

4E2109

Roll No. _____

Total No of Pages: 7

4E2109

B. Tech. IV Sem. (Back) Exam., June/July-2014

Electrical Engineering
4EE1 Power Electronics 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.

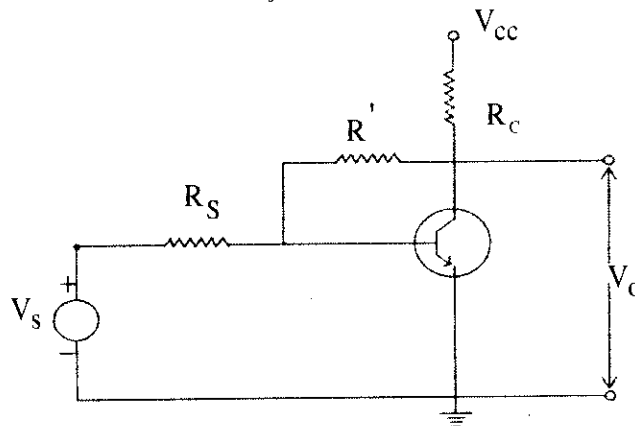
1. _____

2. _____

UNIT-I

Q.1. (a) Identify the topology in the circuit. Prove that the voltage of the amplifier with

feedback is given by $-\frac{R'}{R_s}$ [8]



- (b) List five characteristics of an amplifier which are modified by negative feedback.

Explain them in brief.

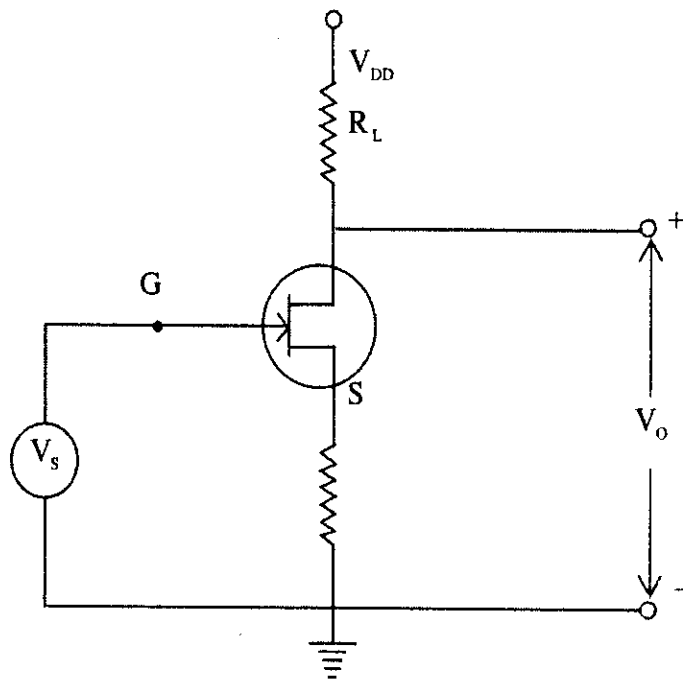
[8]

OR

- Q.1. (a) Draw the equivalent circuit of the following amplifier and show that the output resistance with load resistance R_L with feedback is -

[10]

$$R'_{of} = \frac{R_L [r_d + (\mu + 1)R]}{r_d + R_L + (\mu + 1)R}$$



- (b) Distinguish between voltage series and current series. Explain briefly with suitable circuit diagram.

[6]

UNIT-II

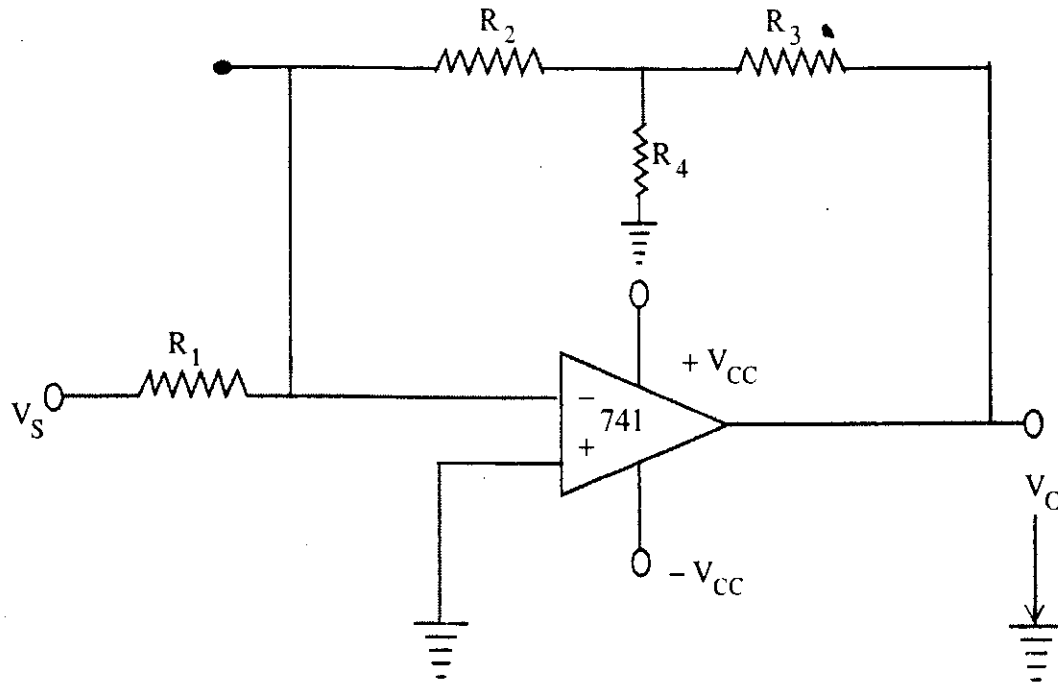
- Q.2. (a) Sketch the topology for a generalised resonant circuit oscillator, using impedance $Z_1 Z_2 Z_3$. At what frequency will the circuit oscillate? Under what conditions does the configuration reduces to Hartley Oscillator? [8]
- (b) What is Schmitt triggering? Explain the working of a Schmitt trigger with the help of a neat circuit diagram and waveform. [8]

