4E4122

Roll No. _____ [Total No. of Pages : 3

4E4122

B.Tech. IV Semester (Main&Back) Examination, May 2018
Electronic Inst. & Control Engineering.
4EI3A Electrical Measurements
EE,EX,EI

Time : 3 Hours **Maximum Marks : 80**
Min. Passing Marks : 26

*Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) Discuss the following types of errors in moving Iron Instruments **(8)**

   i) Error due to stray magnetic field

   ii) Error due to change in frequency

   b) Explain why electrodynamometer type of instruments can be used both on a.c. and d.c.? Why are these instruments used as transfer instruments. **(8)**

OR

1. a) Explain the testing and calibration of single phase energy meter by phantom loading. **(8)**

   b) Explain the working of repulsion type moving iron instruments with the help of suitable diagrams. Discuss the methods of producing controlling and damping torques in them. **(8)**

Unit - II

2. a) Explain the effect of secondary burden on the ratio and phase errors of a current transformers. **(8)**

   b) Explain the wilson compensation method for reduction of errors in current transformers. **(8)**

OR

2. a) Explain the effect of the following on the characteristics of a potential transformer :

   i) Supply voltage

   ii) Power factor of secondary winding circuit **(8)**

   b) A potential transformer, ratio 1000/100 volt, has the following constants:

   Primary resistance = 94.5 Ω

   Secondary resistance = 0.86 Ω

   Primary reactance = 66.2 Ω

   Total equivalent reactance = 110 Ω

   No load current = 0.02 A at 0.4 power factor. Calculate :

   i) Phase angle error at no load

   ii) Burden in VA at unity, power factor at which the phase angle will be zero. **(8)**

Unit - III

3. a) Explain the reasons why d.c. Potentiometer cannot be used for a.c. measurements straightway. Explain the modifications that are needed in a d.c. potentiometers to be used for a.c. applications. **(8)**

   b) Explain the working of polar type Potentiometers. How is it standardized. What are the functions of the transfer instrument and the phase shifting transformer. **(8)**

OR

3. a) Explain the circuit diagram of a Crompton's potentiometer and its working. Discuss about the steps used when measuring an Unknown resistance. **(8)**

   b) Explain how "True zero" is obtained in a slide wire potentiometers. Explain the reason's why a separate "standard cell dial circuit" is provided in modern d.c. potentiometers. **(8)**

Unit - IV

4. a) What are the different problems associated with measurement of low resistances. Derive an expression of Kelvin's Double Bridge. **(8)**

   b) Explain the loss of charge method for measurements of insulation resistance of cables **(8)**

OR

4. a) Explain the construction and working of Price's Guard wire method for the measurement of high resistances. **(8)**

   b) What are the precautions can be taken in the measurements of high resistances. Draw and explain the characteristics of earth resistance. **(8)**

Unit - V

5. a) Explain the working of Anderson Bridge for self inductance measurement with proper phasor diagram. **(8)**

   b) What are the sources of errors in bridge circuits. What are precautions to be taken for minimize the errors. **(8)**

OR

5. Write short notes on the following :

   a) Wagner earth device. **(8)**

   b) Screening of bridge components **(8)**

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4E 4120

Roll No. _____ Total No. of Pages :4

4E 4120

B.Tech. IV Semester (Main/Back) Examination, May- 2018

Electrical & Electronics Engg.

4EX1A Analog Electronics

EE,EX,EC,EI

Time : 3 Hours **Maximum Marks : 80**

Min Passing Marks : 26

*Attempt any **five questions,** selecting **one question** from **each unit.** All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly.*

UNIT - I

1. a) State the three fundamental assumptions which are made in order that the expression $A_f = \frac{A}{(1+A\beta)}$ be satisfied exactly.

   b) Calculate the gain with and without feedback for the FET amplifier circuit of fig.(a) and the following circuit values: R_1 =80kΩ, R_2=20KΩ, R_o=10KΩ, R_D=10KΩ and g_m=4000 μs,

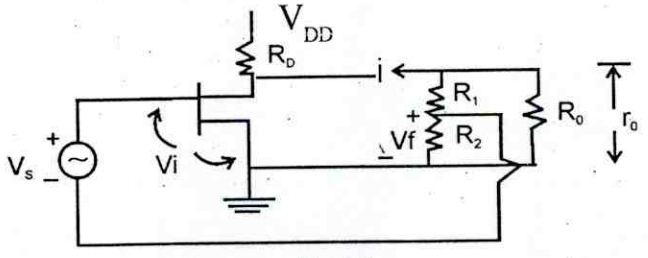

Fig (a)

(OR)

1. a) For a voltage series feedback amplifier, find expression for input and output resistance.

b) An amplifier with an open loop voltage gain of 1,000 delivers 10W of output power at 10 percent second harmonic distortion when the input signal is 10mv. If 40dB negative voltage-series feedback is applied and the output power is to remain at 10W, determine

a) The required input signal

b) The percent harmonic distortion.

