Reg. No. : ....

Name : ....

IV Semester B.Tech. Degree (Reg./Sup./Imp. – Including Part Time) Examination, May 2013
(2007 Admn. Onwards)
PT 2K6/2K6 CE/ME/EE/EC/CS/IT/AEI 401 :
ENGINEERING MATHEMATICS – III

Time: 3 Hours   Max. Marks : 100

Instruction : *Answer all questions.*

1. a) If f(z) = u + iv is analytic in a region R, prove that u and v are harmonic in R, if they have continuous partial derivatives in R.   5

   b) State and prove the necessary condition for a function to be analytic.   5

   c) If f(z) is analytic in a region R and if C_1 and C_2 are any two paths in R joining two points z_0 and z_1 in R and having no other common points, then show that

   $$\int_{C_1} f(z)\,dz = \int_{C_2} f(z)\,dz \ .$$ 5

   d) Explain with examples :

      1) Isolated singularity   2) Removable singularity.   5

   e) Fit a straight line to the following data by this method of least squares.

x	0	1	2	3	4
y	1	1.8	3.3	4.5	6.3

   5

   f) If $\sigma_x \neq 0$, show that $\rho(X, X) = 1$ and $\rho(-X, X) = -1$.   5

   g) Classify the equation $x^2 \dfrac{\partial^2 u}{\partial x^2} + (1 - y^2) \dfrac{\partial^2 u}{\partial y^2} = 0; -\infty < x < \infty$ and $-1 < y < 1$.   5

   h) Using D'Alembert's method find the deflection of a vibrating string of unit length having fixed ends with initial velocity zero and initial deflection, f(x) = a(x − x³).   5

2. a) i) Constant the analytic function $f(z) = u + iv$, if $u = \dfrac{1}{2} \log(x^2 + y^2)$ by Milne Thompson method.   **8**

   ii) Find the image of the circle $|z - 2i| = 2$ under the map $w = 2z$.   **7**

   OR

b) i) If $u + iv$ is analytic, prove that $\left[\dfrac{\partial^2}{\partial x^2} + \dfrac{\partial^2}{\partial y^2}\right] |f(z)|^2 = 4|f'(z)|^2$.   **7**

   ii) Explain :
   i) Translation
   ii) Rotation and magnification
   iii) Inversion and reflection.   **8**

3. a) i) State and prove Cauchy's Residue Theorem.   **6**

   ii) Evaluate $\displaystyle\int_C \dfrac{4 - 3z}{z(z - 1)(z + 2)}\, dz$ where C is $|z| = \dfrac{3}{2}$ using Cauchy's Residue Theorem.   **9**

   OR

b) i) Find $\displaystyle\int_0^\infty \dfrac{dx}{(1 + x^2)^2}$.   **8**

   ii) Expand in Laurent's series, $f(z) = \dfrac{z^2 - 1}{(z + 2)(z + 3)}$, $2 < |z| < 3$.   **7**

4. a) i) The following data gives the rainfall and discharge in a certain river. Obtain the line of regression of y on x.   **8**

Rainfall x (cm)	1.53	1.78	2.60	2.95	3.42
Discharge y (1000 cc)	33.5	36.3	40.0	45.8	53.5

   ii) The joint probability distribution of two random variables X and Y is given by $f(x, y) = \dfrac{3y + x}{24}$, $x = 1, 2$; $y = 1, 2$. Find

   a) The marginal distributions
   b) Cov(X, Y)
   c) $\rho(X, Y)$.   **7**

   OR

b) i) The joint probability distribution of two discrete random variables X and Y

is given by $f(x, y) = \begin{cases} kxy ; & x = 1, 2, 3 ; y = 1, 2, 3 \\ 0 ; & \text{otherwise} \end{cases}$. Find

   a) k

   b) $P[1 \le X \le 2, Y \le 2]$

   c) $P[Y < 2]$

   d) $P[X = 1]$.   **8**

ii) A club basket ball team will play a 44 game season. 26 of these games are against class A teams + 18 are against class B teams. Suppose that the team will win each game against a class A team with probability 0.4 and will win each game against a class B team with probability 0.7. Assume also that the results from the different games are independent. Approximate the probability that

   a) The team wins 25 games or more

   b) The team wins more games against class A teams than it does against class B teams.   **7**

