G 568 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2014

Fourth Semester

Branch : Electronics and Communication/Applied Electronics and Instrumentation/ Electronics and Instrumentation Engineering

ELECTRONIC CIRCUITS—II (LAS)

(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. Explain which capacitance-emitter or collector junction capacitance affects the upper cut-off frequency of a CE amplifier critically ? Why ?
2. What is the trade-off between gain and bandwidth of an RC coupled amplifier ? Explain its figure of merit.
3. Draw the generalised block diagram of a feedback amplifier and identify each block. State their functions.
4. List the four properties - Z_i, Z_o, A_i, A_v of a Darlington pair amplifier.
5. In a transistorised Hartely oscillator, the two inductances are 2 mH and 20 μH while the frequency is to be changed from 630 kHz to 1050 kHz. Calculate the range over which the capacitor is to be varied ?
6. Draw the circuit diagram of a tuned collector oscillator and explain its working.
7. What are the differences between the astable and monostable multivibrator circuits and their applications.
8. What is meant by hysteresis voltage in a Schmitt trigger ? How it is measured ?
9. Mention a few applications of voltage and current time base circuits.
10. Why do you require a complementary-Symmetry amplifier in a power amplifier circuit.

(10 × 4 = 40 marks)

Turn over

Part B

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

11. Derive the *r*-parameter equivalent circuit for a CE transistor and deduce the relationship of the *r*-parameters with the *h*-parameters.

Or

12. Draw the circuit diagram of a double tuned CE amplifier and explain the working with the help of its frequency response curve. Discuss its applications.

13. With the help of necessary equations explain the effect of voltage series feedback in the following performance measures of a BJT amplifier (i) gain stability ; (ii) bandwidth ; (iii) distortion ; (iv) noise ; (v) input resistance ; and (vi) output resistance.

Or

14. With a neat emitter coupled difference amplifier circuit diagram, explain how the problem of drift is overcome ? Explain its difference and common mode operations ?

15. With a neat circuit diagram, explain how Barkhausen conditions are satisfied in a transistorised Wien bridge oscillator. Derive the expressions for its frequency of oscillation and amplifier gain.

Or

16. A crystal has L = 0.33 H, C_1 = 0. 065 pF, C_h = IPF and R = 5.5 KΩ. Find the series resonant frequency and Q factor of the circuit. Explain the operation of the circuit.

17. Draw the circuit of a Schmitt trigger and design it for the following specifications :

$V_{cc} = 15V$, UTP = 5V, $I_{c_2} = 5\ mA$, LTP = 3V. Determine $R_1, R_2, R_E, R_{c_1}, R_{c_2}$ and R_B.

Or

18. With neat circuit diagram and necessary waveforms, explain how a BJT bistable multivibrator can be used as a frequency divider ?

19. Sketch the circuit of a class AB transformer coupled power amplifier and explain its working. With waveforms explain the differences between the class B and class AB circuits.

Or

20. With a generalised block diagram, explain how constant current charging is obtained in a miller sweep configuration. With the BJT circuit and waveforms, explain how linear sweep is obtained in the Miller sweep generator.

(5 × 12 = 60 marks)

G 558 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2014

Fourth Semester

Branch : Electronics and Communication/Applied Electronics and Instrumentation/Electronics and Instrumentation Engineering

COMMUNICATION ENGINEERING—I (L, A, S)

(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. A 500 W carrier is simultaneously modulated by two audiowaves with modulation percentages 35 and 45 respectively. What is the total power radiated ?
2. Why FM is found to be more noise immune than AM ?
3. What is pre-emphasis ? Why it is done ?
4. What are the limitations of modulated transistor amplifiers ? When are they used ?
5. With block diagram, explain TRF receiver.
6. Calculate the image frequency of an AM radio broadcast station, operating with a carrier of 920 kHz. What is its significance ?
7. Compare various modified SSB systems.
8. What do you mean by companding ? What are its advantages ?
9. What is ASTIC ? What is its need ?
10. What are the merits and demerits of powerline communications ?