UNIT - II

2. a) Sketch the circuit diagram of Wein bridge oscillator and explain its working also derive the expression for output frequency.

b) An FET phase shift oscillator having g_m=6000 μs, r_d=36kΩ, and feedback resistor R=12KΩ is to operate at 2KHz. Select 'C' for specified oscillator operation.

(OR)

2. a) Explain the working of schmitt trigger. Also give its application.

b) A crystal has the following parameters L=0.33H, C=0.065PF, C^1=1.0PF, and R=5.5KΩ.

i) Find the series resonant frequency.

ii) By what percent does the parallel-resonant frequency exceed the series resonant frequency.

iii) Find the Q of the Crystal.

UNIT - III

3. a) Derive the expression for the CE Short Circuit current gain Ai as a function of frequency.

b) Show that at low frequencies the hybrid π model with $r_{b'c}$ and r_{cc} taken as infinite reduces to the approximate CE. h-parameter model.

(OR)

3. a) The following low frequency parameters are known for a given transistor at I_c=10MA, V_{CE}=10v and at room temperature.

h_{ie}=500Ω, h_{oe}=10^{-5}A/v

h_{fe}=100, h_{re}=10^{-4}

At the same operating point, f_T=50M. and C_{ob}=3PF, Compute the values of all the hybrid - π parameters

b) i) Prove that $h_{ie} = r_{bb} + r_{b'e}$

ii) Assuming $r_{bb'} << r_{b'e}$ how does $r_{b'e}$ vary with (I_c)?

UNIT - IV

4 a) Sketch and explain the circuit of double tuned amplifier with the help of frequency response plot.

b) A tuned amplifier is required to have a voltage gain of 30 at 10.7MHz with 200KHz BW. An FET with g_m=5MA/V and r_d=100kΩ is available calculate values of tank circuit elements.

(OR)

4. a) What is the effect of cascading single tuned amplifiers on bandwidth? Derive the expression for it.

b) A single tuned amplifier using FET has tank circuit components

L=100 μH, R=5Ω and c=1000PF,

The FET used has r_d=500kΩ and g_m=5MA/V find

(i) Resonant frequency

(ii) Tank Ckt impedance at resonance

(iii) Voltage gain at resonance

(iv) Band width.

UNIT - V

5. a) With the help of circuit diagram explain the working of a transformer coupled class 'A' power amplifier.

b) A power transistor operated in class A operation delivers a maximum of 6W to a 8Ω load with the supply voltage of 25V. The Q point is adjusted for a symmetrical.

Swing. Calculate :

(i) Step down turns ratio

(ii) Peak collector current

(iii) Efficiency

(OR)

5. a) Show that the even harmonics are cancelled at the output of a push pull class B ideal amplifier.

b) For class A CE transistor amplifier, the operating point is located at I_c=250MA and V_{CE}=8V. Due to the input signal, the output collector current goes in between 450MA and 40MA while the V_{CE} swing between 1.5v, to 1v. find

(i) The output power delivered

(ii) The input power

(iii) The collector efficiency

(iv) The power dissipated by transistor.

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4E 4176

Roll No. _____ [Total No. of Pages : 3

4E 4176

B.Tech. IV Semester (Main/Back) Examination, May 2018
Electrical Engg.
4EE6A Advanced Engg. Mathematics - II
EE,EX

Time : 3 Hours **Maximum Marks : 80**

Min. Passing Marks : 26

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable by assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

1. Normal Distribution table *2.* _____

Unit - I

1. a) The ordinates of a normal curve are given by the following table **(8)**

x:	0.0	0.2	0.4	0.6	0.8
y:	0.3989	0.3910	0.3683	0.3332	0.2897

Evaluate y (0.43)

b) Using Regula Falsi method, find the real root of the equation $x^3 - 9x + 1 = 0$ which lie between 2 and 4. **(8)**

OR

1. a) Using Gauss-Siedel iteraction method, solve the following system of linear equation **(8)**

$20x + y - 2z = 17$

$3x + 20y - z = -18$

$2x - 3y + 20z = 25$

b) Use the method of least squares to determine a and b in the formula $y = ax + bx^2$ for the following observations: **(8)**

x:	1	2	3	4	5
y:	1.8	5.1	8.9	14.1	19.8

Unit - II

2. a) Find the value of $\log_e 2$ by evaluating $\int_0^1 \frac{x^2}{1+x^3} dx$, using Simpson's one third rule. **(8)**

b) Use Runge-Kutta fourth order method to solve the differential equation $\frac{dy}{dx} = x + y^2;\ y(0) = 1$ to find the approximate value of y(0.2) **(8)**