5. a) i) Derive this 1-dimensional heat equation.   **5**

   ii) A string of length l has its ends fixed. The mid point is taken to a small height h and released from rest at time t = 0. Find the displacement function y(x, t).   **10**

   OR

   b) An infinitely long metal plate of width 1 with insulated surfaces has its temperature zero along both the edges y = 0 and y = 1 at infinity. If the edge x = 0 is kept at fixed temperature. To, find the temperature T at any point (x, y) of the plate in steady state.   **15**

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IV Semester B.Tech. Degree (Reg./Sup./Imp. – Including Part Time) Examination, May 2013
(2007 Admn. Onwards)
PT2K6/2K6 EE/EC/AEI 402 : COMPUTER PROGRAMMING

Time: 3 Hours   Max. Marks : 100

Instruction : *Answer all questions.*

I. a) Write notes syntax rules and comments in C programming with suitable examples.   **(8×5=40)**

   b) Write a program that prints a table of trigonometric values for sin( ), cos( ) and tan( ). The angles in your table should go from 0 to 2π in 20 steps.

   c) Write notes on the relationship between arrays and pointers with suitable examples.

   d) Write notes on dynamic memory allocation with suitable examples.

   e) Write notes on the different data types in java with suitable examples.

   f) Write notes on constructors in java with suitable examples.

   g) Write notes on strings and the most commonly used string methods in java with suitable examples.

   h) Write notes on the byte streams with suitable examples.

II. a) Write notes on the different types of statements available in C with suitable example demonstration for each.   **15**

                              OR

    b) Write a C program to generate random numbers using functions. Don't use the rand( ) function which is in the standard library.   **15**

III. a) Explain in detail the different string related operations and the string handling functions with suitable example programs to demonstrate each of them.   **15**

                              OR

    b) Explain in detail about the self referential structures and with the help of a program explain how the different types of linked lists are implemented.   **15**

IV. a) Explain in detail with suitable examples on how decision making is done with branching control structures in java. **15**

   OR

   b) Write the help of a good programming example, explain in detail the polymorphism and the overriding methods. **15**

V. a) With notes on single and multi dimensional arrays. An election is contested by 5 candidates. The candidates are numbered 1 to 5 and the voting is done by marking the candidate number on the ballot paper. Write a java program to read the ballots and count the number of votes casted for each candidate using an array variable 'count'. In case a number read is outside the range 1 to 5, the ballot should be considered as a 'spoilt ballot" and the program should count the number of spoilt ballot. **15**

   OR

   b) Explain in detail the different file related operations in java with suitable example programs. **15**

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IV Semester B.Tech. Degree (Reg./Sup./Imp. – Including Part Time) Examination, May 2013
(2007 Admn. Onwards)
PT 2K6/2K6 EE 403 : MICROPROCESSORS AND MICROCONTROLLERS

Time : 3 Hours   Max. Marks : 100

I. a) Explain immediate and register indirect addressing modes of 8085.

   b) When do the following 8086 flags set ?

      i) Sign

      ii) Overflow.

   c) Explain the control word of 8253.

   d) Explain the use of the RxD, Rx RDY pins of 8251.

   e) Compare the real mode of 80386 with PVAM.

   f) Write a brief note on paging.

   g) Explain the following pins of 8051 :

      i) $\overline{EA}$

      ii) $\overline{PSEN}$.

   h) Explain the flag register of 8051.   (8×5=40)

II. a) Draw and explain the timing diagram of 8085 for 2050 : STA 2570 H.   15

                                OR

   b) Draw and explain the architecture of 8086.   15

P.T.O.