(10 × 4 = 40 marks)

Part B

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

11. The output voltage of a transmitter is given by 400 (1 + 0.4 cos 6280 t) cos (3.14 × 10^7 t). This voltage is fed to an antenna load of 600 Ω resistance. Calculate (a) carrier frequency ; (b) modulating frequency ; (c) modulated frequency ; (d) carrier power ; (e) total power output ; (f) derive the equations used.

Or

Turn over

12. (a) Describe the spectrum of FM wave and give its properties. (9 marks)

(b) When a 50.4 MHz carrier is frequency modulated by a sinusoidal AF modulating signal, the highest frequency reached is 50.405 MHz. Calculate :

(i) the frequency deviation produced.

(ii) carrier swing of the wave.

(iii) lowest frequency reached.

(3 marks)

13. Describe the circuit of FET reactance modulator and derive the related equations.

Or

14. Explain the generation of wide band FM using Armstrong technique. Give circuit diagrams of any four blocks in it.

15. With the neat circuit diagrams, describe slope detector and ratio detector. Compare and contrast between their performances.

Or

16. With appropriate circuit diagrams, explain (i) Simple AGC circuit ; (ii) delayed AGC circuit. Compare and contrast between their performances.

17. Explain the need for VSB in TV system, in contrast to DSB and SSB. With the transmitter and receiver response characteristics explain how VSB correction is made.

Or

18. With necessary diagrams, explain two different methods of SSB generation. Compare them.

19. With neat block diagrams, explain how a call is established between two subscribers of a land line telephone.

Or

20. Describe the working of a 500 line EPABX.

(5 × 12 = 60 marks)

G 548 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2014

Fourth Semester

Branch : Electronics and Communication/Applied Electronics and Instrumentation/Electronics and Instrumentation Engineering

DIGITAL ELECTRONICS AND LOGIC DESIGN (LAS)

(Old Scheme—Supplementary/Mercy Chance)

[Prior to 2010 admissions]

Time : Three Hours Maximum : 100 Marks

Part A

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

1. What are De Morgan's theorems ? Write them in equation form. Prepare their truth tables to prove their correctness.
2. What is meant by open collector output of TTL gate ? What is its utility ? Explain.
3. What are minterms and maxterms ? Give examples. In which form of expressions do they occur.
4. Explain the essential features of K-map. What are their advantages and disadvantages ?
5. Implement a half adder circuit using NOR gates only.
6. Define and distinguish between half subtractor and full subtractor.
7. What are the differences between the operation of edge triggered flip-flop and master slave flip-flop ?
8. What are the differences between truth table and excitation table ? Give examples.
9. What are the differences between serial and parallel transfer ? Explain.
10. Draw the basic circuit of a ROM cell and explain its working.

(10 × 4 = 40 marks)

Part B

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

11. (a) What is the principle of operation of Schottky TTL ? Explain with a neat circuit diagram, the operation of a Schottky TTL.

(8 marks)

(b) Implement XOR using NOR gates only. Draw the circuit diagram. (4 mark)

Or

Turn over

12. (a) With circuit examples, show that a positive logic OR gate and a negative logic AND gate or vice versa are the same.

(6 marks)

(b) Obtain a NAND gate realization of the Boolean expression :

$$f\ (A, B, C) = \left(A + \overline{B} + C\right)\left(\overline{A} + \overline{B} + \overline{C}\right)\left(\overline{A} + B\right).$$

(6 marks)

13. (a) Find the minimal sum and minimal product for th following functions using K-map :

$f_1 = \Sigma m\ (1, 3, 4, 5, 6, 7)$

$f_2 = \Sigma m\ (2, 3, 4, 5, 7)$.

(3 + 3 = 6 marks)

(b) Implement the Boolean function $f(w, x, y, z) = \Sigma m\ (0, 1, 5, 6, 7, 9, 12, 15)$ using 8 to 1 multiplexer.