OR

- Q.2. (a) Explain the Barkhausen criterion for sustained oscillation. An FET RC phase shift oscillator is required to oscillate at 1 KHz. JFET used has $g_m = 5 \text{ mA/V}$ and $r_d = 20\text{k}$. If $R = 10 \text{ k}$ find the value of
- (i) Capacitance in RC network.
- (ii) External load resistance R_D . [8]
- (b) Normally, crystal controlled oscillator are not available beyond 10 MHz. Why? [4]
- (c) Explain the working of BJT bistable multi vibrator. [4]

UNIT-III

- Q.3. (a) Find V_o/V_s for the circuit in figure. Use $R_1 = 5 \text{ K}\Omega$, $R_2 = R_3 = 20 \text{ K}\Omega$ and $R_4 = 1 \text{ K}\Omega$ [8]



- (b) Write short note on - [8]

- (i) Logarithmic amplifier using op-amp
- (ii) Differentiator

OR

Q.3. (a) Define following parameters in brief -

[8]

- (i) Slew Rate
- (ii) CMRR
- (iii) Input Offset Voltage
- (iv) PSRR
- (v) Input Offset current drift.

(b) Explain the operation of Integrator using op – amp and also draw input and output wave from.

[8]

UNIT-IV

Q.4. (a) Explain a monostable multivibrator using Ic – 555 with functional block diagram of Ic.

[8]

(b) Connect Ic-555 as astable multivibrator with following particulars-

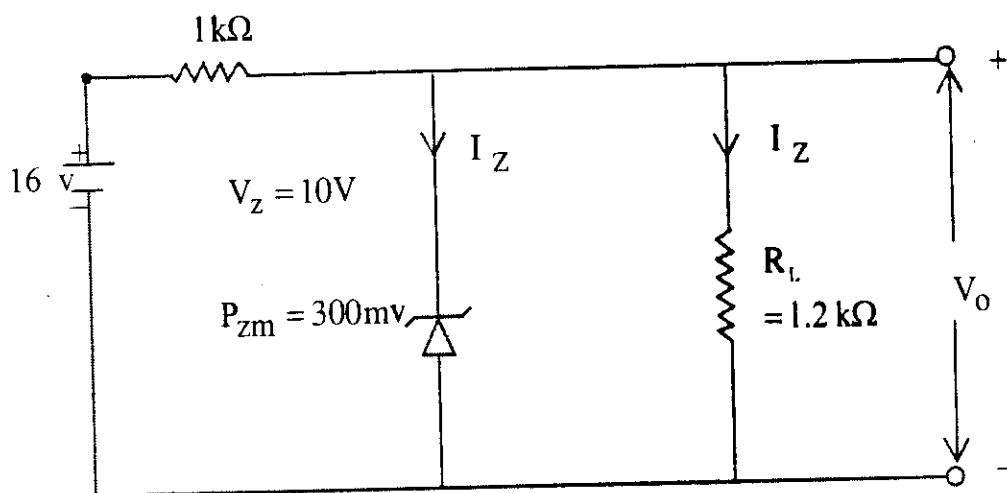
$R_A = R_B = 7.5 \text{ K}\Omega$, $C = 0.1 \mu\text{F}$, $V_{CC} = 5\text{V}$. Find output frequency.