III. a) With the help of a diagram and a simple assembly language program, explain how push button keys can be interfaced to 8255 PPI. **15**

OR

b) With the help of a neat schematic diagram, explain 8257 DMA controller. **15**

IV. a) Explain the task switching mechanism of 80386. **15**

OR

b) Write a note on various types of branch prediction logic and compare them. **15**

V. a) Explain :

i) Stack management of 8051. **7**

ii) 8051 instructions to manager external memory. **8**

OR

b) With the help of a diagram and a simple assembly language programs, explain how a stepper motor can be interfaced to 8051. **15**

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IV Semester B.Tech. Degree (Reg./Sup./Imp. – Including – Part Time) Examination, May 2013
(2007 Admn. Onwards)
PT2K6/2K6 EE 404 : PULSE AND DIGITAL ELECTRONICS

Time: 3 Hours   Max. Marks: 100

Instruction: *All* questions are *compulsory*.

PART – A

1. 1. Write a note on sweep generates.   5

   2. Explain transistor as a switch.   5

   3. Explain what do you mean by lock range and capture range of PLL.   5

   4. Explain VCO with its internal block diagram.   5

   5. Explain two input CMOS NOR gate.   5

   6. Derive both forms of DeMorgan's theorem.   5

   7. For the given counter in Fig. (i) Q. 7, assume the flipflops are master-slave. If all the flipflops trigger on the positive going edge of a clock pulse and are assumed to be initially cleared, sketch the waveforms at A and C for 10 clock cycles ignoring the propagation delay.   5
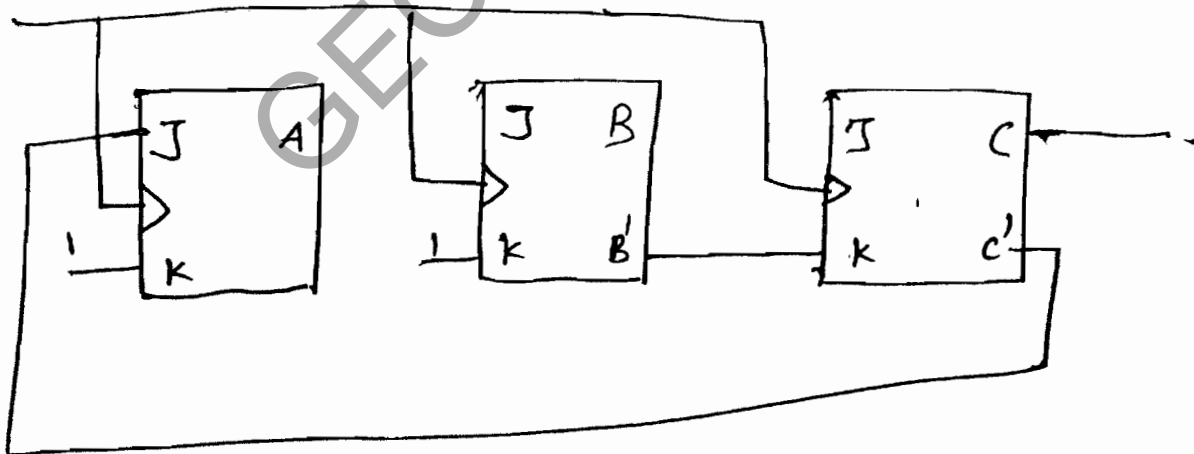

Fig. (i)

   8. Derive the state table for a serial adder.   5

PART – B

2. a) Draw and explain symmetrical and asymmetrical triggering of bistable
multivibrator.   **15**

                                  OR

   b) i) Define forward recovery time and reverse recovery time of diodes.   **6**

      ii) Explain collector coupled astable multivibrator.   **9**

3. a) i) Explain the working of 555 timer as a ramp generator.   **7**

      ii) Write a short note on comparators using op amp and explain any one of its
      application.   **8**

                                  OR

   b) Write short notes on the following :   **15**

      i) Three terminal regulator

      ii) Square wave generator

      iii) Ramp generator.