OR

2. a) Use following table to find the value of x for which y is maximum, also find the maximum value of y. **(8)**

x:	1.2	1.3	1.4	1.5	1.6
y:	0.9322	0.9636	0.9855	0.9975	0.9996

b) Use Euler's Modified method with one step to obtain the value of y at $x = 0.1$, when $\frac{dy}{dx} = x^2 + y$, with $x = 0,\ y = 0.94$. **(8)**

Unit - III

3. For Bessel's function, prove

a) $xJ_n'(x) = nJ_n(x) - xJ_{n+1}(x)$ **(8)**

b) $\frac{d}{dx}\left[x^{-n} J_n(x)\right] = -x^{-n} J_{n+1}(x)$ **(8)**

OR

3. For Legendre's function, prove

a) $(2n+1)x P_n(x) = (n+1) P_{n+1}(x) + n P_{n-1}(x)$ **(8)**

b) $\int_{-1}^{1} x^2 P_{n+1}(x) P_{n-1}(x)\, dx = \frac{2n(n+1)}{(2n-1)(2n+1)(2n+3)}$ **(8)**

Unit - IV

4. a) A letter is known to have come either from CALCUTTA or from TATANAGAR. In the half printed postal stamp of these states only two consecutive letters 'TA' are readable. Find the chances of the letter coming from TATANAGAR. **(8)**

b) A continuous random variable X has the following distribution functions. **(8)**

$$F(x)=\begin{cases} 0 & if \quad x\le 1 \\ k(x-1)^4 & if \quad 1<x\le 3 \\ 1 & if \quad x>3 \end{cases}$$

Find: i) k ii) pdf $f(x)$

OR

4. a) Find the mean and variance of Poisson distribution. **(8)**

b) The income of a group of 10,000 persons was found to be normally distributed with mean = Rs. 750 per month and standard deviations = Rs. 50. Show that of this group about 95% lad income exceeding Rs. 668 and only 5% lad income exceeding Rs. 832. What was the lowest income among the richest 100? **(8)**

Unit - V

5. a) Calculate the coefficient of correlation between x and y using the following data: **(8)**

x:	1	2	3	4	5	6	7	8	9
y:	9	8	10	12	11	13	14	16	15

b) Find the z-transform of n^2; $n \ge 0$. **(8)**

OR

5. a) Lines $2x+3y=10$ and $4x+5y=18$ are lines of regression between two variables x and y. Decide which one is the line of regression of x on y. Give $x = 3$, find y and given $y = 1$, find x. **(8)**

b) Find the inverse z-transform of $\frac{1}{(z-a)^2}$, when **(8)**

i) $|z| < a$

ii) $|z| > a$

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4E 4175

Roll No. _____ [Total No. of Pages : 3

4E 4175

B.Tech. IV Semester (Main/Back) Examination, May 2018
Electrical Engg.
4EE5A Electrical Machines - II
EE,EX

Time : 3 Hours **Maximum Marks : 80**

Min. Passing Marks : 26

*Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) Derive the general equation of induced emf. What are the effect of the Harmonics in generated emf. **(8)**

   b) Calculate the rms value of the induced emf per phase of a 10-pole,3-phase, 50Hz alternator with two slots per pole per phase and 4 conductor per slot in two layers. The coil span is 15^0. The flux per pole has a fundamental component of 0.12 wb and a 20 percent of third harmonic component. **(8)**

OR

1. a) Define chording factor and breadth factor for Ac armature winding. Derive expression for breadth factor. **(8)**

   b) A 3 phase, 50Hz, 2 pole star connected turbo alternator has 54 slots with 4 conductors per slot.The pitch of the coil is 2 slot less than the pole pitch. If machine gives 3.3 Kv between lines on open circuit with sinusoidal flux distribution. Determine the useful flux per pole. **(8)**

Unit - II

2. a) Why 3-phase induction motor does not run at synchronous speed?**(3+3+3+7)**

   b) Why is the no load current drawn by 3-phase induction motor so high?

   c) Define slip of induction motor.

   d) A 3-phase, 3 pole, 50 Hz star connected induction motor delivers useful power 25 Kv while running at a speed of 950 rpm. It is connected to a supply of 400 volt and takes 60A current. Its stator resistance per phase is 0.14Ω mechanical losses are 900w.

Calculate

(i) Shaft torque

(ii) Gross torque developed

(iii) Rotor cu loss

(iv) Stator cu loss

(v) Overall efficiency. The p.f of motor is 0.75 (lagging).

