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4E4172

Roll No. _____ Total No. of Pages : 7

4E4172

B. Tech. IV-Sem. (Main) Exam; April-May 2017

Electrical Engineering

4EE2AC Circuit Analysis - II

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

Min. Passing Marks : 24

Instructions to Candidates :-

*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.
(Mentioned in form No. 205)

1. NIL 2. NIL

UNIT - I

1 (a) Describe the necessary properties for transfer function. **8**

(b) Explain with reasons, why the following expression for the driving point impedance $Z(s)$ is not suitable for representing a passive network.

$$Z(s) = \frac{S^4 - S^3 - 2S^2}{S+5}$$

8

OR

1 (a) Describe the necessary properties of driving point functions. 8

(b) Find the transfer function of the network shown in **Fig. 1**. Also sketch pole zero configuration.

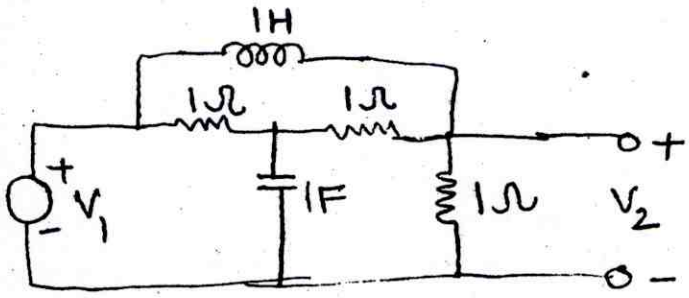


Fig. 1 8

UNIT - II

2 (a) Obtain the transfer function $\frac{V_o}{V_s}$ of the RL circuit in **Fig. 2**, assuming $V_s = V_m \cos\omega t$. Sketch its frequency response.

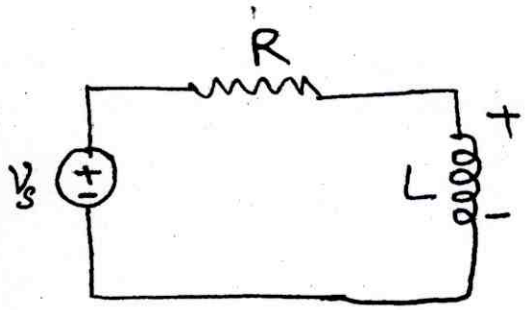


Fig. 2 8

(b) Find G_{21} (s) for the network shown in **Fig. 3**, when V_1 (s) is the applied voltage at the input terminals.

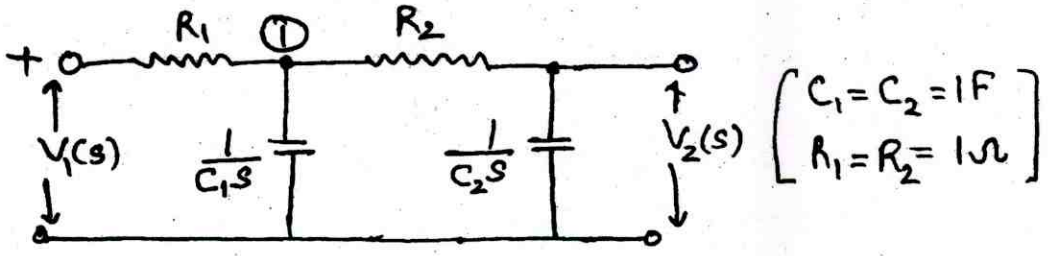


Fig. 3

8

OR

2 (a) Check the stability of the following system expressed of the polynomial $P(s) = S^3 + 2S^2 + 2S + 40$.

Apply Routh-Hurwitz criterion.

8

(b) Find the transfer function $\frac{V_o(w)}{I_j(w)}$ for the circuit in **Fig. 4**. Obtain its zeros and poles.