[8]

OR

Q.4. (a) Explain working of precision half wave and full wave rectifier using op-amp- 741. [8]

(b) For Zener circuit calculate V_L , V_R , I_Z , P_Z [8]



UNIT-V

Q.5. (a) In a class – B push pull amplifier, prove that

$$P_{cmax} = \frac{4}{\pi^2} P_{max} \quad [8]$$

(b) What is meant by cross over distortion in class – B amplifier. Explain how it is overcome in class – AB operation? [4]

- (c) Discuss the classification of amplifiers based on Function, Frequency, Conduction angle, Type of coupling and Load. [4]

OR

- Q.5 (a) Draw the schematic circuit diagram of series fed class – A amplifier and explain its working. [8]

- (b) A sinusoidal signal $V_s = 1.95 \sin 400t$ is applied to a power amplifier, the resultant current is

$$i_o = 12 \sin 400t + 1.2 \sin 800t + 0.9 \sin 1200t + 0.4 \sin 1600t$$

Calculate

- (i) Total harmonic distortion
- (ii) The percentage increase in power because of distortion. [4]
- (c) Show the classification of power amplifier using output characteristics load line and operating point. [4]

4E4172	Roll No. _____	Total No of Pages: 7
	4E4172 B. Tech. IV Sem. (Main/Back) Exam., June/July-2014 Electrical Engg. 4EE2A Circuit Analysis-II	

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks: 24

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(Mentioned in form No.205)

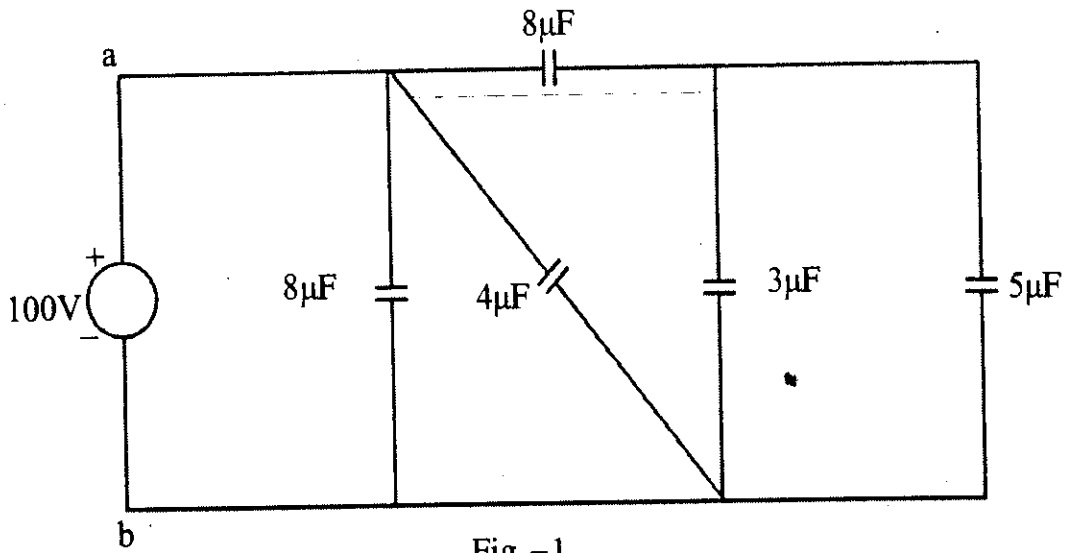
1. _____ NIL _____

2. _____ NIL _____

UNIT - I

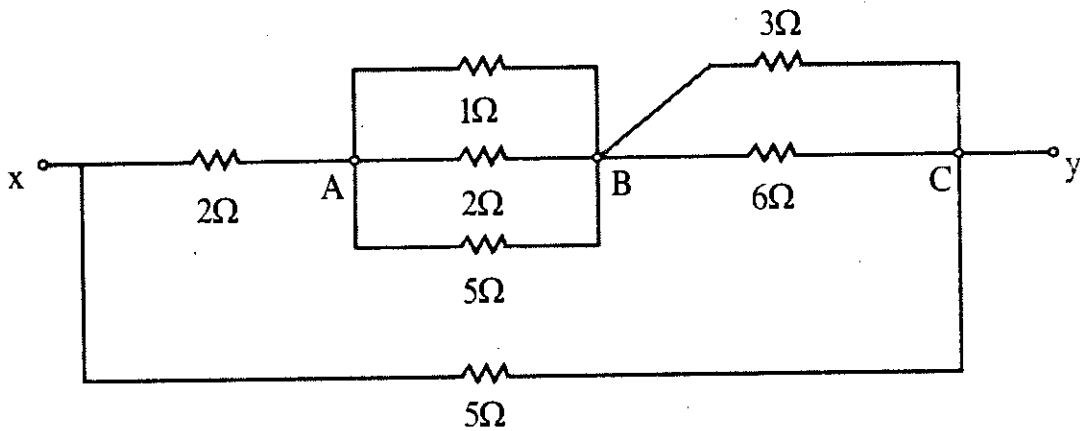
Q.1. (a) Illustrate the importance and advantage of complex frequency. [8]

(b) Determine equivalent capacitance across terminal (a-b) in Fig. 1. Also find the charging time to charge these capacitances by a steady direct current of constant magnitude of 10A. [8]



OR

- Q.1. (a) Differentiate between transform impedance and admittance of a network. [8]
- (b) Find the equivalent resistance across x-y of the circuit shown in fig. 2. [8]



UNIT - II

Q.2. (a) Find $Z_{11}(S)$, $Z_{21}(S)$ in the following circuit shown in fig. 3.

