G 1581 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

Fourth Semester

Branch : Electrical and Electronics Engineering

EE 010 406 – COMPUTER PROGRAMMING [EE]

(New Scheme – 2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Write neat and efficient C-programs wherever needed.
Draw neat flow charts for the programs.

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

1. Explain unary and binary operators in C.
2. Describe *two* ways to include comments in a C program.
3. What is the difference between a function declaration and its definition?
4. How do you access memory address of a variable?
5. Explain how the end of a file is determined.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Distinguish between variables, constants and keywords, giving appropriate examples.
7. Explain how 1D and 2D initialisation can be done, with the help of examples.
8. What is meant by function pointer? Give example and explain.
9. Explain dynamic memory allocation in C.
10. Describe any *five* file handling functions with the help of examples.

(5 × 5 = 25 marks)

Turn over

Part C

Answer **all** *questions.*

Each full question carries 12 *marks.*

11. (a) Describe all the format specifiers of scanf( ) and printf ( ) with examples.

    (b) What is a pseudocode? What are the merits and limitations of pseudocode? Give examples.

(6 + 6 = 12 marks)

Or

12. Write a C program to generate and print all the three-digit Fibonacci numbers.

13. Write a program to accept a message and encode it by adding the value 3 to each character in the input message. Display both the input and encoded messages.

Or

14. Write a C program to read a matrix and interchange any *two* rows *or* columns and display the new matrix.

15. Write a recursive function to obtain the sum of first 100 natural numbers.

Or

16. Write a function using pointers to add two matrices and to return the resulting matrix to the calling function.

17. Write a C program to create a single linked list to read a set of N integers and print the list, where the number N should be obtained from the user.

Or

18. Write a program to sort a set of mark sheets of '*n*' students. The mark sheet consists of the register number, name, marks for 8 subjects and the total marks. Make use of a structure to develop the program.

19. Write a program that copies one text file to another and inserts blank lines between paragraphs in the new file. Paragraphs are identified using a new line character.

Or

20. Write a program that will receive a file name and a line of text as command line arguments and write the text to the file.

[5 × 12 = 60 marks]

G 1538 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

Fourth Semester

Branch : Electrical and Electronics Engineering

EE 010 402—DC MACHINES AND TRANSFORMERS (EE)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

1. What are the functions of interpoles in DC Machines ?
2. How is parallel operation of two series generators made possible ?
3. List out advantages and disadvantages of Swinburne's Test.
4. Give reason why core loss is neglected during SC test.
5. How is the problem of shifting neutral eliminated in star-star connection ?

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Explain the types of armature windings in DC machines.
7. Explain no load characteristics of DC shunt generator. What are the conditions for voltage built up ?
8. With operating characteristics. Compare the performance of shunt and series motors.
9. With phasor diagram, explain the operation of transformer when loaded.
10. Explain how three-phase to two-phase transformation can be accomplished using two transformers.

(5 × 5 = 25 marks)

Turn over

Part C

Answer **all** *questions.*
Each full question carries 12 *marks.*

11. (a) Explain Armature Reaction process in DC machines. (6 marks)

(b) A 6 pole lap wound generator having a commutator ring of diameter 45 cm. runs at 1000 r.p.m. The brush width is 2 cm. and thickness of mica insulation is 0.2 cm. It delivers 115 A and the shunt field current is 5 A. The self inductance of armature coil is 0.1 mH. Determine the reactance voltage of commutation is linear.

(6 marks)

Or

12. With neat sketches, explain the constructional details of DC generator. What are the functions of each part ?

13. (a) Explain the various losses in DC machines. (6 marks)

(b) A shunt generator has FL current of 196 A at 220 V. The stray losses are 720 W and the shunt field resistance is 55 Ω. It has FL efficiency of 88 %, find the armature resistance. Also find the load current corresponding to maximum efficiency.

(6 marks)

Or

14. (a) Explain the load characteristics of shunt generator. (6 marks)

(b) Two shunt generator are operating in parallel. The emf induced in one machine is 260 V and that induced in other machine is 270 V. The total load current supplied is 1800 A. If each machine has an armature resistance of 0.04 Ω and field resistance 50 Ω, determine (i) Terminal voltage ; (ii) Output of each machine.