(6 marks)

Or

14. (a) Implement a full adder circuit using a decoder and two OR gates. (6 marks)

(b) Obtain the NOR gate realisation of the Boolean expressions :

(i) $f_1\ (w, x, y, z) = \Sigma m\ (0, 3, 6, 9, 10, 12, 15)$. (3 marks)

(ii) $f_2(a, b, c, d) = \overline{a}\,\overline{c}\,d + \overline{a}\,cd + \overline{b}\,\overline{c}\,\overline{d} + a\overline{b}c$. (3 marks)

15. Draw the truth table of full subtractor. Using K-maps, design the minimal logic circuit using only NAND gates.

Or

16. Design a circuit for 4-bit 2's complement adder and realise it using only basic logic gates.

17. Draw the circuit diagram of a D flip-flop using only NAND gates and explain with the help of its truth table and excitation table.

Or

18. Draw the circuit diagram of clocked SR flip-flop constructed using fundamental logic gates. Explain its working with the help of timing diagrams. What are its demerits and how they are overcome ?

19. Design a synchronous mod-6 counter using clocked JK flip-flops with the help of excitation tables and K-maps. Draw the minimal circuit diagram and the timing diagram.

Or

20. Draw the organisation of a programmable ROM circuit. Explain the read and write operations clearly.

[5 × 12 = 60 marks]

G 535 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2014

Fourth Semester

Branch : Applied Electronics and Instrumentation/Electronics and Communication Engineering

AI 010 406/EC 010 406—ANALOG CIRCUITS—II (AI, EC)

(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. Define and explain CMRR. What is its significance ?
2. Draw the internal circuit of 741 OP-Amp and explain it in detail.
3. Draw OP-Amp Buffer. Explain its applications. Obtain its voltage gain.
4. What is a Notch filter ? Explain its characteristics.
5. Differentiate ADC from DAC. Explain the difference.

(5 × 3 = 15 marks)

Part B

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

6. Explain the need for current mirror circuits with neat diagrams.
7. Define and explain : 1. Slew Rate ; 2. SVRR.
8. Draw an OP-Amp instrumentation amplifier and explain.
9. Explain the characteristics of All pass filters.
10. Explain the working principle of flash ADC with a neat diagram.

(5 × 5 = 25 marks)

Part C

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

11. Discuss the characteristics of an ideal OP-Amp, in detail.

Or

12. Explain in detail the following :—

    1 Multistage differential amplifier ;

    2 MOS differential amplifier.

13. (i) Draw a 2 stage OP-Amp circuit and explain it in detail.

    (ii) Derive an expression for Bandwidth of an OP-Amp.

Or

14. Discuss in detail the frequency compensation and slew rate in 2 stage OP-Amp with neat diagrams.

15. Explain the applications of OP-Amp in detail. Derive the expressions for voltage for non-inverting amplifier and summer.

Or

16. Draw an OP-Amp RC Phase shift oscillator circuit. Explain its working principle in detail. Derive the condition for oscillation.

17. Bring out the design details of first order high pass filler, with an example.

Or

18. Give an account on : 1 Switched capacitor integrator ; 2 First order SC filter.

19. Draw a dual slope ADC circuit. Explain its principle of operation and applications in detail.

Or

20. Write technical notes on ;

    1 Building blocks of PLL ;

    2 VCO ;

    3 Monostable multivibrator using 555 IC.

(5 × 12 = 60 marks)

G 506 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2014

Fourth Semester

Branch : Applied Electronics and Instrumentation/Electronics and Communication/ Electronics and Instrumentation Engineering

AI 010 403/EC 010 403/EI 010 403—SIGNALS AND SYSTEMS (AI, EC, EI)

(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. Define Energy and power?
2. State convolution properties in relation to Fourier transform ?
3. Define DTFT.
4. Compare Butterworth and Chebyshev filters.
5. Define region of convergence. What are the Properties of ROC ?

(5 × 3 = 15 marks)

Part B

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

6. Explain the classification of signal with examples.
7. Explain about Gibbs phenomenon.
8. State and prove the following properties of DTFT.
   (i) Convolution ; (ii) Correlation ;
   (iii) Multiplication ; (iv) Symmetry Property.
9. Write a short note on magnitude response of Butterworth filter.
10. Explain any two properties of Z-transform.