OR

2. a) Discuss the principle of operation of 3 phase Induction motor. How induction motor acts as transformer. **(8)**

b) A 3 phase, 6 pole, 50 Hz induction motor has a slip of 1% at no-load and 3% at full load. Determine

i) Synchronous speed.

ii) No load speed.

iii) Full load speed.

iv) Frequency of rotor current at stand still. **(8)**

UNIT - III

3. a) Describe the constructional feature and principle of operation of a Universal motor. Draw its speed load characteristic. **(8)**

b) A universal series motor has a resistance of 30Ω and an inductance of 0.5H. When connected to a 250v d.c. Supply and loaded to take 0.8A, It runs at 2000 rpm. Estimate its speed and power factor, when connected to a 250v, 50 Hz A.C. Supply and loaded to take same current. **(8)**

OR

3. a) Describe the single phase synchronous motor. **(8)**

b) A 230v, 380w,50Hz,4pole,1-phase, induction motor gave the following test results.

No load test:	230v	84w	2.8A
Block rotor test:	110v	460w	6.2A

The stator winding resistance is 4.6 ohm and during the block rotor test, the auxiliary winding is open. Determine the equivalent circuit parameter. **(8)**

UNIT-IV

4. a) What are the conditions to be full filled for parallel operation of two synchronous machines? Explain any one method of synchronizing. **(8)**

b) Two identical, 3-phase alternators operating in parallel share equally a load of 1000 kw at 6600v and 0.8 lagging p.f. The field excitation of the first machine is adjusted so that the armature current is 50A at lagging p.f. **(8)**

Determine:

i) The armature current of the second alternator.

ii) The p.f. at which each machine operates.

OR

4. a) Explain construction, excitation and principle of Synchronous Generator. **(8)**

b) A 3-phase, 10KVA, 400v, 50Hz, star connected alternator supplies the rated load at 0.8 p.f. lag. If armature resistance is 0.5 ohm and synchronous reactance is 10 ohms, find the power angle and voltage regulation. **(8)**

UNIT-V

5. a) Show that a synchronous motor has no net starting torque. Describe the methods of starting the synchronous motor. **(8)**

b) A 3-phase, 18MVA,10pole, 50Hz,11KV star connected synchronous motor has $X_d = 5\Omega$ and $Xq = 3\Omega$ respectively. It has negligible armature resistance calculate the following on full load at 0.8 p.f. lagging.

i) The excitation voltage.

ii) The power

iii) The maximum value of power angle and the corresponding power. **(8)**

OR

5. a) Discuss the effects of varying excitation on armature current and power factor in a synchronous motor. **(8)**

b) The excitation of a 415v, 3-phase,mesh-connected synchronous motor is such that the induced emf is 520v. The impedance per phase is (0.5+j 4.0) ohm. If the friction and iron losses are constant at 1000W, Calculate the power output, line current, power factor and efficiency for maximum power output. (8)

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4E4174

Roll No. _____ [Total No. of Pages : 2

4E4174

B.Tech. IV Semester (Main/Back) Examination, May - 2018
Electrical Engg.
4EE4A Generation of Electrical Power

Time : 3 Hours **Maximum Marks : 80**

Min. Passing Marks : 26

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly. Use of following supporting material is permitted during examination.*

Unit - I

1. a) Explain by help of neat & clean diagram working and construction of a closed cycle gas turbine plants. **(8)**

   b) Describe basic schemes of hydroelectric & pumped storage plant of Hydro power plant. **(8)**

OR

1. a) Explain Nuclear fission type of Nuclear power plant. **(8)**

   b) Write a short note on conventional energy? Generation methods in India also describe efficiencies of various power plant. **(8)**

Unit - II

2. a) In New energy sources of Generation of Electrical power explain Impact of thermal power station on environment. **(8)**

   b) Explain the concept of Non Renewable energy sources in Electrical power Generation? **(8)**

OR

2. a) Write a short note on effect & phenomena of Green house effect? **(8)**

   b) Describe briefly electric energy generation by help of solar power. **(8)**

Unit - III

3. Explain the following Maximum demand, demand factor, load factor, diversity factor, capacity factor utilization, chronological load curve and load duration curve. **(16)**

OR

3. a) Explain power factor improvement using capacitor and condensers. (8)

   b) What is power factor explain its causes and effect of low power factor? (8)

Unit - IV

4. a) Explain the phenomena of capital cost of plant, also explain annual fixed and operating cost of plants by help of suitable example. (8)

   b) Describe the phenomena of effect of load factor on unit energy cost. Also describe role of load diversity in power system economics. (8)

OR

4. a) Describe uses of calculation of most economic power factor for KW and KVA constant demand. (8)

   b) Explain phenomena of co-generation and energy conservation. (8)

Unit - V

5. a) What is objective of tariffs, explain straight and block meter rate? (8)

   b) Explain power factor dependent tariffs and three part tariff with suitable example. (8)