(6 marks)

15. (a) With neat sketch, explain the working of three point starter. (6 marks)

(b) A 4 pole 500 V shunt motor takes 7A on no load, the no load speed being 750 r.p.m. It has shunt field current of 2 A. Calculate the full-load speed if it takes 122 A on full-load. Armature resistance = 0.2 Ω. Contact drop/brush = 1 V. Armature reaction weakens the field by 4 % on full-load.

(6 marks)

Or

16. (a) Explain the various methods of speed control in DC series motors. (6 marks)

(b) Brake test on a DC shunt motor gave the following results-supply voltage = 240 V, Armature current = 35 A. Field current = 5 A. Tension of the two sides of the brake = 60 kgf and 15 kgf. Diameter of brake pulley = 35 cm., speed = 1000 r.p.m. Determine the output torque, HP output and efficiency.

(6 marks)

17. (a) Explain how efficiency of transformer can be predetermine from Sumpner's test. (6 marks)

(b) Two single-phase transformer with equal turns have impedance of $(0.5 + j3)\ \Omega$ and $(0.6 + j\ 10)\ \Omega$ with respect to secondary. If they operate in parallel, determine how they will share total load of 100 kW at 0.8 pf lagging.

(6 marks)

Or

18. (a) Explain the parallel operation of two single-phase transformers. (6 marks)

(b) A 100 kVA, 6600/330 V, single-phase transformer took 10 A and 436 W at 100 V in SC test with LV shorted. Calculate the approximate voltage drop referred to secondary and the secondary terminal voltage at full load, 0.8 pf lag when primary is connected to 6600 V supply.

(6 marks)

19. Describe in detail, the four phasor groups in three-phase transformer connections. Draw the phasor diagrams and connection schemes for each of these four groups.

Or

20. (a) Explain all day efficiency and how is it determined. (6 marks)

(b) A 500 kVA, three-phase transformer has line voltages 33/11 kV and is delta/star connected. The iron loss is 3 kW. The resistances per phase are 35 Ω and 0.9 Ω on HV side and LV side. Calculate the efficiency of the transformer at 3/4 full-load, 0.8 pf.

(6 marks)

[5 × 12 = 60 marks]

16. Determine the type and order of the unity feedback control system whose open loop transfer functions are :

(a) $G(s) = \dfrac{K(1+2s)(1+4s)}{s^2\left(s^2+2s+10\right)}$.

(b) $G(s) = \dfrac{K}{s^2\left(s^2+4s+200\right)}$.

Find also static error coefficients and the errors for unit step and unit ramp inputs.

17. Examine the stability of the system having characteristic equation :

$3s^4 + 10s^3 + 5s^2 + 5s + 3 = 0$ using Routh's criterion.

Or

18. A feedback system has an open loop transfer function :

$$G(s)\,H(s) = \frac{Ke^{-s}}{s\left(s^2+2s+1\right)}.$$

Determine by the use of Routh stability criterion the maximum value of K for the closed loop system to be stable.

19. Write short notes on :

(a) Impedance converter.

(b) Gyrator.

(c) Ideal transformers.

Or

20. Write short notes on :

(a) Negative Impedance converter.

(b) Impedance, admittance, hybrid and transmission parameters.

(5 × 12 = 60 marks)

G 1545 **(Pages : 4)** **Reg. No.....**

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

Fourth Semester

Branch : Electrical and Electronics Engineering

EE 010 403—LINEAR SYSTEM ANALYSIS (EE)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

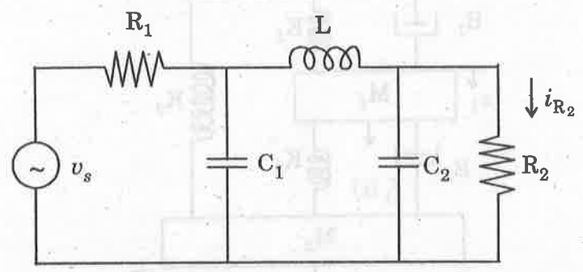
1. Distinguish between continuous time and discrete time systems.
2. What is Mason's Gain formula ?
3. What are the different standard test inputs ?
4. Define negative definiteness of a function.
5. Define transmission parameters.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Obtain the transfer function of the electrical network :



7. Write the state space representation of a linear time invariant system.

8. A unity feedback control system has an open loop transfer function $G(s) = \frac{10}{s(s+2-)}$. Find rise time, % overshoot, peak time, time delay and settling time for a step input of 12 units.

