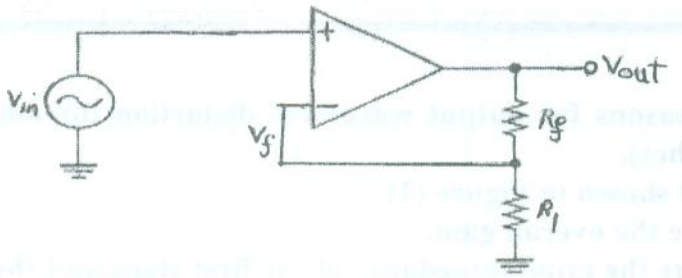


Figure (3)

(c) Find V_{out} in terms of V_1 and V_2 for the circuit shown in Figure (4).

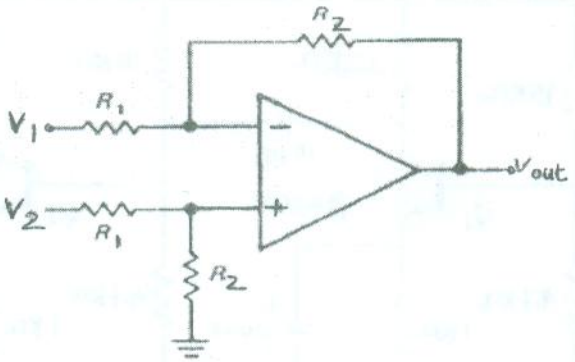


Figure (4)

Question (4)

(a) State two types of oscillators.

(b) Sketch a circuit for Wien-bridge oscillator. Drive an expression for the attenuation and the resonant frequency of Wien-bridge oscillator.

(c) Determine the value of R_f necessary for the circuit in shown Figure (5) to operate as an oscillator and determine the frequency of oscillation.

$R_1 = R_2 = R_3 =$ 10 kΩ

$C_1 = C_2 = C_3 =$ 0.001 μF

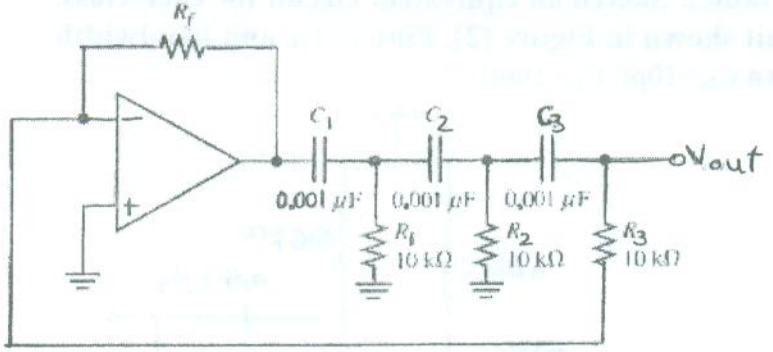


Figure (5)

Best Wishes of Success

Tanta University | Department: Electronics and Electrical Communication Eng. | Faculty of Engineering

Total Marks: 90 Marks

Course Title: Electronic Circuits (1)	Course Code: EEC 2103	Year: 2nd
Date: 16 /1/ 2012	Allowed time: 3 hrs	No. of Pages: (2)

Remarks: (answer the following questions… assume any missing data… answers should be supported by sketches)

Question (1)

(a) Discuss the reasons for output waveform distortion for amplifier (Support your answer with sketches).

(b) For the circuit shown in Figure (1)

(i) Calculate the overall gain.

(ii) Calculate the input impedance of the first stage and the output impedance of the second stage.

