G 2097 (Pages 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2010

Fourth Semester

Branch : Electrical and Electronics Engineering

ELECTRONIC CIRCUITS (E)

(2008 admissions)

(Regular/2007 admissions—Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*

Each question carries 4 *marks.*

1. Define stability factor. Explain its significance.
2. Compare FET and BJT.
3. Explain, how h-parameters are obtained from the state characteristics.
4. Explain the situations where cascading of amplifiers is required.
5. What are the effects of negative feedback ?
6. Discuss the applications of Hartley and Colpitt's oscillators.
7. Explain the basic principle of an astable multivibrator.
8. Explain with diagrams the working of a slicer circuit.
9. Compare the characteristics of small signal and power amplifiers.
10. Explain how the efficiency of a power amplifier is defined.

(10 × 4 = 40 marks)

Part B

Answer **all** *questions.*

Each question carries 12 *marks.*

11. (a) Explain with diagrams the biasing techniques used for BJT.

Or

(b) Explain with diagrams the principle of operation and characteristics of FET.

Turn over

12. (a) Obtain the *h*-parameter equivalent circuit of a transistor amplifier in CE mode. Derive expressions for voltage gain, current gain and input impedance.

Or

(b) Explain the frequency responses of single stage and multistage amplifiers. Discuss the effects of different components on the frequency response.

13. (a) Explain with diagrams the different types of feedback amplifiers.

Or

(b) Explain with figures the principle of operation of a Hartley Oscilator. Derive its frequency of oscillation.

14. (a) Design an astable multivibrator to generater a square wave of 1.5 kHz.

Or

(b) Explain with figures the principle of operation of transistor sweep circuit. Derive its expression for sweep voltage.

15. (a) Explain with a diagram the principle of operation of a Class AB amplifier. Discuss its applications.

Or

(b) Explain with circuit diagram the principle of operation of a push pull amplifier.

(5 × 12 = 60 marks)

G 2114 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2010

Fourth Semester

Branch : Electrical and Electronics Engineering

COMPUTER PROGRAMMING (E)

(2008 admissions—Regular/2007 admissions—Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. Differentiate between keywords and identifies. Give examples for each.
2. What are short hand assignment operators ? Explain their advantages.
3. Discuss the uses of break and continue statements.
4. What is a function ? What are the different types ? Discuss their uses.
5. Explain the methods of initializing arrays.
6. What are the operations performed on character strings ?
7. Explain how pointers are declared and initialized ?
8. Describe the use and limitations of the functions get C and put C.
9. Differentiate between structure and Union.
10. Discuss the basic concept of linked list.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. (a) Explain with examples the data types used in C.

Or

(b) Write a program in C to find whether a given triplet represents a triangle or not. if yes, find its area and perimeter.

Turn over

12. (a) Discuss the various variable storage classes in C. Briefly describe the scope and logavity of each of the above class of variables.

Or

(b) Write a function prime that returns 1 if its argument is a prime number and returns zero otherwise. Write the main program also.

13. (a) Two matrices A and B are conformable for multiplication. Write a program to read the matrices A and B and to produce the matrix C such that C = A × B.

Or

(b) Write a program to arrange the names in a list in the alphabetic order.

14. (a) Explain with examples how pointers could be used to reduce the length and complexity of programs.

Or

(b) Write a program to copy the contents of one file into another.

15. (a) Explain with a program the method of sending an entire structure as a parameter to a function.

Or

(b) Explain with examples the uses of command line arguments.

(5 × 12 = 60 marks)

G 2122 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2010

Fourth Semester

Branch : Electrical and Electronics Engineering

ELECTRICAL AND ELECTRONIC INSTRUMENTS (E)

[2008 admissions—Regular/2007 admissions—Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

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

1. Sketch the curves showing deflection versus time for indicating instrument for under damping, critically damping and overdamping. Explain why overdamping is not used.
2. Describe gravity control.
3. Discuss the advantages and disadvantages of permanent magnet moving coil instruments.
4. What are the types of errors in moving iron instrument ? Explain any *two* type.
5. Explain the sources of errors in single-phase induction type energymeter.
6. Describe the special features incorporated in electrodynamometer type wattmeter so that it can be used for low power applications.
7. Draw the circuit diagram of an electronic voltmeter using full-wave rectifier.
8. Explain the function of the following controls of CRO :
   (i) Focus ; and
   (ii) Synchronization.
9. Give the symbols for the following instruments :—
   (i) Moving permanent magnet.
   (ii) Moving iron.
   (iii) Iron cored electrodynamic.
   (iv) Electrostatic.
10. Describe an instrument for measuring frequency.