(5 × 5 = 25 marks)

Turn over

Part C

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

11. Give the properties of convolution integral ?

Or

12. Find the natural and forced response of an LTI system given by

$10dy(t)/dt + 2y(t) = x(t)$?

13. Find the Fourier transform given signal ;

(a) Square ;

(b) Triangular.

Or

14. Explain and derive convergence of Fourier series.

15. State and prove Parseval's theorem of DTFT, verify the same for the sequence :

$x(n) = (0.5)n\ u(n)$?

Or

16. Find the DTFT of $x(n) = \{1, 1, 1, 1, 1, 1, 0, 0\}$.

17. Describe about time domain characteristics of ideal LPF.

Or

18. Explain in detail with necessary mathematical derivations :

(a) Interpolation ;

(b) Aliasing.

19. Give the relationship between Z-transform and Fourier transform.

Or

20. Find the Z-transform of $x(n) = \text{an}\ u\ (n)$ and for unit impulse signal.

(5 × 12 = 60 marks)

G 515 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2014

Fourth Semester

Branch : Applied Electronics and Instrumentation/Electronics and Communication/Electronics and Instrumentation/Instrumentation and Control Engineering

AI 010 404/EC 010 404/EI 010 404/IC 010 404—DIGITAL ELECTRONICS (AI, EC, EI, IC)

(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. Explain the properties of Hamming codes. Mention its applications.
2. Define and explain : (i) Noise Margin ; (ii) Fan in ; (iii) Fan out.
3. What is the difference between combinational logic and sequential logic circuits ? Explain.
4. Mention the potential applications of flip flop. Explain any two in detail.
5. Draw the block diagram of PAL and explain it.

(5 × 3 = 15 marks)

Part B

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

6. Explain the principle of Duality with an example.
7. Explain the subfamilies of TTL in detail.
8. Differentiate latch from FFs. Explain the difference.
9. Explain the types of RAM in detail.
10. Define Hazard. Explain the types of Hazard in detail.

(5 × 5 = 25 marks)

Part C

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

11. (i) Explain : (a) Gray code ; (b) XS 3 code with examples.

    (ii) Explain hexa decimal and octal number system with examples.

Or

12 (i) Explain the limitation of K map.

(ii) Simplify the Boolean expression F = 1,4,5,9,12,14. Realize the simplified expression using only NAND gates.

13. (i) Explain positive and negative logics in detail.

(ii) Draw a TTL logic circuit with totem pole and explain it in detail.

Or

14. Explain the characteristics of TTL and CMOS logic families in detail.

15. Explain the half and full adders with schematic diagrams. Realize them with basic gates.

Or

16. (i) Explain all the types of FFs with diagrams, truth tables and excitation tables.

(ii) Derive the characteristic equations of all the types of FFs.

17. Draw a Binary ripple counter and explain it in detail. Bring out its design procedure.

Or

18. (i) Explain the bidirectional shift registers with a neat diagram.

(ii) Give an account on "Universal Register".

19. (i) Explain the steps to design a hazard free combinational circuit with an example.

(ii) Draw the architecture of GAL and explain in detail.

Or

20. (i) Draw the architecture of FPGA and explain it in detail.

(ii) Write a technical note on "Configurable PAL".

(5 × 12 = 60 marks)

G 529 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2014

Fourth Semester

Branch : Electronics and Communication Engineering

EC 010 405—ANALOG COMMUNICATION (EC)

(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. Define modulation index for AM.
2. Define synchronous detection.
3. What are the advantages of super heterodyne receiver ?
4. Explain Gaussian distribution.
5. What is meant by noise figure ? Give the expression of noise figure.

(5 × 3 = 15 marks)

Part B

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

6. Define with relevant equations CDF, PDF and conditional PDF of a random process.
7. Write a short note on balanced modulator.
8. With neat block diagram, explain the operation of super heterodyne receiver.
9. Discuss any *two* properties of Gaussian process.
10. Write short notes on sources of noise.