OR

5. a) Explain concept implimitization while selection and location of power plant is done? Also explain concept of Base and peak load. (8)

   b) Explain comparative study done for nuclear and gas power plant. (8)

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4E4172

Roll No. _____ [Total No. of Pages : 4

4E4172

B.Tech. IV Semester (Main/Back) Examination, May - 2018
Electrical Engg.
4EE2A Circuit Analysis - II

Time : 3 Hours **Maximum Marks : 80**
Min. Passing Marks : 26

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable be assumed and stated clearly.) Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) Explain the physical interpretation of complex frequency. **(8)**

   b) In the series RLC circuit shown in figure (I), the switch k is being held in position 'a' until a current I_0 flow in the inductor and the capacitor is charged to voltage v_0. After steady conditions have been reached, the switch is thrown to position 'b' which connects the circuit to a voltage source v_1 (t).

   i) Draw the transform network, showing the initial condition

   ii) Find the expression for current I(s). **(8)**

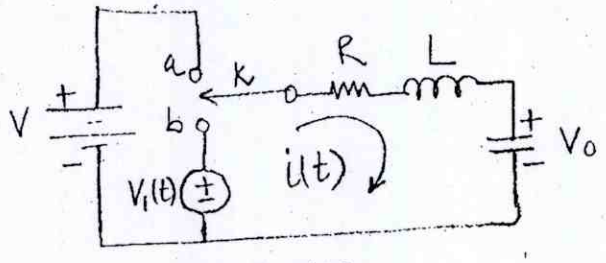

Figure (I)

OR

1. a) Find the transform admittance of the network shown in figure (II). **(8)**

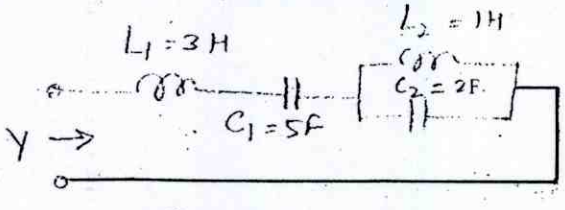

Figure II.

b) For the network shown in figure III, assuming all initial conditions to be zero, draw the transform network. Also the simplified transform network obtained by the combinations of various impedances and/or admittances and therefore obtain I(s). **(8)**

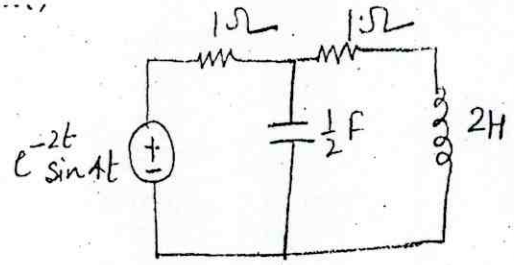

Figure III.

Unit - II

2. a) A current transfer function is given by $I(s) = \dfrac{5s}{(s+2)(s^2+2s+2)}$ obtain time response. **(8)**

b) Check the stability of the following polynomial by applying Routh Hurwitz criterian $P(s) = s^4 + 2s^3 + 4s^2 + 12s + 10$. **(8)**

OR

2. a) Determine the voltage transfer Ratio of the circuit shown in figure IV. **(8)**

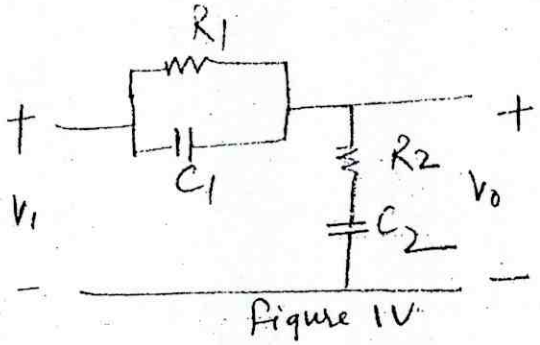

Figure IV

b) Calculate transfer impedance of the circuit shown in figure V. **(8)**

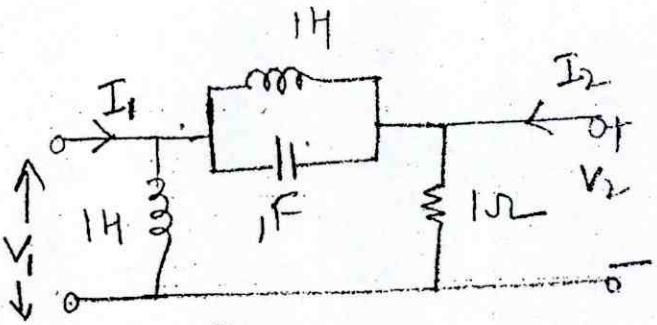

Figure V.