(10 × 4 = 40 marks)

Part B

Answer **either** *(a)* **or** *(b) of each module.*
Each full question carries 12 *marks.*

Module I

11. (a) Discuss the construction and operation of a typical indicating instrument. (12 marks)

Or

Turn over

(b) Explain the following :—

(i) Spiral control. (4 marks)

(ii) Air friction damping. (4 marks)

(iii) Torque to weight ratio. (4 marks)

Module II

12. (a) (i) Derive the torque equation of a permanent magnet moving coil instrument. (6 marks)

(ii) Explain the design of multipliers for extending the range of an instrument. (6 marks)

Or

(b) Explain the construction and working of a moving iron (repulsion type) instrument. (12 marks)

Module III

13. (a) Describe the construction and working of electrodynamometer type voltmeter.

Or

(b) Explain the construction and theory of operation of induction type single-phase energy meter. (12 marks)

Module IV

14. (a) Discuss the principle of operation, characteristics and applications of electrostatic voltmeter.

Or

(b) Describe a multichannel oscilloscope. Explain its uses. (12 marks)

Module V

15. (a) Discuss the constructional details and working of a power factor meter.

Or

(b) Explain the construction and working of a synchroscope. (12 marks)

[5 × 12 = 60 marks]

G 2106 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2010

Fourth Semester

Branch : Electrical and Electronics Engineering

ELECTRICAL MACHINES—I (E)

[2008 admissions—Regular/2007 admissions—Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

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

1. Derive the e.m.f. equation of a d.c. generator.
2. Explain the types of windings in DC machines.
3. Draw and explain the magnetisation characteristics of DC shunt generator.
4. Write short note on back e.m.f. of DC motor.
5. Explain the different types of DC motor with their application.
6. Explain the requirement of starter for a DC motor.
7. Explain the principle of operation of I phase transformer.
8. Explain the losses in a transformer.
9. Explain the significance of all day efficiency in transformers.
10. Briefly explain the different connections of three-phase transformers.

(10 × 4 = 40 marks)

Part B

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

Module 1

11. (a) (i) Explain armature reaction in DC machines. (6 marks)

(ii) A 90 kW, 450 V, 4 pole, d.c. shunt generator has a wave wound armature of 640 conductors. If the brushes are given an actual lead of 8°, determine the demagnetising and cross magnetising ampere-turns/pole. Assume the resistance of the shunt field winding is 45 Ω. (6 marks)

Or

(b) (i) Explain commutation process in DC machines. (7 marks)

(ii) Explain the methods to improve commutation. (5 marks)

Turn over

Module 2

12. (a) (i) Explain the load characteristics of a DC shunt generator. (6 marks)

(ii) A short shunt compound generator supplies a load current of 10 Amps at 250 V. The generator has the following winding resistances shunt field 130 Ω, armature 0.1 Ω and series field 0.1 Ω. Find the e.m.f. generated if the brush drop is 1 V/brush. (6 marks)

Or

(b) A 250 kW 240 V generator is to be compounded such that its voltage rises from 220 V at no-load to 240 V at full-load. When series field is cut out and shunt field is excited from an external source then from the load test it is found that the rise in voltage can be obtained by increasing the exciting current from 7A at no-load to 12 A at full-load. Given shunt turns / pole = 650 series turns/pole = 4 and resistance of series winding 0.006 Ω. If the machine is connected long shunt, find the resistance of the series diverter. (12 marks)

Module 3

13. (a) (i) Derive an expression for the torque of a DC motor. (6 marks)