[6]

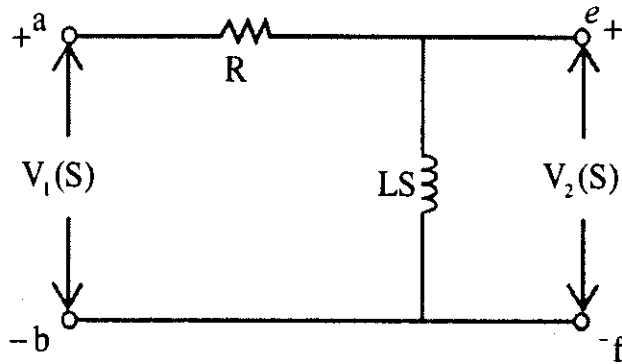


Fig. -3

(b) Find the pole zero locations of the current transfer ratio I_2/I_1 in S-domain for circuit shown in fig. 4.

[10]

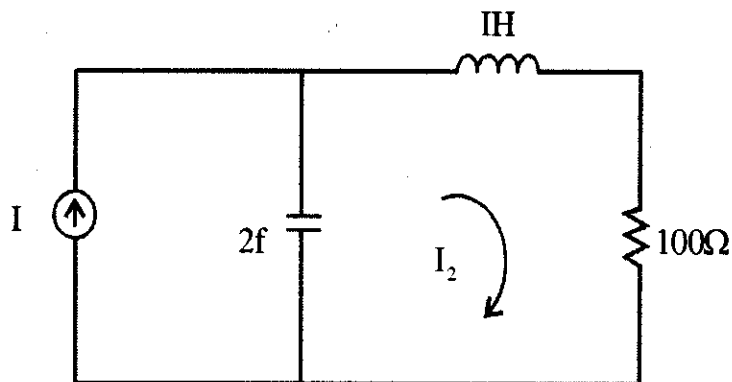


Fig. -4

OR

- Q.2. (a) Obtain the pole zero diagram of the given function and obtain time domain response. [10]

$$I(S) = \frac{2S}{(S+1)(S^2+2S+4)}$$

- (b) Find the transfer function of network shown in fig. 5 [6]

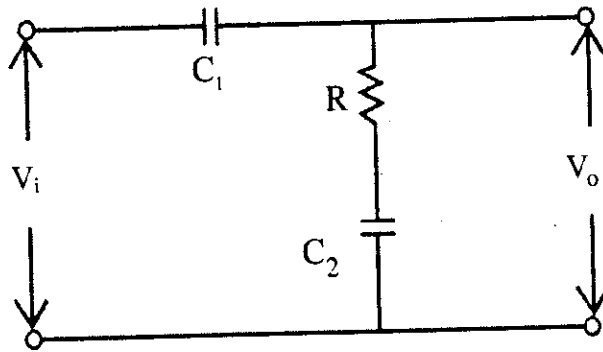


Fig. -5

UNIT - III

- Q.3. (a) Test whether the polynomial $S^5 + S^3 + S$ is Hurwitz or not. [6]

- (b) A driving point impedance is given by $Z_{LC}(S) = \frac{S(S^2+4)(S^2+6)}{(S^2+1)(S^2+5)}$ Obtain the first form of caver network. [10]

OR

Q.3. An impedance is given by $Z(S) = \frac{8(S^2 + 1)(S^2 + 3)}{(S^2 + 2)(S^2 + 4)}$

Realise the network in Foster – I, II and Caver – I, II form.

[16]

UNIT – IV

Q.4. (a) Determine the Z-parameters for a π - type attenuator section (fig. 6)

[8]

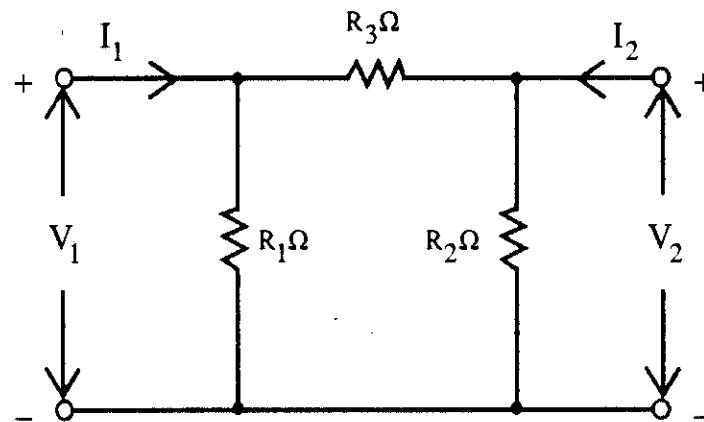


Fig.-6

(b) Find out ABCD parameters of network shown in fig.7. Also find image parameter of network.