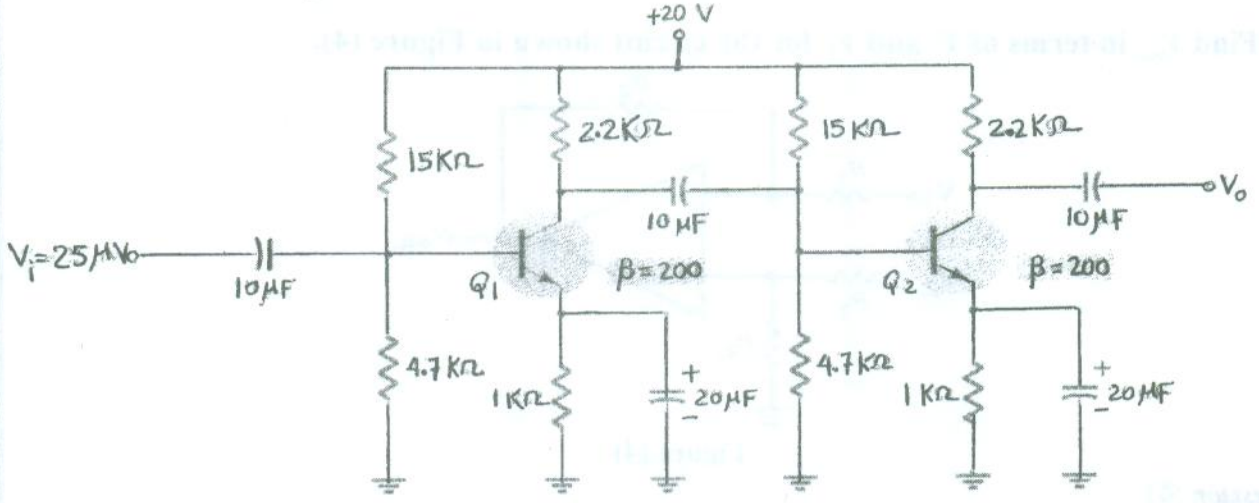


Figure (1)

Question (2)

(a) Compare between Class A, Class B, Class AB, and Class C from points of view location of operating point, dc power, ac power, and efficiency (Put your answer in a table). Sketch an equivalent circuit for each class.

(b) For the circuit shown in Figure (2), Find F_L,F_H, and bandwidth

(Given C_{bc}=10pf, C_{be}=10pf)

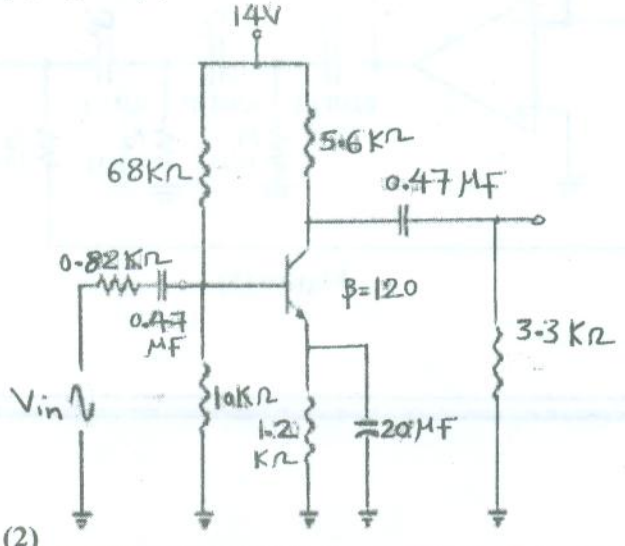


Figure (2)

(b) Apply Adams-Bashforth three- step method to obtain an approximate solution for the IVP

$y' = -y\,x\,\sin x \quad , x \in [0,2], \; y(0) = 3$

with h = 0.5. use the mid-point method to get the required initial values.

Problem number (4) (16 Marks)

(a) Solve the following BVP using the finite difference method.

$y'' + y' + 2y = \cos x \quad y(0) = y(1) = 1 \;, \; 0 \le x \le 1, \quad h = 0.2$

(b) Use the linear shooting method to approximate the solution of the BVP

$y'' = x\,y' + 2y - x \quad y(0) = -1 \;, \; y(1) = 0 \;, \quad h = 1/2$

By applying Euler's method.

Problem number (5) (16 Marks)

(a) Approximate the solution of the following parabolic partial differential equation

$\frac{1}{4} U_{xx}(x,t) = U_t(x,t) \quad 0 \le x \le 1$ and $0 \le t \le 0.15$, where

$U(0,t) = 0, \; U(1,t) = 30$ and $0 \le t \le 0.15$

$U(x,0) = 60(x^2 - x/2), \quad 0 \le x \le 1$, use $h = 0.2$, $k = 0.05$

(b) Solve Laplace's equation for a square $0 \le x \le \pi$, $0 \le y \le \pi$ where

$U_{xx}(x,y) + U_{yy}(x,y) = 0$

subject to the specified boundary conditions

$U(x,0) = U(\pi, y) = U(x, \pi) = 0, \quad U(0, y) = \sin^2 y \;, \; 0 \le y \le \pi$

with $h = k = \pi/3$

Good luck

Dr. Manal Mohamed Hekal

Dr. Waheed Kamal Zahra

Course Title: Engineering Mathematics (3) a Year: 2nd Electronics and Electrical Communications Engineering.
Course Code: PME2110 Date: 23/ 1 / 2012 (First term) Allowed time: 3 hrs No. of Pages: (2)

Remarks: (Answer the following questions. Assume any missing data…)

Problem number (1) (20 Marks)

(a) Find the Fourier transform of the function

$$f(x)=\begin{cases} e^{2ix} & -1<x<1 \\ 0 & otherwise \end{cases}$$

(b) Let $f(x)=2x^2e^x+1$. Construct a Lagrange polynomial of degree two or less using $x_0=0,\ x_1=0.4,\ x_2=1.2$. Then approximate $f(1)$.