9. Discuss the effect of location of poles on stability.

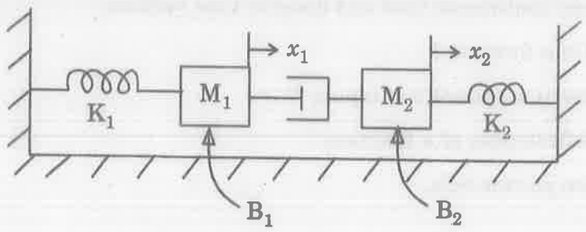
10. Discuss about driving point functions.

(5 × 5 = 25 marks)

Part C

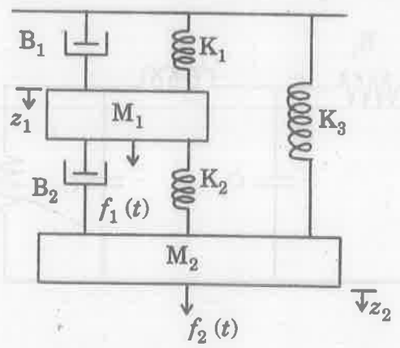
Answer **all** *questions.*
Each full question carries 12 marks.

11. Write the performance equation for the system shown in figure. Find the transfer function $\frac{X_2(s)}{F(s)}$.

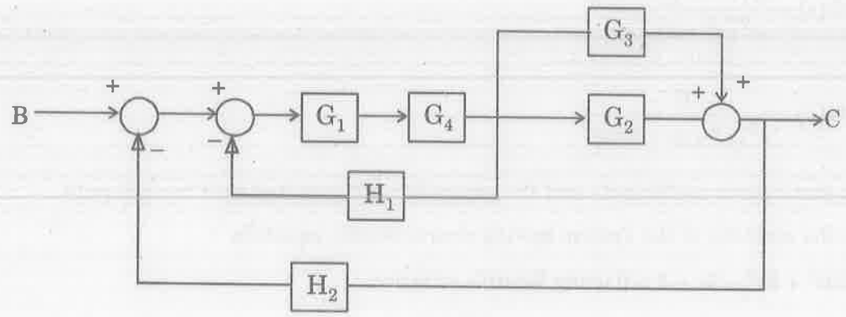


Or

12. Write the equations of motions for the mechanical system :



13. From the block diagram, determine the relationship between R and C by successive block reduction.

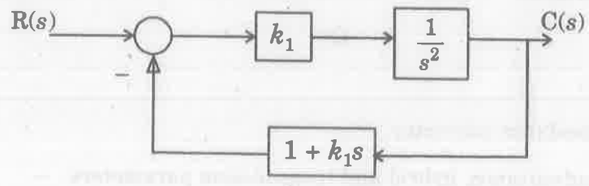


Or

14. Construct a signal flow graph representing the following system of equations :

$$X_2 = a_{12}\,X_1 + a_{22}\,X_2 + a_{42}\,X_4$$
$$X_3 = a_{13}\,X_1 + a_{23}\,X_2 + a_{43}\,X_4$$
$$X_4 = a_{34}\,X_3$$
$$X_5 = a_{35}\,X_3 + a_{45}\,X_4$$

15. For the control system shown in Fig. find the values of K_1 and K_2 so that M_p = 25% and T_p = 4s. Assume unit step input :



Or

20. The electric field intensity in a perfect dielectric medium is given as

$\bar{E} = E_0 \cos(wt - kz)\,\bar{a}_x$ V/m, where E_0 is its peak value, and k is a constant.

Determine :

(a) The magnetic field intensity in the region.

(b) The direction of power flow.

(6 + 6 = 12 marks)

[5 × 12 = 60 marks]

G 1557

(Pages : 4) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

Fourth Semester

Branch : Electrical and Electronics Engineering

EE 010 404—ELECTROMAGNETIC THEORY (EE)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

1. Express $\bar{A} = x\,\bar{a}_y + y\,\bar{a}_x + z\,\bar{a}_y$ at P (–1, 4, 3) in cylindrical form.
2. Define monopole and dipole.
3. Explain current continuity equation.
4. What is magnetic torque ? Explain.
5. State and explain Faraday's law of electromagnetic induction.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. A uniform line charge of infinite length with $\rho_L = 18\text{nC/m}$ lies along z-axis. Find $\bar{E}$ at (6, 8, 2) m.
7. A line charge of 10 nC/m is uniformly distributed along a circular ring of radius 2 m. Calculate the potential at a point on the axis of the ring 5 m from the plane of the ring.
8. Explain the boundary conditions at the boundary of two perfect dielectrics.
9. Derive an expression for the torque on a solenoid situated in a uniform magnetic field.
10. Derive an expression for Maxwell's equations law in integral form, derived from Faraday's law.