(ii) Determine the value of torque in Nm of a 4 pole motor having 774 conductors two paths in parallel, flux of 24 mWb per pole when the total armature current is 50 amps. (6 marks)

Or

(b) (i) Draw the sketch of a 3-point starter and explain its operation. (6 marks)

(ii) A series motor with an unsaturated magnetic circuit and 0.5 Ω total resistance when running at a certain speed takes 60 Amps at 500 V. If the load torque varies as the cube of speed, calculate the resistance required to reduce the speed by 25 %. (6 marks)

Module 4

14. (a) (i) Explain the method of predetermining the efficiency and regulation of a single-phase transformer by OC and SC tests. (6 marks)

(ii) A 100 kVA transformer rated at 3,300/400 V has an efficiency of 97.5 % both at full-load and 0.75 times full-load at a p.f. of 0.8 in both the cases. If the no-load p.f. is 0.3 and the regulation at full-load and 0.8 p.f. lag 3 % draw the equivalent circuit of the transformer with all the values of parameters. (6 marks)

Or

(b) (i) Draw the vector diagram of a transformer at lagging load and explain. (6 marks)

(ii) In a 60 kVA transformer the full-load Cu loss is 900 W and the iron loss is 600 W. Determine the efficiency at full-load at 0.9 p.f. lagging. (6 marks)

Module 5

15. (a) (i) Explain the Scott connection method of obtaining two single-phase power circuits from a three-phase circuit. (6 marks)

(ii) Explain clearly an autotransformer. (6 marks)

Or

(b) (i) Write short note on the different cooling methods of transformer. (6 marks)

(ii) Explain the principle of operation of on load tapchanging transformers. (6 marks)

[5 × 12 = 60 marks]

G 2085 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2010

Fourth Semester

ENGINEERING MATHEMATICS—III (CMELRPTANUS)

(Common for all Branches)

[2008 admissions—Regular/2007 admissions—Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Answer **one** *full question from each module.*
Statistical tables permitted.

Module 1

I. (a) Solve $\frac{d^2y}{dx^2} + 4\frac{dy}{dx} + y = \sin 4x \sin 2x$. (7 marks)

(b) Solve $\left(D^2 - 2D + 1\right) y = e^{-2x} \cos 2x + \left(2x^2 + 1\right) e^x$. (7 marks)

(c) Solve $x^2y'' + 5xy' + 4y = \cos(2 \log x)$. (6 marks)

Or

II. (a) Solve $\left(D^2 + 1\right) y = \left(x^2 - 1\right) \cos 2x$. (7 marks)

(b) Solve by the method of variation of parameters $y'' + y = \text{cosec } x$. (6 marks)

(c) Solve the system of simultaneous linear equations

$$(5D + 4)x - (2D + 1)y = e^{-t}$$
$$(D + 8)x - 3y = 5e^{-t}$$

where $D = d/dt$. (7 marks)

Module 2

III. (a) Form the partial differential equation from $z = (x - a)^2 + (y - b)^2$. (6 marks)

(b) Solve $\left(x^2 - y^2 - z^2\right) p + 2xyq = 2xz$. (7 marks)

(c) Solve $\frac{\partial^2 z}{\partial x^2} = \frac{\partial^2 z}{\partial x \partial y} = \sin x \cos 2y$. (7 marks)

Or

IV. (a) Solve $\left(p^2+q^2\right)y = qz$. (6 marks)

(b) Solve $\frac{\partial^3 z}{\partial x^3} - 3\frac{\partial^2 z}{\partial x \partial y} + 4\frac{\partial^3 z}{\partial y^3} = e^{x+2y}$. (7 marks)

(c) Find the solution of the one-dimensional wave equation using the method of separation of variables. (7 marks)

Module 3

V. (a) Express $f(x) = \begin{cases} 1, & \text{for } 0 \le x \le \pi \\ 0, & \text{for } x > \pi \end{cases}$ as a Fourier sine integral and hence evaluate

$$\int_0^{\infty} \frac{1-\cos(\pi\lambda)}{\lambda} \sin(\lambda x)\, d\lambda.$$

(10 marks)