(c) For the following values of the Bessel function $J_0(x)$, use Newton's forward and backward difference formulas to estimate the values of $J_0(1.72)$, $J_0(1.95)$.

x	1.7	1.8	1.9	2.0
$J_0(x)$	0.3979849	0.3399864	0.2818186	0.2238908

(d) Construct a natural cubic Spline that interpolates the function $f(x)=1/(1+x^2)$ at $x=-1,\ 0,\ 1$. Compare the interpolate values at $x=-0.5\ ,0.5$ with the true values.

Problem number (2) (17 Marks)

(a) Use Taylor's series to derive the following approximation formula for the third derivative of $f(x)$

$$f'''(x)\cong\frac{1}{h^3}[-f(x)+3f(x+h)-3f(x+2h)+f(x+3h)]$$

(b) From the following table find $f'(6.4)$, $f''(6.2)$

x	6.1	6.2	6.3	6.4
$f(x)$	-0.1998	-0.2223	-0.2422	-0.2596

(c) Approximate the integral $\int_0^2 \ln\left(\frac{e^x+2}{\cos x+2}\right)dx$, using the Simpson's composite rule with n = 6.

Problem number (3) (16 Marks)

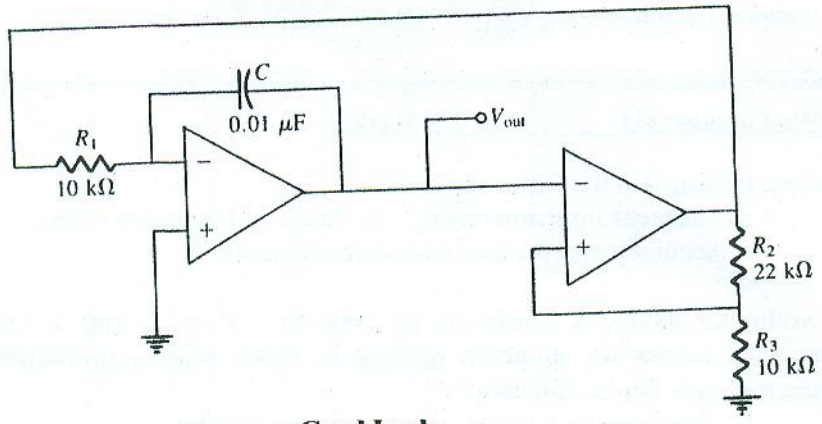
(a) Use the third order Taylor's method to get the solution of the initial value problem

$y'=-y\cos x$, $x\in[0,1]$, $y(0)=2$, with n = 4.

P.T.O.

(c) Determine and sketch the peak-to peak voltage and period of the output waveform for the circuit shown in Fig.1. The maximum output voltage level that the op-amp comparator is ± 12V.

Fig.1



Good Luck

Course Coordinator: Prof. Mustafa Mahmoud Abd Elnaby

Course Title: Electronic Measurements (1) | Course Code: EEC2105 | Year: 2nd
Date: January 2012 (First term) | Allowed time: 3 hrs | No. of Pages: (2)

Remarks: (answer the following questions… assume any missing data…

Question number (1) (25 Marks)

(a) Define and explain the following terms:
1. Instrument insertion error 2. Static and dynamic errors
3. Accuracy and precision of measurements

(b) A voltmeter having a sensitivity of 1000 Ω / V reads 100 V on its 150V scale when connected across an unknown resistor in series with a milliammeter. When the milli-ammeter reads 5mA., calculate:
1. Apparent resistance of the unknown resistor
2. Actual resistance of the unknown resistor
3. Error due to the loading effect of the voltmeter.
(Neglect the resistance of the milliammeter)

(c) Current was measured during a test as 30.4A ,flowing in a resistor of 0.105 Ω .It was discovered later that the ammeter reading was low by 1.2% and the marked resistance was high by 0.3%. Find the true power as a percentage of the power that was originally calculated.

Question number (2) (25 Marks)

(a) Describe the principle of operation of a displacement transducer employing each of the following principle: (i) Resistive transducer (ii) Hall effect devices

(b) A capacitive transducer is made up of two concentric cylinder of length 20 mm. The outer diameter of the inner cylinder is 3 mm and the dielectric medium is air . The inner diameter of the outer cylinder is 3.1 mm .Calculate the change in capacitance if the inner electrode is moved through a distance of 2 mm. ($\varepsilon_0 = 8.85 \times 10^{-12}$ F/m).