[8]

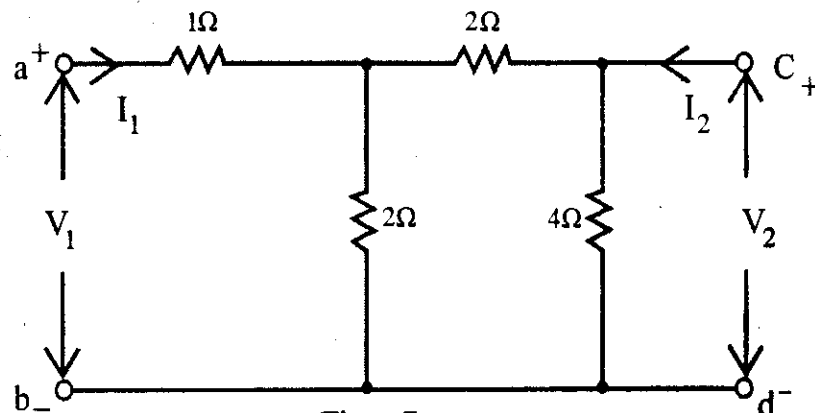


Fig.-7

OR

- Q.4. (a) Two networks have been shown in fig. 8. Obtain the transmission parameters of resulting circuit when both circuits are in cascade. [10]

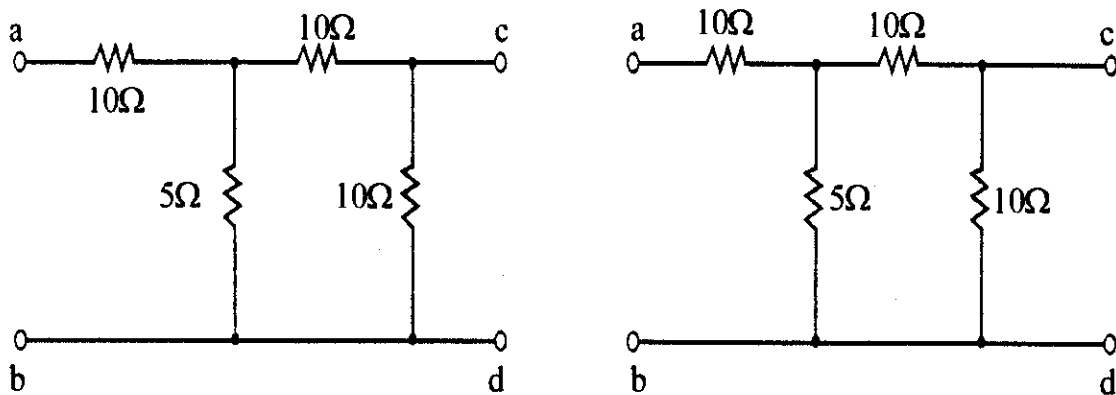


Fig. -8

- (b) How Z- parameters are represented in two port network analysis. [6]

UNIT-V

- Q.5. (a) Illustrate Barlett's bisection theorem with suitable example. [6]
- (b) Design an m-derived high pass filter having a design impedance of 600Ω , cut off frequency of 5 kHz and $m = 0.35$. Also determine the frequency of infinite attenuation. [10]

OR

- Q.5. (a) Design a low pass composite filter to operate with a design impedance 500Ω ,
 $m = 0.2$ and cut off frequency = 2000Hz [8]
- (b) Write short note on importance of active filters in circuit analysis. [8]
-

4E2112	Roll No. _____	Total No of Pages: 3
	4E2112 B. Tech. IV Sem. (Back) Exam., June/July-2014 Electrical Engineering 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.

(Mentioned in form No.205)

1. _____

2. _____

UNIT-I

Q.1. Explain following shell commands of UNIX:

- (a) who
- (b) ls
- (c) head
- (d) tail
- (e) cat

- (f) mv
- (g) expr
- (h) grep

[8×2]

OR

Q.1. Explain following shell commands of UNIX:

- (a) touch
- (b) bc
- (c) sort
- (d) date
- (e) cp
- (f) rm
- (g) cut
- (h) paste

[8×2]

UNIT-II

Q.2. (a) Write and explain modes of operations in vi editor. [8]

(b) Explain set commands available in vi editor. [8]

OR

Q.2. (a) Discuss string replacement commands in vi editor. [8]

(b) Discuss line, word and character movement commands in vi editor. [8]

UNIT-III

- Q.3. (a) State the difference between C++ and Java? Explain byte codes in detail. [8]
- (b) What are the special features of JAVA which make it special? Explain. [8]

OR

- Q.3. (a) Discuss the difference between stand alone Applications & web Applications. Also explain security features of JAVA. [8]
- (b) How JAVA works as a virtual Machine? Explain. [8]

UNIT-IV

- Q.4. (a) How boolean operator works in JAVA [5]
- (b) Explain demotion and promotion in type casting. [6]
- (c) Why Java does not support size of operator. [5]

OR

- Q.4. Write & explain the syntax of all available control statements in JAVA with example. [16]

UNIT-V

- Q.5. (a) What are packages? How packages are important in a JAVA program? [8]
- (b) Explain any five JAVA string handling functions with example. [8]

OR

- Q.5. (a) What is Interface? How does it support the concept of multiple inheritance? [8]
- (b) Write a program to use Interface as a macro. [8]

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4E4174

Roll No. _____

Total No of Pages: 3

4E4174

B. Tech. IV Sem. (Main) Exam., June/July-2014

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.