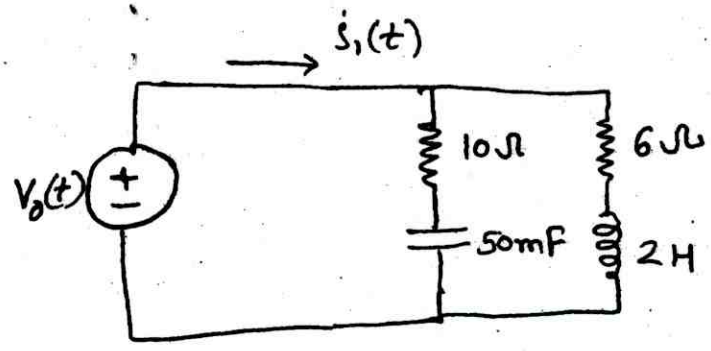


Fig. 4

8

UNIT - III

3 (a) A function is given by $Z(s)=\frac{\left(S^2+1\right)\left(S^2+16\right)}{S\left(S^2+4\right)}$. Realise it in the first and second form of Foster LC forms. 8

(b) An impedance function of LC network is given by

$$Z(s)=\frac{12S^3+4S}{3S^4+10S^2+2}$$

Synthesize the function to draw the Cauer-2 network. 8

OR

3 (a) Find the driving port impedance in Laplace form of the given network across a–b in **Fig. 5**.

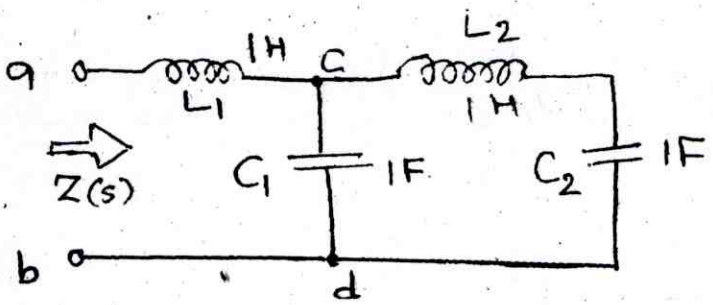


Fig. 5 8

(b) The driving port impedance of a one port reactive network is given by

$$Z(s)=\frac{S\left(S^2+4\right)}{\left(S^2+1\right)\left(S^2+16\right)}$$

Obtain the Foster forms of LC network realization. 8

UNIT - IV

4 (a) Find the transmission parameters for the circuit in **Fig. 6**.

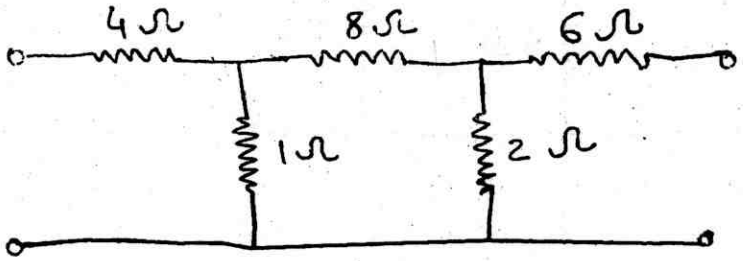


Fig. 6

8

(b) A π (Pie) network has been shown in **Fig. 7** where $(0.5\, I_3)$ is the controlled current source. Obtain the Z-parameters for the π circuit model.

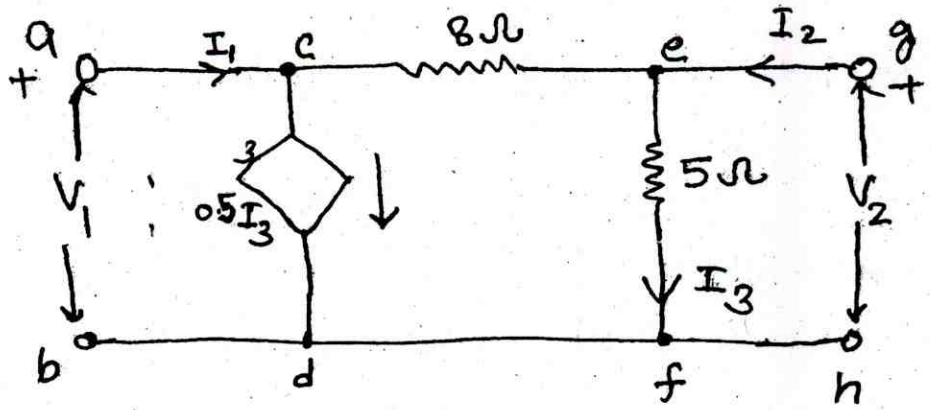


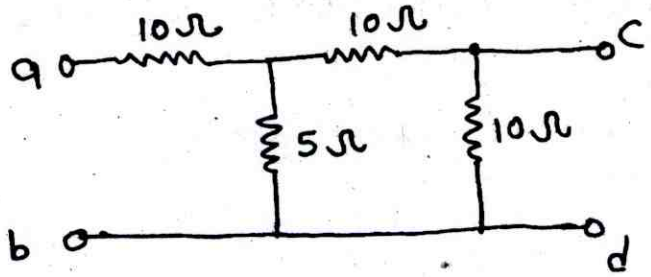
Fig. 7

8

OR

4 (a) Two networks have been shown in **Fig. 8**. Obtain the transmission parameters of the resulting circuit when both the circuits are in cascade.