Unit - III

3. a) Check whether the given function is PR function OR NOT

$$Z(s)=\frac{s^3+5s^2+9s+3}{s^3+4s^2+7s+9}.$$ **(8)**

b) Find the foster-I form of the given function $Z(s)=\frac{2(s+2)(s+4)}{(s+1)(s+3)}$. **(8)**

OR

3. Obtain foster I and foster II form for $Z(s)=\frac{s\left(s^2+4\right)}{\left(s^2+1\right)\left(s^2+9\right)}$. **(16)**

Unit - IV

4. a) What do you mean by image impedances? Explain derive the expression for image parameter in terms of ABCD parameters. **(8)**

b) Convert the following:

i) ABCD parameter into h parameter.

ii) Z parameter into ABCD parameter. **(8)**

OR

4. a) Derive the condition of reciprocity and symmetry in two port parameter for ABCD parameter. **(8)**

b) For the Lattice Network shown in figure V_1. Find Z parameters. **(8)**

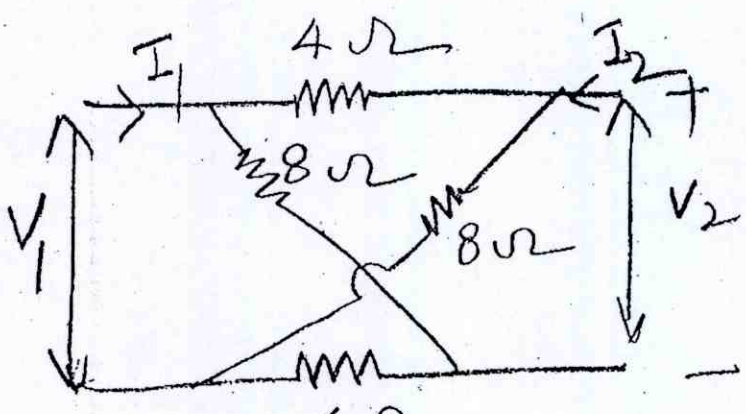

figure V1

Unit - V

5. a) Derive all the characteristics for constant k filters.

   i) Low pass filter

   ii) High pass filter

   (8)

   b) Design a constant k, T section high pass filter having cut off frequency of 10KHz, design impedance $R_0 = 600\Omega$ find its charactestic impedance and phase constant at 25 KHz.

   (8)

OR

5. a) Derive all the characteristics for constant k filters

   i) Band pass filter

   ii) Band elimination filter

   (8)

   b) Derive m derived T and π section of low pass filter having a design impedance of 600Ω a cut off frequency of 2000HZ and a frequency of infinite attenuation $f\infty = 2100\,HZ$.

   (8)

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4E2112

Roll No. _____ [Total No. of Pages : 2

4E2112

B.Tech. IV Semester (Back) Examination, May-2018
Electrical Engineering
4EE4 (O) Computer Programming-II

Time : 3 Hours **Maximum Marks : 80**
Min. Passing Marks : 26

*Attempt any **five questions**. selecting **one question** from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly.*

UNIT - I

1. Explain following Unix Commands with at least two options available with command.

(i) ls (ii) mv
(iii) rm (iv) banner
(v) sort (vi) paste
(vii) expr (viii) bc

(2×8)

(OR)

(i) mkdir (ii) man
(iii) date (iv) cal
(v) head (vi) tail
(viii) cut (viii) grep

(2×8)

UNIT - II

2. a) Explain modes of vi editor and also discuss switching from one mode to another. **(8)**
   b) In Vi-editor, explain how to move to line no 25 and then write the remaining lines to a separate file. **(8)**

(OR)

2 a) During an Active Session of Vi, if suddenly power fails. What will happen to that session and how we can recover the data later on. **(8)**

b) How we can combine 5 lines into a Single line in Vi editor. **(8)**

UNIT - III

3. a) State the difference between C++ and Java **(8)**

b) What is the Scope of a variable declared within the initialization clause of a 'For' Statement in Java. Explain by code **(8)**

(OR)

3. a) What is JVM and also explain its usage. **(8)**

b) Explain basic data types in Java with the help of examples. **(8)**

UNIT -IV

4. Write a Java Program to find the sum of digits of the given Integer. (Integer may be of 1 to 5 digits) **(16)**

(OR)

4. Write a Java Program to generate following Pattern. **(16)**

```
1
1 2
1 2 3
1 2 3 4
1 2 3 4 5
```

UNIT -V

5. Write short Notes on following:

a) Similarities between Interfaces and classes.

b) Various forms of Interface Implementation. **(16)**

OR

a) Difference between Interfaces and Classes.

b) Packages **(16)**

4E 2110

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4E 2110

B.Tech. IV semester (Back) Examination, May - 2018
Electrical Engineering
4EE2(O) Digital Electronics