(5 × 5 = 25 marks)

Turn over

Part C

Answer **all** *questions.*
Each full question carries 12 *marks.*

11. (a) Define absolute potential. If potential function in free space is V = 10 $xyz + x^2y$. What will be the flux density vector in this region at P (1, 2, – 1) ?

(6 marks)

(b) A circular ring charge lies in $z = 0$ plane with centre at the origin. If the uniform charge density of Q_L = 10 nC/m is residing on it, find the point charge Q at the origin which would produce the same electric field at (0, 0, 5) m.

(6 marks)

Or

12. (a) The electric field at a point P (1, –1, 2) is $\bar{E} = 100\,\bar{a}_x + 40\,\bar{a}_y + 10\,\bar{a}_z$ volt/meter. The point P (1, –1, 2) lies on the conductor-free space boundary. Find the normal component of $\bar{D}$ field and tangential component of $\bar{D}$ field in free space at point P.

(6 marks)

(b) Three point charges Q coulombs are placed at the corner of an equilateral triangle of side l. Calculate the point charge to be placed at the centre of the triangle such that all the charges are in equilibrium.

(6 marks)

13. (a) Calculate the field and potential, both inside and outside of two concentric spheres of radii a and b.

(6 marks)

(b) State and explain Laplace and Poisson's equations in relation with electrostatic field.

(6 marks)

Or

14. (a) If V = $50x^2yz + 20\,y^2$ in free space, find :

(i) V at P (1, 2, 3) and (ii) E_p. (6 marks)

(b) A point charge of 16 nC is located at Q (2, 3, 5) in free space, and a uniform line charge of 5 nC/m is at the intersection of planes $x = 2$ and $y = 4$. If the potential at the origin is 100 Volts, find the potential at P (4, 1, 3).

(6 marks)

15. (a) Obtain the point form of the current continuity equation and explain its significance.

(6 marks)

(b) Three parallel pates are separated by 5 mm, 4 mm and 2 mm and filled with $\epsilon_r = 2, 4$ and 5 respectively. If the area of the plated are 10 cm^2, calculate the effective capacitance.

(6 marks)

Or

16. (a) Clearly explain the concept of polarization of dielectrics and its significance. (5 marks)

(b) Two conducting sphere shells have radii of a = 2 cm and b = 5 cm. The interior is a perfect dielectric with $\epsilon_r = 10$:

(i) Find the capacitance.

(ii) If a portion of the dielectric is now removed so that $\epsilon_r = 1$ for $0 < \theta < \pi/6$ and $\epsilon_r = 10$ for $\pi/6 < \theta < \pi$, find the capacitance.

(7 marks)

17. (a) Find the magnetic field intensity at the center of a square loop of side L carrying a current of magnitude I.

(6 marks)

(b) The magnetic flux passing perpendicular to the plane of a coil is varying according to the relation $\phi_B = 6t^2 + 7t + 1$. What is the magnitude of e.m.f. induced in the coil when t = 2 sec ?

(6 marks)

Or

18. (a) State and prove Stoke's theorem for magnetic field. (5 marks)

(b) Show that $\bar{B}$ field at the ends is half of that at the center of a long solenoid. Hence find $\bar{B}$ for a toroid of radius R.

(7 marks)

19. (a) Explain the significance of Poynting vector. (5 marks)

(b) A plane wave is incident normally on a large sheet of copper. If the frequency and peak $\bar{E}$ of the incident wave is 100 MHz and IV/m respectively, find the power absorbed per unit area by the copper sheet.

(7 marks)

Or

G 1610 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

Fourth Semester

Branch : Electrical and Electronics Engineering

ELECTRICAL MACHINES—I (E)

(Old Scheme—Prior to 2010 Admissions)

[Supplementary/Mercy Chance]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 4 *marks.*

1. What is armature reaction ? What are its effects ?
2. What do you mean by excitation of a d.c. machine ?
3. Why the voltage drop due to load in a d.c. separately excited generator is less than in a d.c. shunt generator ?
4. Explain power flow diagram of a d.c. generator.
5. Explain the flux control method for the speed control of d.c. shunt motor.
6. What are the advantages and disadvantages of Hopkinson test ?
7. Why the transformer cores are laminated ?
8. How harmonics are produced in a transformer ? What are its effects ?
9. Explain all day efficiency ?
10. Compare the weight of coper used in a two-winding transformer and an autotransformer.