(i)



(ii)

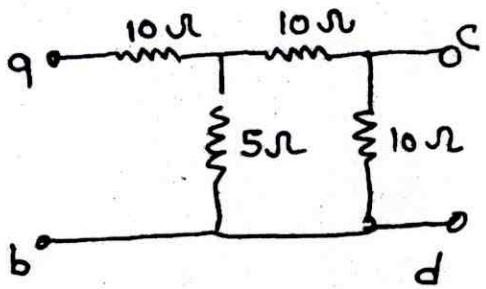


Fig. 8

8

(b) For **Fig. 9** obtain Z parameters and show that the network is not reciprocal.

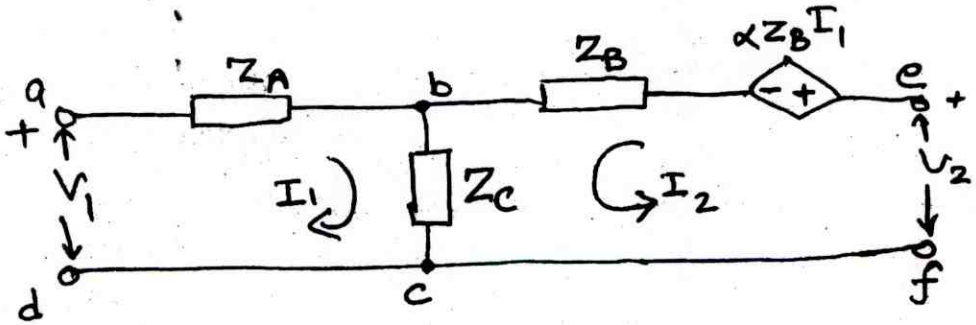


Fig. 9

8

UNIT - V

5 (a) Determine what type of filter is shown in **Fig. 10**.
Calculate the corner of cutoff frequency.
(Take $R = 2\,k\Omega$, $L = 2H$ and $C = 2\,\mu F$)

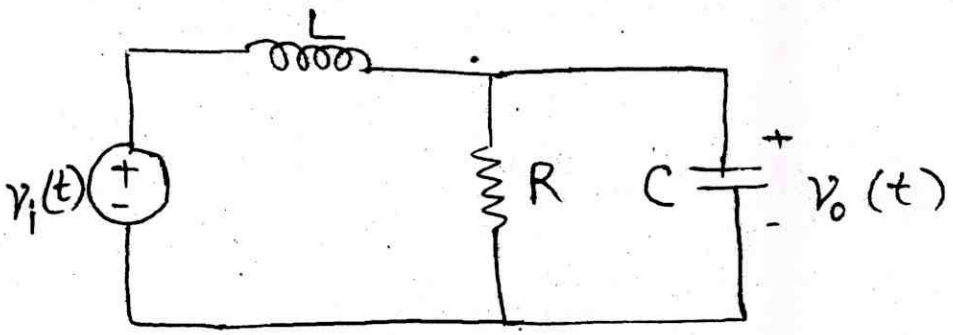


Fig. 10

8

(b) Design a constant K-high pass filter having $f_c = 4\,kHz$ and design impedance $R_0 = 600\,\Omega$ (π–section)

8

OR

5 (a) Design an m-derived high pass filter having a design impedance of $600\,\Omega$, cut off frequency 5 kHz and m = 0.35. Also determine the frequency of infinite attenuation.

8

(b) A series LCR type BPF is to work with cut-off frequencies 23 kHz and 25 kHz. Assume L = 45 mH while load resistance is 50 kΩ. Design the BPF.

8

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4E4174

Roll No. _____ Total No. of Pages : 4

4E4174

B. Tech. IV Sem. (Main / Back) Exam; April-May 2017

Electrical Engg.

4EE4A Generation of Electrical Power

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

Min. Passing Marks : 24

Instructions to Candidates :-

*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 materials is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

UNIT - I

1 (a) Discuss why ?