Time : 3 Hours **Maximum Marks : 80**
Min. Passing Marks : 26

*Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal marks**. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) Find the radix r

i) $\left(\frac{41}{3}\right)_r = (13)_r$

ii) $(42)_r = (50)_{r-1}$

iii) $\sqrt{(175)_8 \times (5)_6} = (?)_{10}$

iv) $\left(\sqrt{41}\right)_r = (5)_r$ **(4×2=8)**

b) State & prove De - Morgan's theorem. **(2)**

c) Realize the following logic operation using only NAND gates.

i) NOT gate

ii) OR gate

iii) XOR gate **(6)**

OR

1. a) Convert $(0.125)_{10}$ to octal **(8×2=16)**

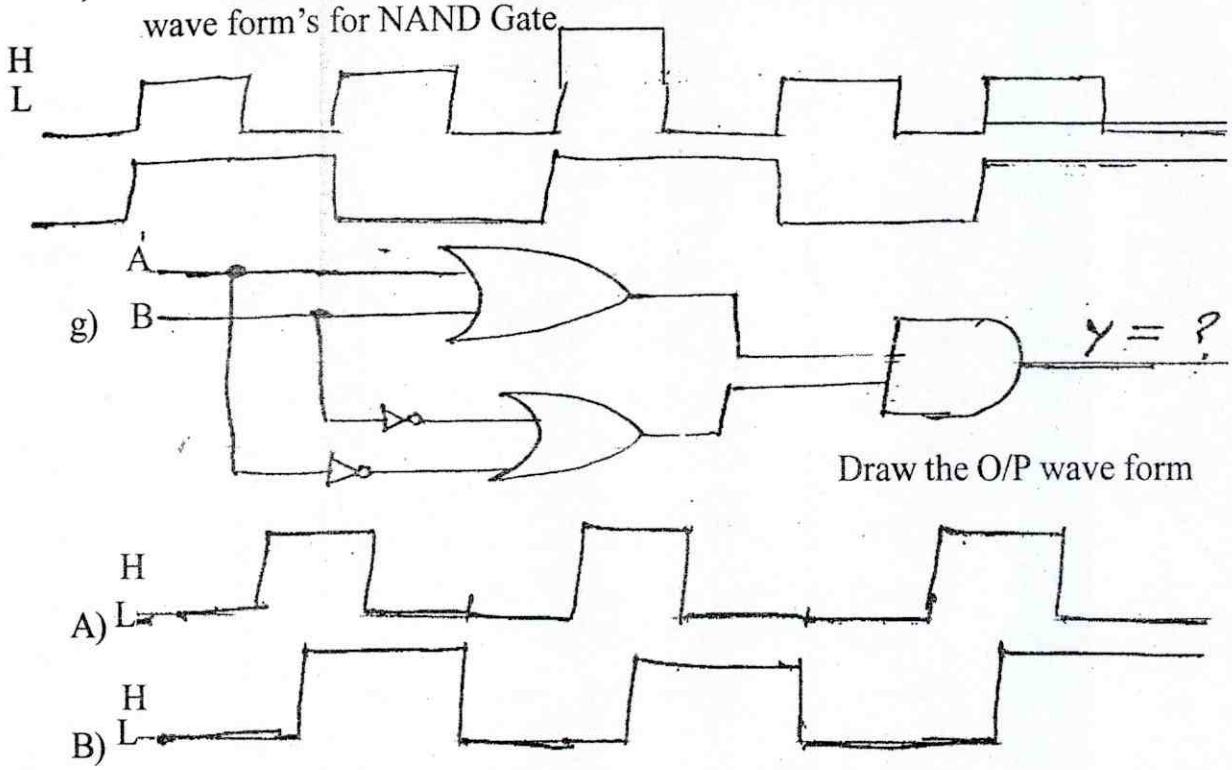
b) Convert $(47.375)_{10}$ to Hexadecimal

c) Gray code $(1010110)_2$

d) Subtraction using octal 45600-13271.

e) Subtraction $(11B)_{16}$ from $(2A5)_{16}$

f) Waveform A & B shown in fig. are applied 2 - i/p and Determine the output wave form's for NAND Gate



g) Draw the O/P wave form

h) Realize the AND gate and OR gate using transistor

Unit - II

2. a) Explain the following terms with suitable diagram

i) Fan - in

ii) Fan - out

iii) Noise margin

iv) Power dissipation

v) Propagation delay

b) With the circuit diagram explain the working of ECL NOR - gate

c) Discuss the circuit of RTL NOR gate. **((2×5=10)+3+3)**

OR

2. a) With the help of neat circuit diagram explain the working of Tristate TTL gate.

b) With the help of a neat circuit diagram, explain the working of

i) CMOS inverter

ii) 2 - input CMOS NAND gate

iii) 2 - input CMOS - NOR gate. **(3×2=6)**

c) Write a short notes of working of IIL NAND gate (4)

Unit - III

3. a) Simplify using k - map and implement the real minimal expression in universal logic.