(b) Find the Fourier cosine transform of $f(x) = \frac{1}{\left(1+x^2\right)}$ and hence derive the Fourier sine transform of $\phi(x) = \frac{x}{\left(1+x^2\right)}$. (10 marks)

Or

VI. (a) Find the Fourier transform of $f(x) = \begin{cases} 1-x^2, & |x| \le 1 \\ 0, & |x| > 1 \end{cases}$ and hence evaluate

$$\int_0^{\infty} \left\{\frac{x\cos x - \sin x}{x^3}\right\} \cos\left(\frac{x}{2}\right) dx.$$

(8 marks)

(b) Find the Fourier sine transform of $\frac{1}{x\left(x^2+a^2\right)}$. (6 marks)

(c) Find the Fourier cosine transform of $e^{-x^2/2}$. (6 marks)

Module 4

VII. (a) Define binomial distribution. Find the mean and variance of the binomial distribution. (10 marks)

(b) In a normal distribution 7 % of the items are under 35 and 10 % of the items are above 55. Find the mean and variance of the distribution. (10 marks)

Or

VIII. (a) The probability that a pen manufactured by a company will be defective is 0.15. A random sample of 10 pens are chosen. What is the probability that in the sample (i) not more than one is defective ; (ii) at least 7 are good ; and (iii) all are good. (10 marks)

(b) Fit a Poisson distribution for the following data and hence calculate the theoretical frequencies:—

x :	0	1	2	3	4	5
f :	142	156	69	27	5	1

(10 marks)

Module 5

IX. (a) A normal population has a mean 0.1 and S.D. 2.1. Find the probability that the mean of a sample of size 900 will be negative. (10 marks)

(b) A random sample of size 18 is taken from a normal population with mean 28 and variance 49. Find the probability that the sample variance S^2 will be less than the population variance. (10 marks)

Or

X. (a) In a random sample of size 500, the mean is found to be 20. In another independent sample of size 400, the mean is 15. Could the samples have been drawn from the same population with S.D. 4. (10 marks)

(b) In a large city A, 20 % of a random sample of 900 school boys had a slight physical defect. In another city B 18.5 % of a random sample of 1600 school boys had the same defect. Is the difference between the proportions significant. (10 marks)

[5 × 20 = 100 marks]

G 2088 **(Pages : 3)** **Reg. No.....**

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2010

Fourth Semester

Branch : Electrical and Electronics Engineering

NETWORK ANALYSIS AND SYNTHESIS (E)

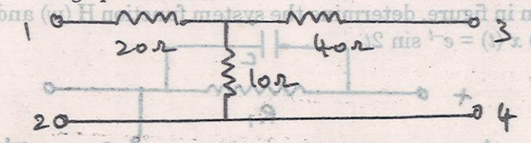
[2008 admissions—Regular/2007 admissions—Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

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

1. What is a Gate function ? Obtain its Laplace Transform. What is the importance of Gate function ?
2. State and explain the initial value and final value theorems of Laplace Transform.
3. Explain frequency spectrum of periodic waveforms.
4. Obtain the Fourier Transform of (i) Unit Impulse function $\delta(t)$; (ii) $f(t) = 1$.
5. What are the restrictions on poles and zeroes for driving point functions ?
6. What is a negative impedance converter ? Explain.
7. Explain the characteristic of ideal low pass, high pass, band pass and band stop filters.
8. Calculate the image parameters of the network shown in figure.



9. Explain the properties of positive real functions.
10. Discuss Foster's and Cauer realizations of LC immitances.

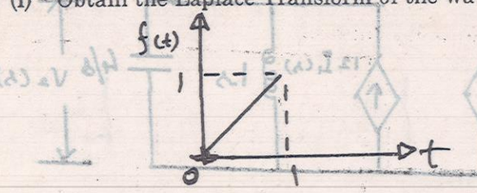
(10 × 4 = 40 marks)

Part B

Answer **either** *(a)* **or** *(b) section from each module.*
Each question carries 12 *marks.*

Module I

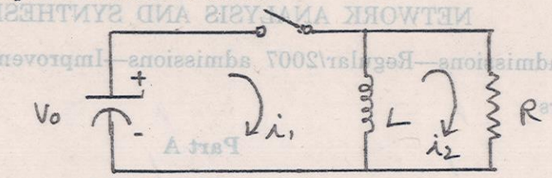
11. (a) (i) Obtain the Laplace Transform of the waveform shown in figure.