(i) The overall station efficiency of a thermal plant is very low.

(ii) It is necessary to heat the water (in a feed water heater) before feeding it to the boiler.

8

(b) Discuss the principle of operation of an open cycle gas turbine plant. Why is its efficiency low ?

8

OR

1 (a) What is hydrograph ? What information does it provide ? How can a flow duration curve be obtained from a hydrograph ?

8

(b) Discuss why ?

(i) Nuclear power plants are used only as base load plants.

(ii) Moderator is necessary in a reactor.

8

UNIT - II

2 (a) How can tidal power be utilized for benefit of mankind ? What are problems associated in construction of barrages for tidal schemes ?

8

(b) How can wind energy be converted into electrical energy ? What prohibits large scale utilization of wind power for electricity generation.

8

OR

2 (a) Discuss the role of new energy sources in the context of present day energy crisis.

8

(b) Discuss the future prospects of solar energy use.

8

UNIT - III

3 (a) The daily load curve data for a system is as under :

Week days :

Time	12 – 5 am	– 8 am	– 12 noon	– 1 pm	– 5 pm	– 9 pm	– 12 pm
Load (MW)	100	150	250	100	250	350	150

Saturday and Sunday :

Time	12–5 am	–5 pm	–9 pm	–12
Load (MW)	100	150	200	150

Draw a load duration curve for the system for one week. Find the weekly load factor.

10

(b) What is the effect of load factor on unit generation cost.

6

OR

3 (a) Discuss why ?

(i) Some power companies put a penalty for low power factors.

(ii) It is not economical for consumers to raise power factor to unity.

10

(b) Discuss the advantages of improving power factor.

6

UNIT - IV

4 (a) What is depreciation curve ? Why is it necessary to maintain it ? Discuss the methods to calculate the depreciation charges.

8

(b) How the power factor affects when kW demand is constant and in another case when kVA demand is constant.

8

OR

4 (a) What do you understand by the term co-generation ?

8

(b) Why should the total generation cost per unit of thermal energy depend on the station load factor ? Draw a typical curve showing this variation and justify its shape.

8

UNIT - V

5 (a) How does the plant location affect the reliability of electric supply ?

6

125

(b) Distinguish between operating reserve and spinning reserve.

5

(c) What is the difference between 'present worth' and 'capitalized cost'.

5

OR

5 (a) An industrial consumer has single phase 230 V supply. His monthly energy consumption is 2020 kWh. A maximum demand indicator installed at his premises indicates 40A which is charged at unity power factor for 2 hours daily at Rs. 3.50 per kWh. The remaining units are charged at Rs. 1.80 per kWh. Find his monthly bill (for 30 days) and average tariff per kWh.

10

(b) What is tariff ? What are its objectives ?

6

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4E4175

Roll No. _____ Total No. of Pages : 4

4E4175

B. Tech. IV-Sem. (Main) Exam; April-May 2017

Electrical Engg.

4EE5A Electrical Machines - II

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

Min. Passing Marks : 24

Instructions to Candidates :-

*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.
(Mentioned in form No. 205)

1. NIL 2. NIL

UNIT - I

1 (a) Show that a 3-phase distributed winding excited by balanced 3-phase currents will produce a sinusoidally distributed rotating magnetic field of constant magnitude when the phase windings are wound 120° electrical degrees apart in space.

(b) Explain the term "distribution factor" in connection with alternator armature winding and derive the equation of it, when the armature winding is uniformly distributed.

8+8

OR

1 (a) Explain clearly the meaning of coil-pitch factor. Give equation for coil-pitch factor of armature winding of alternator.

(b) A 3-phase, 50 Hz, 2-pole, star connected alternator has 54 slots with 4 conductors per slot. The pitch of the coil is 2 slots less than pole-pitch. If the machine is given 3300 volts between lines on open circuit, determine useful flux per pole.

6+10

UNIT - II

2 (a) Starting from first principles, develop the equivalent circuit of a 3-phase induction motor. Also draw phasor diagram of 3-phase induction motor.

(b) Derive the equation for torque developed under running conditions, by a 3-phase induction motor. Find the condition for maximum running torque.

8+8

OR

2 (a) Draw and explain the circuit diagrams for performing no-load and block rotor tests on a 3-phase induction motor. How the parameters of equivalent circuit are determined with the results of these tests ?

(b) Why starters are necessary for starting the 3-phase induction motor. Explain star-delta starter.