4. a) Explain schottky TTL.   **15**

                                  OR

   b) Explain BCD to 7-segment decoder and use NAND gate to realize the same.   **15**

5. a) Draw the circuit of 4-bit binary counter using JK flip flop and explain its operation
   with timing diagram.   **15**

                                  OR

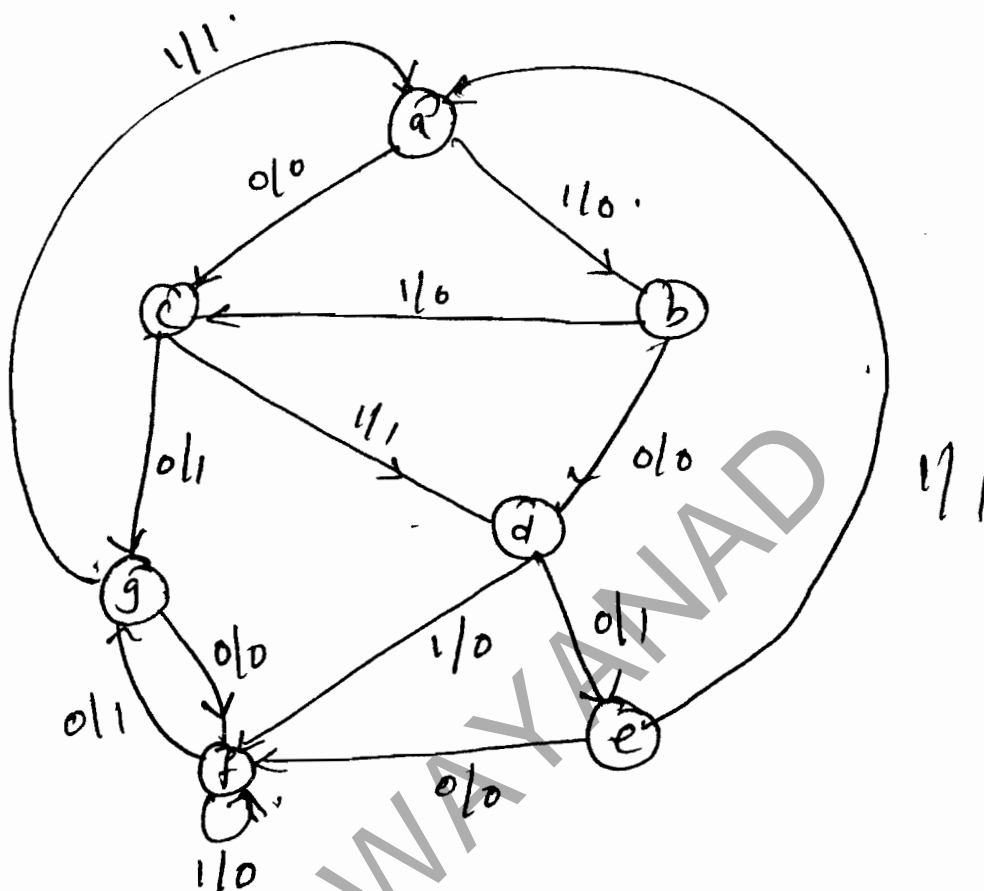b) Design a clocked sequential circuit for the state diagram shown in Fig. (ii). Q. 5. b.

15

Fig. (ii)

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IV Semester B.Tech. Degree (Reg./Sup./Imp. – Including Part Time) Examination, May 2013
(2007 Admn. Onwards)
PT 2K6/2K6 EE 405 : ELECTRICAL MACHINES – I

Time : 3 Hours   Max. Marks : 100

*Instruction : Answer **all** questions.*

I. a) Define coil span, back pitch, front pitch and commutator pitch.

   b) Explain the demagnetising effect of armature reaction.

   c) A 4 pole d.c. generator has a lap-wound armature with 792 conductors. Find the speed at which it should run to generate 240 V on no-load. Flux per pole is 0.012 wb.