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Use of following supporting material is permitted during examination.

(Mentioned in form No.205)

1. _____

2. _____

UNIT - I

- Q.1 (a) Explain the scheme & working principle of thermal power plants? [8]
- (b) What are Fissile & Fertile materials? Give example of each. [8]

OR

- Q.1 (a) Derive the efficiency or various power plants. Which one is most efficient & Why? [10]
- (b) Differentiate between nuclear fission & nuclear fusion. [6]

558

UNIT – II

- Q.2 (a) Discuss Green house effect and its impact on environment. [8]
- (b) How can we conserve natural resources? [8]

OR

- Q.2 Write a detailed note on generation of electrical energy by wind, solar and tidal. [16]

UNIT – III

- Q.3 (a) Discuss the significance of chronological load curve. [6]
- (b) Explain the following terms:- [10]
- (i) Demand factor
- (ii) Diversity factor

OR

- Q.3 (a) What are the causes & effects of low power factor? [8]
- (b) Explain the working of synchronous condensers. [8]

UNIT – IV

- Q.4 (a) Discuss the role of load diversity in power system economics. [8]
- (b) How can we calculate generation cost & depreciation of power plants? [8]

OR

- Q.4 Calculate the most economic power factor when
- (a) KW demand is constant. [8]
- (b) KVA demand is constant. [8]

UNIT - V

- Q.5 (a) Differentiate between two part tariff and three part tariff. [8]
- (b) Explain spot pricing with example. [8]

OR

Q.5 Write short note on:-

- (a) Thermal & Gas power plants. [8]
- (b) Flat demand & straight meter rate. [8]

4E4175	Roll No. _____	Total No of Pages: 4
<p>4E4175</p> <p>B. Tech. IV Sem. (Main/Back) Exam., June/July-2014</p> <p>Electrical Engg.</p> <p>4EE5A Electrical Machines-II</p> <p>Common with EX</p>		

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks: 24

Instructions to Candidates:-

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Use of following supporting material is permitted during examination.

1. _____

2. _____

UNIT-I

- Q.1. (a) Derive the basic emf equation for an induced emf per phase for full pitch, concentrated type of winding. [8]
- (b) An alternator runs at 250 rpm and generates an emf of 50 Hz. The winding distribution factors k_d is 0.9597 and coil span factor or pitch factor k_c is 1. All the conductors of each phase are in series and flux per pole is 30mwb. Which is sinusoidally distributed. If the winding is star connected, determine the value of induced emf available across the terminals. [8]

OR

- Q.1. (a) Explain the concept of rotating magnetic field. [8]
- (b) Explain the different ways to eliminate the harmonics effect from generated voltage. [8]

UNIT-II

- Q.2. (a) Explain the construction of a three phase induction motor with neat-drawing of different parts. [8]
- (b) A 4-pole, 3-phase star connected induction motor is supplied from a 50Hz supply. Determine its synchronous speed. On full load, its speed is observed to be 1410 rpm. Calculate its full load slip. When the full load slip become 4%, Calculate the full load speed of the motor. [8]

OR

- Q.2. (a) Explain the equivalent circuit of induction motor and draw basic equivalent circuit and approximate equivalent circuit. [8]
- (b) A 440 volt, 3- ϕ , 50Hz, 6 pole induction motor running at 960 rpm takes 50kW at a certain load. The friction and windage losses = 1.8kW. Stator losses = 1.2kW. Calculate (i) The percentage slip
(ii) The rotor copper loss
(iii) The rotor output
(iv) Efficiency [8]

UNIT-III

- Q.3. (a) Explain the general construction with neat drawing of a single phase induction motor with double revolving field theory. [8]
- (b) What do you mean by split-phase motor? How many types of split phase are there? Explain the principle of operation of any one. [8]

OR

- Q.3. (a) Describe the principle and operation of shaded pole motor with the neat drawing. [8]
- (b) Explain the principle and operation of a.c. servo motor with neat drawing. [8]

UNIT-IV

- Q.4. (a) Give the advantage for providing armature winding on stator circuit rather than rotor circuit and explain the working principle of a two pole synchronous generator. [8]
- (b) Explain power angle characteristic of cylindrical rotor synchronous generator. [8]

OR

- Q.4. (a) Explain the parallel operations of two alternators. Describe any one method by which two alternators could be put in parallel. [8]
- (b) Why almost all large size synchronous machines are constructed with rotating field system type. Why synchronous generator ratings are in kVA and not in kW? [8]