(c) Explain phenomenon of crawling and logging in a 3-phase induction motor.

6+5+5

UNIT - III

3 (a) Explain, why single-phase induction motor is not self starting.

(b) Explain double-revolving field theory of single-phase induction motor and derive the equation for net torque developed.

(c) Draw and explain the equivalent circuit of single-phase induction motor, based upon double-field revolving theory.

(d) Draw circuit diagram and phasor diagram of a capacitor start and run single-phase induction motor.

2+6+4+4

OR

3 (a) Describe construction and working of a shaded pole motor.

(b) Briefly explain construction and working of single-phase series motor. Also draw its phasor diagram.

(c) Write short note on "Universal Motor."

5+6+5

UNIT - IV

4 (a) Why a rotating field system used in synchronous machines is preferable to a stationary field ?

(b) Draw phasor diagrams of a loaded alternator (cylindrical type) for following conditions :

(i) Lagging power factor

(ii) Leading power factor and

(iii) Unity power factor

(c) Sketch and explain the open-circuit and short-circuit characteristics of a synchronous generator. Briefly explain, how the voltage regulation of an alternator is found by synchronous impedance method.

4+4+8

OR

4 (a) Explain the two reaction theory applicable to salient pole synchronous machines and draw its phasor diagram.

(b) Derive the equation for power developed by the salient pole synchronous machines and draw its power-angle characteristics.

(c) Why salient pole synchronous machines are more stable than cylindrical rotor machine, explain.

6+6+4

UNIT - V

5 (a) Explain why the synchronous motor is not self-starting. Explain the procedure of starting a synchronous motor in brief.

(b) What are V-curves and inverted V-curves of a 3-phase synchronous motor? How these curves are obtained experimentally ?

(c) Explain hunting of a synchronous machine. How it can be avoided ?

5+7+4

OR

5 (a) Explain with neat sketches, the principle of operation of a 3-phase synchronous motor. Explain why it will not run at other than synchronous speed.

(b) A 3-phase, star-connected synchronous motor has effective armature resistance and synchronous reactance of 0.2 Ω and 2.0 Ω per phase respectively. It takes 20 amps to drive a certain load. Calculate the excitation emf induced in the motor if its works with (i) 0.8 power factor Lagg. (ii) 0.8 P.F. leading (iii) Unity P.F. conditions.

8+8

4E4176

Roll No. 15B63B0032 Total No. of Pages : 7

4E4176

B. Tech. IV-Sem. (Main / Back) Exam; April-May 2017

Electrical Engg.

4EE6A Advance Engg. Mathematics - II

(Common to EE and EX)

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

Min. Passing Marks : 24

Instructions to Candidates :-

*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.
(Mentioned in form No. 205)

1. NIL 2. NIL

UNIT - I

1 (a) Prove that $E \equiv e^{hD}$. 4

(b) Solve the following equations by Gauss-Seidel Method, correct upto 3 decimal places :

$$2x - 4y + 10z = -15$$
$$9x + 2y + 4z = 20$$
$$x + 10y + 4z = 6$$

4

(c) Find u_{32} using Stirling's Formula : $u_{20}=14.035$, $u_{25}=13.674$, $u_{30}=13.257$, $u_{35}=12.734$, $u_{40}=12.089$, $u_{45}=11.309$.

8

OR

1 (a) Find the positive value of $\left(\frac{1}{17}\right)^{1/3}$ correct upto 4 decimal places using Newton-Raphson Method.

4

(b) Use Lagrange Formula, express the rational function $\frac{3x^2+x+1}{(x-1)(x-2)(x-3)}$ as a sum of partial fractions.

4

(c) Find least squares fit of the form $y=a+bx^2$ to the following data :

x	−1	0	1	2
y	2	4	10	15

8

UNIT - II

2 (a) Compute $f'(3)$ from the following table :

x	1	2	4	8	10
y	0	1	5	21	27

4

(b) Find $\int$

(c) Using

taking

2 (a) The t
temper
time i

t	
θ	8

Find

(b) Find t
the i
appro

(c) Solve

(b) Find $\int_0^6 \frac{e^x}{1+x}dx$ approximately using Simpson's 3/8th rule of integration. 4

(c) Using Runge Kutta 4th order method, find the value of y when x=1 by taking h=0.5, given that y(0)=1 and $\frac{dy}{dx}=\frac{y-x}{y+x}$. 8