(10 × 4 = 40 marks)

Part B

Answer **all** *questions.*
Each full question carries 12 *marks.*

11. (a) Define the following terms with reference to armature winding of d.c. machine :

(i) Pole pitch ; (i) Front pitch ; and (iii) Commutator pitch.

(6 marks)

Turn over

(b) Find the number of turns required on each commutating pole of a 5 kW, 230 V, 4 pole separately excited d.c. generator having a wave connected armature with 564 conductors. The flux density in the commutating pole air gap is 0.15 Wb/m.^{2} at full-load and length of gap is 0.25 cm. Neglect the ampere-turns required for iron parts of the commutation pole magnetic circuit.

(6 marks)

Or

12. (a) Differentiate between lap winding and wave winding. (4 marks)

(b) An 8-pole lap wound armature rotated at 350 rpm is required to generate 260 V. The useful flux per pole is 0.05 Wb. The armature has 120 slots. Calculate a suitable number of conductor per slot and hence determine the actual value of flux required to generate the same voltage.

(8 marks)

13. (a) Explain how armature reaction produces cross magnetisation and demagnetisation effect.

(6 marks)

(b) A 110 V d.c. shunt generator delivers a load current of 50 A. The armature resitance is 0.2 Ω and the field circuit resistance is 55 Ω. The generator rotating at a speed of 1800 rpm has 6 poles lap wound and has a total of 360 conductors. Calculate

(i) the no-load voltage in the armature; and

(ii) the flux per pole.

(6 marks)

Or

14. (a) Explain the methods of improving commutation with relevant figures. (6 marks)

(b) A 440 V d.c. compound generator has an armature, series field, and shunt field resistances of 0.5 Ω, 1.0 Ω and 200 Ω respectively. Calculate the generated voltage while delivering 40 A to external circuit for both long shunt and short shunt connections.

(6 marks)

15. (a) What are the drawbacks of three-point starter ? Describe a four-point starter with a neat sketch.

(6 marks)

(b) A 4-pole d.c. shunt motor working on 250 V takes a current of 2A when running at 1000 rpm. What will be its back emf, speed and percentage speed drop if the motor takes 51A at a certain load ? Armature and shunt field resistances are 0.2 Ω and 250 Ω respectively.

(6 marks)

Or

16. (a) What are the losses that occur in d.c. machines ? Derive the condition for maximum efficiency of a d.c. machine.

(6 marks)

(b) When running on no-load, a 400 V shunt motor takes 5A. Armature resistance is 0.5 Ω and field resistance 200 Ω. Find the output of the motor and efficiency when running on full-load and taking a current of 50 A. Also, find the percentage change in speed from no-load to full load.

(6 marks)

17. (a) Explain different methods of cooling of transformers. (4 marks)

(b) A 100 kVA transformer is provided with tap changer on the primary side. Find the tap setting, for maintaining rated voltage on the secondary side for loads of (i) 90 kVA at 0.8 pf lag and (ii) 100 kW at 0.8 pf lag (pu leakage impedance of transformer is 0.0075 + j 0.09).

(8 marks)

Or

18. The full-load voltage drops in a 1ϕ transformer are 2 % and 4 % respectiely due to resistance and leakage reactance. The full-load ohmic loss is equal to the iron loss. Calculate :

(i) The efficiency on full-load at UPF ;

(ii) The full-load pf at which voltage drop is maximum; and

(iii) The load pf at which voltage drop is zero.

(3 × 4 = 12 marks)

19. (a) Explain, with the help of phasor diagram, how two-phase supply can be obtained from three-phase supply using Scott connection.

(6 marks)

(b) A 11500/2300 V transformer is rated at 100 kVA as a two-winding transformer. If the windings are connected in series to form an autotransformer, what will be the possible voltage ratios and output ? Also calculate the saving in conductor material.

(6 marks)

Or

20. A 3-phase, step down transformer is connected to a 6.6 kV mains and takes 10 A. Calculate the secondary line voltage, line current and output for the following connection if ratio of turns/phase = 12 :

(i) Δ – Δ. (ii) Δ – Y.

(iii) Y – Δ. (iv) Y – Y.

[5 × 12 = 60 marks]