UNIT-V

- Q.5. (a) Describe the power factors control of synchronous motor under: [8]
- (i) Under excitation
 - (ii) Normal excitation
 - (iii) Over excitation
- (b) Describe in brief with a neat drawing the functional operation of synchronous induction motor. Draw the performance characteristics curve when operating at unity p.f. and at 0.8 p.f. leading. [8]

OR

- Q.5. (a) Explain the principle of operation of a 3-phase synchronous motor. Why synchronous motor not Self starting? [8]
- (b) Explain the hunting of synchronous machine. What is the prevention use for eliminating the hunting? [8]
-

4E4176

Roll No. _____

Total No of Pages: **4**

4E4176

B. Tech. IV Sem. (Main/Back) Exam., June/July-2014

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.

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(Mentioned in form No.205)

1. _____

2. _____

UNIT-I

Q.1. (a) Evaluate:- $E = 1 + \frac{1}{2}\delta^2 + \delta\sqrt{1 + \frac{\delta^2}{4}}$ [4]

(b) Using Lagrange's formula find the value of y (10) from the following data [4]

x	5	6	9	11
y	12	13	14	16

(c) The ordinates of the normal curve are given by the following table: [8]

x	0.10	0.15	0.20	0.25	0.30
y	0.1003	0.1511	0.2026	0.2554	0.3093

Calculate y for

(i) $x = 0.14$

(ii) $x = 0.21$

(iii) $x = 0.28$

OR

Q.1. (a) Use Regular Falsi method to find a real root of the equation $x \log_{10} x - 1.2 = 0$ correct to four decimal places. [5]

(b) Solve the following equations by Gauss-Seidel method upto third iterations. [5]

$$27x + 6y - z = 85$$

$$6x + 15y + 2z = 72$$

$$x + y + 54z = 110$$

(c) Fit a straight line to the following data [6]

x	1	2	3	4	6	8
y	2.4	3	3.6	4	5	6

UNIT-II

Q.2. (a) Evaluate $\int_1^2 \sqrt{x - \frac{1}{x}} dx$ by [8]

(i) Trapezoidal rule

(ii) Simpson's 1/3 rule by taking 5 ordinates.

(b) Solve the difference equation: [8]

$$y_n - y_{n-1} + 2y_{n-2} = n + 2^n$$

OR

- Q.2. (a) Using Picard's method, find the fourth order approximate solution at $x = 0.2$ of the problem [8]

$$\frac{dy}{dx} = 1 + xy, \quad y(0) = 0$$

- (b) Given $\frac{dy}{dx} = y - x^2$; $y(0) = 1$; $y(0.2) = 1.12186$; $y(0.4) = 1.4682$; $y(0.6) = 1.7379$, Evaluate $y(0.8)$ using Milne's predictor - corrector method. [8]

UNIT-III

- Q.3. (a) Prove that $\int x J_0^2(x) dx = \frac{x^2}{2} [J_0^2(x) + J_1^2(x)] + C$ [6]
- (b) Find $J_{-5/2}(x)$ [5]
- (c) Prove $\frac{d}{dx} [x^{-n} J_n(x)] = -x^{-n} J_{n+1}(x)$ the recurrence relation for $J_n(x)$ [5]

OR

- Q.3. (a) Show that [8]
- (i) $\int_{-1}^1 P_n(x) dx = 0$; $n \neq 0$
- (ii) $\int_{-1}^1 P_0(x) dx = 2$
- (b) Prove that [8]
- (i) $n P_n(x) = x P'_n(x) - P'_{n-1}(x)$
- (ii) $(2n+1) P_n(x) = P'_{n+1}(x) - P'_{n-1}(x)$

UNIT-IV

- Q.4. (a) In a bolt factory machines A, B and C manufactory respectively 25%, 35% and 40% of the total bolts. Of their output 5, 4 and 2 percent are respectively defective bolts. A bolt is drawn at random from the product and is found to be defective, what is the probability that is was manufactured by machine A, B and C? [8]

- (b) A and B throws alternatively with a pair of dice. The one who throws a first wins. Show that their chances of wining are 9:8 [8]

OR

- Q.4. (a) A car-hire firm has two cars, which it hires out day by day. The demand for a car on each day is distributed as a Poisson distribution with mean 1.5. Calculate the proportion of days on which some demand is refused. [8]
- (b) In a normal distribution 31% of the items are under 45 and 8% are over 64. Find the parameters of the distribution. [8]

UNIT-V

- Q.5. (a) Calculate the Karl Pearson's coefficient of correlation of the following data [8]

x	25	27	30	35	33	28	36
y	19	22	27	28	30	23	28

- (b) Find the inverse Z transform of $\frac{1}{(z-a)^2}$ [8]
- (a) $|z| < a$
- (b) $|z| > a$

OR

- Q.5. (a) Calculate the coefficient of correlation from the following data: [8]