OR

2 (a) The table below gives the results of an observation. θ is observed temperature in degrees centigrade of a vessel of cooling water, t is the time in minutes from the beginning of observations :

t	1	3	5	7	9
θ	85.3	74.5	67.0	60.5	54.3

Find approximate rate of cooling at t=3.5. 4

(b) Find the solution of $\frac{dy}{dx}=1+xy,\ y(0)=1$ which passes through (0,1) in the interval (0, 0.5) using Picard's interation formula upto second approximation. 4

(c) Solve the difference equation $y_{n+2}-2y_{n+1}+y_n=n^2 2^n$. 8

UNIT - III

3 (a) Express $f(x)=x^4+2x^3-6x^2+5x-3$ in terms of Legendre Polynomials. 4 (a)

4

(b) Show that (b)

(i) $P_n(1)=1$

(ii) $P_n(-x)=(-1)^n P_n(x)$.

4

(c) Prove that $J_n(x)=\frac{1}{\pi}\int_0^{\pi}\cos(n\theta - x\sin\theta)d\theta$. (c)

8

(d)

OR

3 (a) Prove that $(n+1)P_{n+1}(x)=(2n+1)xP_n(x)-nP_{n-1}(x)$.

4

(b) Find the values of $P_0(x), P_1(x), P_2(x), P_3(x)$ and $P_4(x)$ using Rodrigue's Formula and sketch a rough diagram of these functions between -1 to 1. 4 (a)

4

(c) State and prove orthogonality of Bessel's function of 1st kind.

8

UNIT - IV

4 (a) State axioms of probability and prove that for any two events A and B, $P(A \cup B) = P(A) + P(B) - (A \cap B)$.

4

(b) Probability distribution function of variable x is given by $f(x) = \begin{cases} 2e^{-2x} & x \geq 0 \\ 0 & x < 0 \end{cases}$. Find expected value of $1, x, x^2, x^3, x^4$ (i.e. First four moments of x about the origin).

4

(c) A student is given a true-false examination with 8 questions. If he corrects at least 7 questions, he passes the examination. Find the probability that he will pass given that he guesses all questions.

4

(d) The income of a group of 10,000 persons was found to be normally distributed with mean 750 pm and standard deviation of 50. Show that, of this group, about 95% had income exceeding 668/- and only 5% had income exceeding 832/-. Also find the lowest income among the richest 100. [Area under the normal curve from 0 to $z = \Phi(z)$,, $\Phi(1.64) = 0.4495, \Phi(0.49) = 2.33$]

4

OR

4 (a) In a certain college, 4 percent of the men and 1 percent of the women are taller than 6 feet. Furthermore, 60 percent of the students are women. Suppose a randomly selected student is taller than 6 feet. Find the probability that the student is a woman.

4

(b) Compute mean of binomial distribution. Is binomial distribution always symmetric ?

4

(c) In a certain factory turning out razor blades, there is a small chance of 0.002 for any blade to be defective. The blades are supplied in packets of 10. Calculate the approximate number of packets containing no defective, one defective and two defective blades in a consignment of 10,000 packets. 5

4

(d) The mean weight of 500 male students at a certain college is 151 lb and the standard deviation is 15 lb. Assuming that the weights are normally distributed, find how many students weigh (a) between 120 and 155 lb, (b) more than 185 lb. [Area under the normal curve from 0 to $z = \Phi(z); \Phi(2.10) = .4821, \Phi(0.30) = 0.1179, \Phi(2.30) = 0.4893$]

4

UNIT - V

5 (a) Obtain the rank correlation co-efficient for the following data :

x	68	64	75	50	64	80	75	40	55	64
y	62	58	68	45	81	60	68	48	50	70

4

(b) If θ is the acute angle between the two regression lines in the case of two variables x and y, show that $\tan\theta = \frac{1-r^2}{r} \cdot \frac{\sigma_x \sigma_y}{\sigma_x^2 + \sigma_y^2}$ where r, σ_x, σ_y have their usual meanings.

4

(c) Using Z transform, solve the difference equation :

$$y_{n+2} + 10y_{n+1} + 25y_n = n;\ y_0 = 1, y_1 = -5.$$

8

OR

5 (a) Determine Z transform, $Z\left\{e^{-an}\cos(\beta n)\right\}$.