$f = \pi M(2,8,9,10,11,12,14)$ (8)

b) $f = \sum m(1,2,6,7,8,13,14,15) + d(3,5,12)$ (4)

c) $f = \sum m(0,1,2,3,4,6,8,9) + d(10,11)$ (4)

OR

3. a) Using the tabular method, obtain the minimal expression of, $f = \sum m(6,7,8,9) + d(10,11,12,13,14,15)$

b) Reduce to its minimum sum of products form. Then implement it in logic circuit.

$x = \bar{A}\bar{B}\bar{C}\bar{D} + \bar{A}\bar{B}C\bar{D} + A\bar{B}\bar{C}\bar{D} + \bar{A}CD + A\bar{B}C\bar{D}$

c) Minimize the following expression using variable enter Map

$f = (0,1,2,3,4,6,8,9,10,11)$ (6+6+4)

Unit - IV

4. a) Show that how a 2 : 1 MUX can be used to implement a half adder.

b) Design a BCD to Binary encoder. (8+8)

OR

4. a) Realize using 16:1 multiplexer

$f(A,B,C,D) = \sum m(0,1,3,4,6,8,10,11,12,15)$ (6)

b) Perform the Excess - 3 adder with suitable logic diagram for 9 & 5 . (6)

c) Explain the 2 - bit magnitude comparator with suitable logic- diagram. (4)

Unit - V

5. a) Explain the following

i) T - flip flop

ii) D - flip flop

Draw its logic circuit and explain its working with suitable truth table.

b) Design a MOD - 6 asynchronous counter using T - flip flop (6+6+4)

OR

5. a) Discuss the difference between combinational sequantial logic

   b) What is a universal shift register? Draw its circuit & explain its working

   c) Explain the terms : Register, buffer register, controlled buffer register.

(6+4+6)

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4E 2109

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4E 2109

B.Tech. IV Semester (Back) Examination, May- 2018
Electrical Engineering
4EE1(O) Power Electronics - II

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable by assumed and stated clearly.) Units of quantities used/calculated must be stated clearly.*

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

1. Calculator

Unit - I

1. a) Explain the Nyquist's stability criterion for feedback amplifiers. Compare positive and negative feedback. **(8)**

   b) An amplifier has a mid band gain without feedback of 200.the 3dB frequency width in 200 KHz. What gain can be obtained and what feedback must be used if required bandioidth after feedback is 5MHz. **(8)**

OR

1. a) Explain the effect of negative feedback an gain and frequency response of an amplifier with the help of suitable diagram. **(8)**

   b) Derive expression for output resistance in voltage series feedback amplifier. **(8)**

Unit - II

2. a) Explain the barkhaucen criterion in brief. **(4)**

   b) Draw the neat diagram of Hartley oscillator and discuss its working. **(6)**

   c) Explain the working principle of Schmitt Trigger. **(6)**

OR

2. a) Explain the working of monostable multi-vibrator and derive an expression for gate width. **(8)**

   b) Find the operating frequency of hartley oscillator if L_1=100 μH, L_2=1 mH, mutual inductance between coils,M_1=20 μH and c = 20 pF. **(8)**

Unit - III

3. Discuss the operation of following **(4×4=16)**

   a) Adder using OPAMP

   b) Integrator using OPAMP

   c) Differentiator using OPAMP

   d) Inverting amplifier using OPAMP

OR

3. a) Explain the working of logarithmic amplifier with help of circuit. **(8)**

   b) The input signal v_i to an OPAMP is 0.03 sin(1.5×10^5 t) What can be the maximum gain of OPAMP with slow rate of 0.4 v/μsec. **(8)**

Unit - IV

4. a) Explain the use of IC 555 timer as an astable multi vibrator **(8)**

   b) Give the brief idea of monolithic regulator and how it is different from voltage regulator **(8)**

OR

4. a) Explain precision full wave rectifier and half wave rectifier. **(8)**

   b) Discuss the voltage regulator IC with feedback current limiting **(8)**

Unit - V

5. Compare class A, class B, class AB and class C power amplifiers with required circuit diagram and waveforms. **(16)**

OR

5. a) Explain the main draw back of class B, power amplifiers and proof that optimum conversion efficiency in a class B push-pull amplifiers is 78.5%.**(8)**

b) A class B push pull amp^r uses v_{cc} = 15 v and R_L=8Ω. Find the maximum input power, ac output power, conversion efficiency and power dissipated by each transistor. **(8)**