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

- (b) Solve the difference equation by -Z transform [8]
- $$u_{n+2} - 6u_{n+1} + 8u_n = 2^n + 6_n$$

-----x-----x-----

4E2110	Roll No. _____	Total No of Pages: 4
	4E2110 B. Tech. IV Sem. (Back) Exam., June/July-2014 Electrical Engineering 4EE2 Digital Electronics	

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks: 24

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(Mentioned in form No.205)

1. _____

2. _____

UNIT I

Q.1 (a) Explain the following codes with example -

[10]

(i) 8421 code

(ii) 2421 code

(iii) Reflective code

(iv) Sequential code

(b) Convert $[10110]_2$ to Gray code. [6]

OR

Q.1 (a) Construct Hamming code for BCD 0110. Use even parity [8]

(b) For ASCII Code -

(i) Determine the number of parity bits which must be appended to the code to make it an error-correcting code i. e Hamming code.

(ii) Determine the locations of the parity bits. [8]

UNIT-II

Q.2 (a) You have rented a locker in a bank. Express the process of opening the locker in terms of a digital operation. [8]

(b) Which of the following system are analog & which are digital? Why? [8]

(i) Pressure gauge

(ii) An electronic counter used to count persons entering an exhibition

(iii) Clinical thermometer

(iv) Electronic calculator

(v) Transistor radio receiver

(vi) Ordinary electric switch

(vii) Electronic Voting Machine (EVM)

(viii) Multimeter

OR

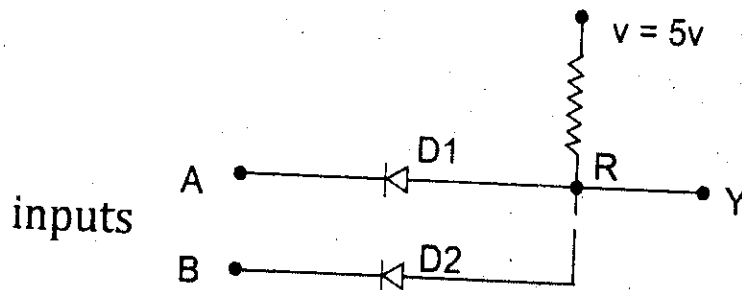
Q.2 (a) Simplify the logic function of following equation using the Quine Mc Cluskey method -

$$f(A,B,C,D) = \sum m (1,3,7,11,15) + d (0,2,5) \quad [10]$$

(b) How will you group eight adjacent ones? [6]

UNIT- III

Q.3 (a) In the diode circuit of figure, the inputs applied are 0 V & 5 V corresponding to low & high respectively.



(i) Determine output Y for all the possible combination of inputs [6]

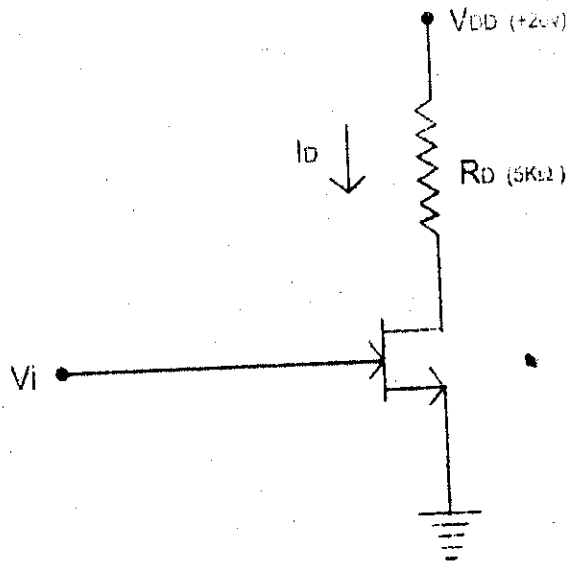
(ii) Does it perform any logic function? If yes, name the logic function. [6]

(b) Draw the diagram of 3 input TTL NAND Gate driving N similar Gates [4]

OR

Q.3 (a) For the circuit shown in figure determine the output voltage V_o for the input voltage V_i of (a) -5V (b) 0V. The output characteristics of the JFET are modified.

Draw the changed characteristic. [8]



- (b) Write short note on CMOS Logic families

[8]

UNIT- IV

- Q.4 (a) Design a 32:1 multiplexer using 16:1 multiplexers & one OR gate.
- (b) Write down the algorithm for performing subtraction using adder.

[6]

[10]

OR

- Q.4 (a) Design a hexadecimal- to - binary encoder using 74148 encoders & 74157 multipliers.
- (b) Write a short note on parity generators.

[10]

[6]

UNIT V

- Q.5 (a) Design a sequence generator to generate the sequence ----- 1101011-----.
- (b) Design a divide - by -6 counter using 7490.

[10]

[6]

OR

- Q.5 (a) Design a 3 - bit synchronous counter using J-K Flip - Flops.
- (b) Design a counter with states 0011 through 1100 using 74169 counter.

[10]

[6]