(c) Explain the working principle of a linear variable differential transducer (LVDT) and its applications as a displacement transducer.

Question number (3) (20 Marks)

(a) Sketch the circuit diagram of 555 timer chip and explain its operation

(b) Explain how 50% duty cycle can be obtained using 555 timer.

(c) Determine the frequency of oscillation of a phase shift oscillator with three section feedback network consisting of 13 Ω resistors and a 100 μF capacitors.

Question number (4) (20 Marks)

(a) Explain the construction and working of a true RMS voltmeter

(b) Explain with help of the block diagram, the operating principle of a ramp type digital voltmeter and explain its operation.

Q3: **(20 Marks)**

A. Find and plot the electric field intensity and potential everywhere due to a point charge Q which located at the center of a spherical conducting shell of radii *a* and *b*. **(5 Marks)**

B. The plane z = 0 is a perfectly conducting surface. A point charge of 5 nC is located at A(2, -3, 6), and a point charge of – 8 nC is located at B(4, 3, 1).

i- Determine V at a point midway between the two charges.

ii- Find y if V=0 at C (5, y, 1). **(8 Marks)**

C. Evaluate the force produced on a square loop connecting points A(1,0,0), B(3,0,0), C(3,2,0) and D(1, 2, 0) which carries a current of 2 mA in counterclockwise direction due to a current carrying conductor of 15 A in the y-axis. **(7 Marks)**

Q4: **(25 Marks)**

A. Drive an expression for the magnetic field strength due to an infinite line carries current I directed in positive z-axis direction. **(7 Marks)**

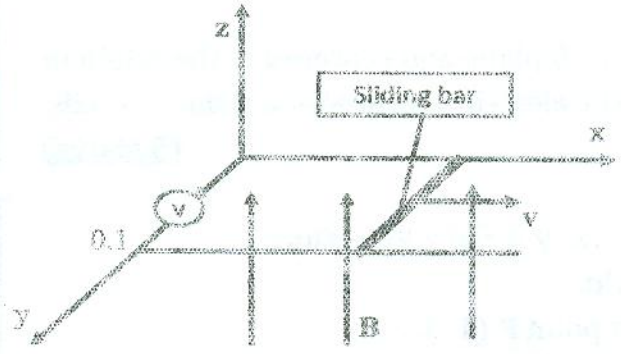
B. Evaluate the magnetic field strength at the point P(2, 2, 0) at the center of square loop of 2 meter length located at z = 0 plane and carries current 5 A in counterclockwise direction as shown in the figure. **(8 Marks)**

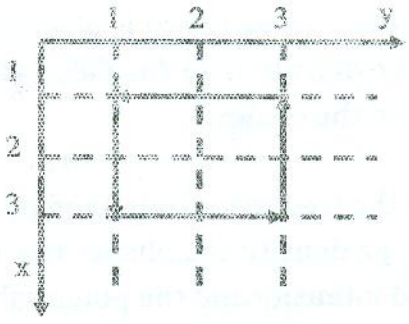
C. Let a magnetic flux density $B = (0.5\,x)\,a_z$ Tesla as in the figure. The position of the sliding bar is given by $x = 4t - 2t^2$ meter. If the separation of the rails is 10 cm.

i- Calculate the voltmeter reading at t =0.5 second

ii- Calculate the voltmeter reading when x=1 meter

iii- Plot the voltmeter reading for 0 < t < 3 second **(10 Marks)**





WISH YOU ALL THE BEST Dr. Ayman Hoballah

انتهت الأسئلة

TANTA UNIVERSITY
Faculty of ENGINEERING
DEPARTMENT OF ELECTRICAL POWER AND MACHINES ENGINEERING
EXAMINATION (SECOND YEAR) STUDENTS OF ELECTRICAL ENGINEERING

COURSE TITLE: ELECTROMAGNETIC FIELDS			COURSE CODE: EPM2104/EPM2142
DATE: 09/01/2012	TERM: FIRST	TOTAL ASSESSMENT MARKS: 85	TIME ALLOWED: 3 HOURS

Notes:
Systematic arrangement of calculations and clear neat drawings are essential.
Any data not given is to be assumed – Answer as many questions as you can.
Answer as brief as possible

الإمتحان مكون من 4 اسئلة في ورقتين

Q1: **(20 Marks)**

A. Using Gauss's law, derive an expression for the electric field intensity **E** at a point P a radial distance *a* meter from a uniformly charged infinite line by ρ_l C/m. **(5 Marks)**