(ii) Determine the Inverse Laplace transform of $F(s) = \dfrac{s}{(s+1)^2(s+4)}$.

Or

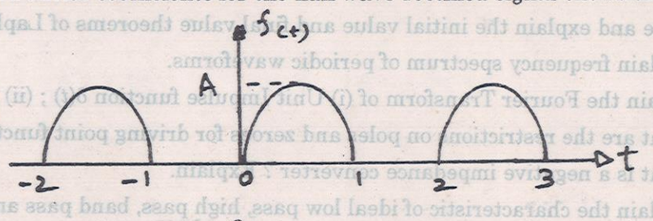
(b) (i) In the circuit shown in figure, C is charged to V_0 and the switch is closed at $t = 0$. Solve for i_1 and i_2 using Laplace Transform method :



(ii) State and explain Convolution Integral.

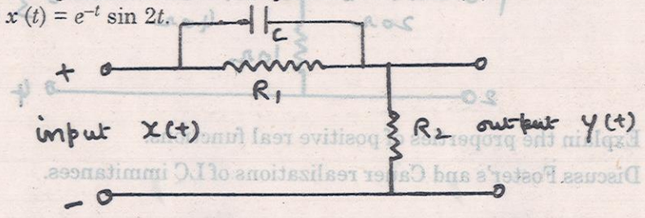
Module II

12. (a) Find the complex Fourier coefficients for the half wave rectified signal shown in figure.



Or

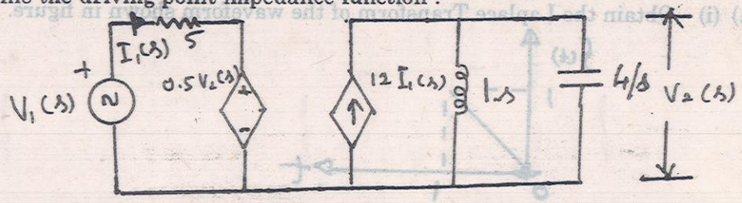
(b) For the network shown in figure, determine the system function H (w) and hence its response to (i) $x(t) = e^{-t}$ and (ii) $x(t) = e^{-t} \sin 2t$.



Module III

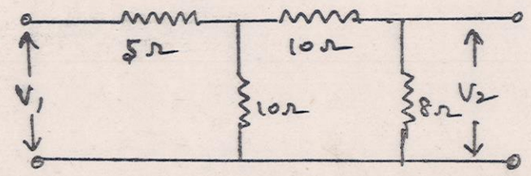
13. (a) (i) A transfer function is given by $z(s) = \dfrac{4s(s+30)}{(s^2+9)(s+2)}$. Find its pole zero plot.

(ii) Determine the driving point impedance function :



Or

(b) Find the admittance and hybrid parameters :



Module IV

14. (a) A constant K low-pass filter has 2.4 kHz cut-off frequency and design resistance R_0 is 650 Ω. Design the filter and determine the frequency at which this filter would give 20 dB attenuation. Also calculate its characteristic impedance pass band and stop band.

Or

(b) Determine the T and π sections of an m derived high pass filter having $f_c = 3$ kHz, $f_\alpha = 2.7$ kHz and $R_0 = 600$ ohms.

Module V

15. (a) (i) Test if the polynomial $s^3 + 6s^2 + 12s + 8$ is Hurwitz.

(ii) Test for LC immitance. Discuss the reasons :

$$\frac{s\left(s^2+9\right)}{\left(s^2+1\right)\left(s^2+16\right)}.$$

Or

(b) Synthesize the network function $F(s) = \dfrac{(s+1)(s+3)}{(s+2)(s+4)}$ in Foster forms I and II. (series RL impedance and parallel RC admittance).

(5 × 12 = 60 marks)