   d) What is meant by critical resistance ? How it is determined ?

   e) What is back e.m.f. Discuss its significance.

   f) Sketch the electrical and mechanical characteristics of d.c. series motor.

   g) Derive the condition for maximum efficiency of a transformer.

   h) Draw and explain the phasor diagram of a transformer supplying lagging power factor load.   **(8×5=40)**

II. a) Explain the advantages, disadvantages and applications of lap and wave windings.   7

   b) A 4-pole generator has a wave wound armature with 722 conductors, and it delivers 100 A on full load. If the brush lead is 8° find demagnetising and cross magnetising ampere turns per pole.   8

                     OR

   c) Explain the commutation process in d.c. machine. Describe the various methods to improve commutation.   15

III. a) Draw and explain the power flow diagram of a d.c. generator.   5

b) Explain the conditions for building up of voltage in d.c. shunt generator.   4

c) Sketch and explain the internal and external characteristics of d.c. shunt generator.   6

OR

d) Derive the e.m.f. equation of a d.c. generator.   5

e) Two shunt generators with no load voltage 125 are running in parallel. The external characteristics are linear. The rating of the generators are 25 kW, 119 V and 200 kW 116 V. Find bus bar voltage when the load is 3500 A (total). How the load is divided between them ?   10

IV. a) Derive the torque equation of a d.c. motor.   5

b) Explain the operation and design of three point starter.   10

OR

c) Explain retardation test.   8

d) The no load test on 44.76 kW, 220 V-dc shunt motor gave the following result : In put current = 13.25 A, Field current = 2.55 A, Armature resistance = 0.032, brush drop = 2 V. Estimate full load efficiency.   7

V. a) Draw the circuit diagrams and explain the procedure for conducting O.C. and S.C. tests on single phase transformed. Also explain the determination of equivalent circuit parameters from the test results.   15

OR

b) A 230/40 V, 3 KVA transformer gave the following results :

O.C. Test : 40 V, 2 A, 100 W

S.C. Test : 15 V, 13 A, 120 W

Determine the regulation and efficiency a F.L. 0.8 pf lagging.   10

c) Write a note on switching transients.   5

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IV Semester B.Tech. Degree (Reg./Sup./Imp. – Including Part Time) Examination, May 2013
(2007 Admn. Onwards)
PT 2K6/2K6EE 406 : ELECTRICAL ENGG. MATERIALS

Time : 3 Hours   Max. Marks : 100

PART – A

I. a) Explain electrical contact materials with an example.   5

   b) Explain diamagnetism.   5

   c) Write a short note on dielectric losses.   5

   d) What is polarisation ? Explain.   5

   e) Write a short note on breakdown in liquid dielectrics.   5

   f) Describe the properties of a good insulator.   5

   g) What is photo voltaic connection ? Explain.   5

   h) Explain Organic solar cells.   5

PART – B

II. a) What are the factors affecting the resistivity of electrical materials   8

   b) List the magnetic materials used in electrical machine. Explain them briefly.   7

         OR

   c) What is hysteresis Curve ? Explain.   8

   d) What are hard and soft magnetic materials ? List their applications.   7

III. a) Write a note on piezo electricity.   8

   b) Derive the Clausius - Mosotti expression for elemental dielectric.   7

         OR

   c) Show that the absorption of energy in a dielectric subjected by an alternating field is proportional to the imaginary part of dielectric constants.   8

   d) Derive an expression for electronic polarisation in monoatomic gases.   7

IV. a) Explain the streamer theory of breakdown in gaseous dielectric.　　8

   b) Explain the factors influencing dielectric strength of solid dielectrics.　　7

          OR

   c)　What are the requirements of soft and hard magnetic materials ?　　8

   d) Write short note on Ageing of Insulators.　　7

V. a) Explain the working principle of solar cells. What are the material used in solar cells ?　　15

          OR

   b) Explain the principle of Atomic absorption Spectroscopy with a neat sketch.　　15

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