4

(b) Find the coefficient of correlation between the values of x and y :

x	1	3	5	7	8	10
y	8	12	15	17	18	20

6

(c) In a partially destroyed laboratory record of an analysis of a correlation data, the following results only are legible : Variance of $x = 9$, regression equations : $8x - 10y + 66 = 0$, $40x - 18y = 214$. What were *(a)* the mean values of x and y *(b)* the standard deviation of y and the co-efficient of correlation between x and y.

6

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4E2112

Roll No. _____ Total No. of Pages : 4

4E2112

B. Tech. IV-Sem. (Main / Back) Exam; April-May 2017

Electrical Engg.

4EE4 Computer Programming-II

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

Min. Passing Marks : 24

Instructions to Candidates :-

*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.

1. NIL 2. NIL

UNIT - I

1 (a) Explain the following Unix commands :

(i) cp

(ii) ls

(iii) cal

(iv) rm

(v) banner

(vi) date

using appropriate syntax. 2×6

(b) Write short notes on file system in Unix. 4

OR

1 (a) Explain the following Unix commands :

(i) cat

(ii) wc

(iii) grep

(iv) sort

3×4

(b) Write the names of commands that perform following operation :

(i) Places one or more files in the line printer queue.

(ii) Deletes empty directories from the file system.

(iii) Reports how much space is used by a directory.

(iv) Evaluates an expression.

1×4

UNIT - II

2 (a) What is vi editor ? Explain different modes of operation in vi editor. 8

(b) Explain the following vi command :

(i) h	(ii) j
(iii) K	(iv) X
(v) V	(vi) r
(vii) a	(viii) R

1×8

OR

2 Write short notes on :

(i) Cursor movement commands.

(ii) String replacement commands.

8×2

UNIT - III

3 Write short notes on :

(i) Java virtual machine (JVM).

(ii) Java byte code.

(iii) Applets of Java.

8+4+4

OR

3 (a) How Java is different from C++ ?

5

(b) What are data types in Java ? Explain various data types in detail.

8

(c) What is the structure of a Java program.

3

UNIT - IV

4 (a) Write a Java program that prints table of a given number n.

8

(b) Explain the followings :

(i) Relational operators.

(ii) Boolean logic operators.

4×2

OR

4 (a) Write a Java program to generate the Fibonacci series.

8

(b) Write short notes on :

(i) Switch statement.

(ii) Operator precedence.

4×2

UNIT - V

5 (a) What is a package ? How package is defined in Java ? Explain user defined package. **8**

(b) What is applet ? How applets are implemented ? How applets are useful in programming ? **8**

OR

5 (a) What is an interface ? How interfaces are defined and implemented in Java ? **8**

(b) Write short note on awt tools and control. **8**

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4E2110

Roll No. _____ Total No. of Pages : 4

4E2110

B. Tech. IV-Sem. (Back) Exam; April-May 2017

Electrical Engg.

4EE2 Digital Electronics

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

Min. Passing Marks : 24

Instructions to Candidates :-

*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.
(Mentioned in form No. 205)

1. NIL 2. NIL

UNIT - I

1 (a) Find the radix r.

(i) $(30)_{10} + (54)_r = (144)_r$

(ii) $\sqrt{(41)_r} = 5_r$

(iii) $(25)_{10} + (30)_8 = (54)_r$

(iv) $(23)_r + (12)_r = (101)_r$ **8**

(b) Write short note on weighted and nonweighted code. **8**

OR

1 (a) Briefly explain the concept of error detection and correction codes. **8**

(b) Perform the following decimal additions for use with the 8421 BCD code :

(i) $(386)_{10} + (756)_{10}$

(ii) $(123)_{10} + (987)_{10}$ **8**

UNIT - II

2 (a) Simplify the following Boolean expressions :

(i) $(A+C)(\overline{A}\overline{B}+B)\overline{(\overline{C}+AB)}$

(ii) $\overline{(AC+\overline{B})(\overline{A+C}+B)}$ **8**

(b) Minimize following function using k-map.

$f(A, B, C, D) = \Sigma_m(1, 2, 6, 7, 9, 13, 15) + \Sigma d(3, 5, 11, 12)$ **8**

OR

2 (a) Implement a 2-input EX-OR gate using

(i) 2 input NAND gates only

(ii) 2 input NOR gates only **8**

(b) Minimize following Boolean function using Quine Mc-clusky method.