B. Let a point charge Q1 = 25 nC be located at point P_1 (4, -2, 7) and a charge Q_2 = 60 nC at P_2 (-3, 4, -2) in free space.
   i. Find **E** at P_3 (1, 2, 3).
   ii. Specify at what point on the y-axis is E_x =0.
   iii. Determine the location of a point charge Q_3 = -30 nC to cancel the field at the origin.
   iv. How much electric flux leaves the surface of a sphere of radius 10 m centered at the origin?
(10 Marks)

C. A volume charge is distributed throughout a sphere of radius *a* meter and centered at the origin with uniform density ρ C/m³. Evaluate the electric field and total energy stored due to this charge distribution. **(5 Marks)**

Q2: **(20 Marks)**

A. Find the work done in moving a 5 μC charge from the P1(1,8 ,5)to P(2, 18 , 6) through electric field $\mathbf{E} = (-8xy)\bar{a}_x - (4x^2)\bar{a}_y + \bar{a}_z\ V/m$ along the path: $y = 3x^2 + z,\ z = x + 4$ **(5 Marks)**

B. Consider a circular line charge (ring) is placed in z=0 plane and centered at the origin in which the line charge density is k c/m. Calculate the electric potential at a point at z-axis away distance *h* from the center. **(5 Marks)**

C. A potential field in the free space is defined by $V = x^2 y + 5y^2 z$ Volt. Find: -
   i- The volume charge density establishes this field.
   ii- The electric field intensity and the potential at point P (1, 3, 2).
   iii- The potential difference between A (1, 2, 3) and B (2, 3, 1).
   iv- The total charge inside cube defined by $0 < x, y, z < 3$. **(10 Marks)**

PROBLEM # Four (20 mark)

I. **Define Figure of merit, Explain why it is important to study system noise?**
II. **Deduce then Compare between figures of merit of DSB-SC and envelop detector receiver model.**

Good Luck,

Dr. Salwa Serag Eldin

لا تحسبن العلم ينفع وحده ما لم يتوج ربه بخلاق

	TANTA UNIVERSITY FACULTY OF ENGINEERING DEPARTMENT OF ELECTRONICS & ELECTRICAL COMMUNICATIONF EXAMINATION (*SECOND* YEAR)		
	COURSE TITLE: Communication theory		COURSE CODE: EEC 2102
DATE:20/1/2012	TERM: FIRST	TOTAL ASSESSMENT MARKS: 100	TIME ALLOWED: 3 HOURS

Answer the following questions

PROBLEM # ONE (25mark)

State whether the following statements are true or false, comment on your Answers

a. **The Energy for nonperiodic signals is infinite.**
b. **Autocorrelation is the Fourier transform for energy spectral density.**
c. **Baseband signal generated by information source is suitable for transmission over free space.**
d. **Percentage modulation should be greater than 100% for proper transmission of AM.**
e. **Square law detector is used when the baseband signal is weak.**
f. **Costas loop is used to compensate for phase shift between transmission and receiver.**
g. **Single sideband (SSB) is used in broadcasting communications.**
h. **Vestigial sideband is used for TV picture transmission while FM is used for sound transmission.**
i. **AM is less susceptible for noise than FM signal.**
j. **Coherent detection is better than envelope detection from noise point of view.**

PROBLEM # TWO (22 mark)

I. **Write short notes about the following:**

a. **Linear and nonlinear modulation.**
b. **Energy and power signals.**
c. **Bandwidth in different AM modulation techniques.**
d. **Interrelation between frequency modulation and phase modulation.**
e. **Frequency deviation and phase deviation.**
f. **Overmodulation distortion.**

II. **Find Fourier transform for the following signals**

a. **rect(t/10) u(2-t)**
b. **rect((t-1)/2)+tri((t-3)/3)**
c. **3sgn $(t-t_0)$**
d. **10 sinc (10t)**

PROBLEM # THREE (33 mark)

I. **Define and represent the AM signal mathematically in time and frequency domain.**
II. **If it is required to transmit the baseband signal $m(t)=30 \cos(2\pi x10^4 t)$ via DSBSC system using the carrier $c(t)=100 \cos(2\pi x10^6 t)$:**
   a. **Draw the block diagram of the system (transmitter and receiver).**
   b. **Evaluate the total transmitted power and occupied bandwidth.**
III. **Describe, using diagram and equations, a method for WBFM demodulation.**
IV. **Write an expression for the narrow band FM signal. In what way do a standard AM wave and NBFM differ from each other?**

Please Turn Over ⟶