$f(A, B, C, D) = \Sigma_m(0, 2, 4, 5, 8, 9, 10) + d(1, 13, 14)$ **8**

UNIT - III

3 (a) Write short notes on :

(i) noise immunity

(ii) Fan-out

(iii) Fan-in

(iv) Propagation delays

8

(b) Compare various logic families : TTL, RTL, ECL and MOS.

8

OR

3 (a) Draw and explain 2-input CMOS NAND gate.

8

(b) Explain ECL family with the help of suitable circuit diagram.

8

UNIT - IV

4 (a) Implement the following function with multiplexer.

$f(A, B, C, D) = \Sigma_m(0, 1, 3, 4, 8, 9, 15)$

8

(b) Design BCD to excess-3 encoder.

8

OR

4 (a) Design and implement a 4-bit binary to gray code converter.

8

(b) Explain the half adder and full adder with suitable diagram.

8

UNIT - V

5 Write short notes on : (any two)

(i) Registers

(ii) Counter

(iii) J-K flip-flop

(iv) R-S flip-flop

8×2=16

OR

5 (a) Write the difference between sequential and combinational circuits. List some applications of sequential circuits.

8

(b) Explain the following conversions :

(i) JK flip-flop to D-flip-flop

(ii) J-K flop-flop to T-flip-flop.

4×2=8

145

4E2109

Roll No. _____ Total No. of Pages : 3

4E2109

B. Tech. IV-Sem. (Main/Back) Exam; April-May 2017

Electrical Engg.

4EE1(O) Power Electronics - II

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

Min. Passing Marks : 26

Instructions to Candidates :-

*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.
(Mentioned in form No. 205)

1. NIL 2. NIL

UNIT - I

1 (a) What are the advantages of negative feedback in amplifiers ? Derive the input impedance R_{if} of a voltage series and current shunt feedback amplifier.

(b) An amplifier has a voltage gain of 4000. It's input impedance is 2K and output impedance is 60 K. Calculate the voltage gain, input and output impedance of the circuit is 5% of the feedback is fed in the form of series negative voltage feedback.

OR

1 (a) Explain the concept of feedback with the help of block schematic of a signal loop feedback amplifier. Derive expression for the transfer gain with feedback.

(b) Draw the circuit diagram of a two stage amplifier employing current shunt feedback and obtain the expression of its gain with feedback.

UNIT - II

2 (a) What is the Barkhausen criterion for the feedback oscillators ? Explain the principle of working of Colpitts oscillator.

(b) What type of feedback is employed in oscillators ? Explain how amplitude and frequency stability are improved in an oscillators.

OR

2 (a) Why are the RC oscillators preferred for the generation of low frequencies ? Draw a neat circuit diagram of a phase shift oscillator using BJT. Derive an expression for its frequency of oscillation.

(b) In a Hartley oscillator, L_1 = 15 mH and C = pF. Calculate L_2 for a frequency of 168 kHz. The mutual inductance between L_1 and L_2 is 5 μH. Also find the required gain of the transistor to be used for the oscillator.

UNIT - III

3 (a) What is the mean by CMMR ? Derive the expression for CMMR in an emitter coupled differential amplifier.

(b) How a differentiator circuit can be designed using an ideal operation amplifier ? Explain.

OR

3 (a) Draw and explain logarithmic and antilog amplifier by using operation amplifier. Derive the expression of logarithmic amplifier.

(b) Explain the slew rate. For an operation amplifier having a slew rate of 3 v/μsec. What is the maximum closed loop voltage gain that can be used when the input signal varied by 0.4 v in 12 μsec ?

UNIT - IV

4 (a) Define the following term of D/A conversion :
(1) Resolution
(2) Accuracy
(3) Monotonicity
(4) Conversion time.

(b) Draw and explain the series emitter follower regulated power supply circuit.

OR

4 (a) Draw and explain the functional diagram of IC 555 timer and explain an application with the help of circuit diagram.

(b) Write short note on three terminal monolithic regulator.

UNIT - V

5 (a) Define the conversion efficiency. Compare maximum efficiency of a series fed and transformer coupled class A signal transistor power stage.

(b) Show that optimum conversion efficiency possible in class B push pull amplifier is 78.5% and also explain the main drawback of class B configuration in power amplifier.

OR

5 (a) Write short note on complementary symmetry power amplifiers.

(b) Prove that in class A amplifier if distortion is 10 percent power gain to the load is increased by 1 percent

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