(5 × 5 = 25 marks)

Part C

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

11. Define amplitude modulation and explain mathematical derivation of AM.

Or

12. Explain with neat block diagram of communication system in detail.

13. Explain in detail how balanced modulator can be used to generate DSB-SC modulation.

Or

14. Explain in detail about diode and transistor modulator.

15. Write short notes on different nonlinear FM detection methods.

Or

16. Explain direct and indirect FM generation methods.

17. Explain about :

    (a) Binomial distribution ;

    (b) Gaussian distribution ;

    (c) Rayleigh distribution.

Or

18. Write short notes on :

    (a) Conditional probabilities ;

    (b) Random variable ;

    (c) Mean ;

    (d) Moment.

19. The noise figure of the individual stages of a two stage amplifier is 2.03 and 1.54 respectively. The available power gain of the first stage is 62. Evaluate the overall noise figure ? Derive the relation used.

Or

20. Write short notes on :

    (a) Noise bandwidth ;

    (b) Noise temperature ;

    (c) Noise figure ;

    (d) Signal to noise ratio.

(5 × 12 = 60 marks)

20. (a) Given :

Day	:	Mon	Tue	Wed	Thu	Fri	Sat	Sun
f	:	16	8	12	11	6	14	14

(No. of accidents)

Is there any reason to doubt that the accident is equally likely to occur on any day of the weak ? (6 marks)

(b) A machine produced 20 defective units in a sample of 400. After overhauling the machine, it produced 10 defective units in a hatch of 300. Has the machine improved due to overhauling ? (6 marks)

[5 × 12 = 60 marks]

G 500

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

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2014

Fourth Semester

EN 010 401—ENGINEERING MATHEMATICS—III

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

(Common to all Branches)

Time : Three Hours Maximum : 100 Marks

Part A

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

1. If $f(x) = \begin{cases} kx, & 0 \le x \le l/2 \\ k(l-x), & l/2 \le x \le l \end{cases}$

find a_0.

2. Show that the Fourier Cosine transform of Fourier Cosine transform of a given function is itself.

3. Solve : $a(p+q) = z$.

4. Find the distribution function from $f(x) = \begin{cases} c(3+2x), & 0 < x < 2 \\ 0, & \text{otherwise} \end{cases}$

5. What are type-I and type-II errors ?

(5 × 3 = 15 marks)

Part B

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

6. Write the Fourier Series for $f(x) = \begin{cases} 1-x, & -\pi < x < 0 \\ 1+x, & 0 < x < \pi \end{cases}$.

7. Find the finite Fourier Cosine transform of $f(x) = \frac{\pi}{3} - x + \frac{x^2}{2\pi}$.

Turn over

8. Solve : $\left(\frac{y^2z}{x}\right)p + xzq = y^2$.

9. Fit a binomial distribution for :

x	:	0	1	2	3	4
f	:	5	29	36	25	5

10. Write the application of ψ^2-test.

(5 × 5 = 25 marks)

Part C

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

11. Obtain the Fourier Series for $f(x) = \begin{cases} l - x, & 0 < x \le l \\ 0, & l \le x < 2l \end{cases}$

Hence deduce that $1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \ldots = \frac{\pi}{4}$ and $\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \ldots = \frac{\pi^2}{8}$.

(12 marks)

Or

12. If $f(x) = lx - x^2$ in $(0, l)$, show that the half range, sine series for $f(x)$ is

$\frac{8l^2}{\pi^3} \sum_{n=0}^{\infty} \frac{1}{(2n+1)^3} \sin \frac{(2n+1)\pi x}{l} \ldots$ and deduce that $\frac{\pi^3}{3^2} = 1 - \frac{1}{3^3} + \frac{1}{5^3} - \ldots$.

(12 marks)

13. Show that the Fourier transform of $f(x) = \begin{cases} a^2 - x^2 & \text{for } |x| \le a \\ 0 & \text{for } |x| > a > 0 \end{cases}$

is $2\sqrt{\frac{2}{\pi}}\left(\frac{\sin as - as\cos as}{s^3}\right)$. Hence deduce that $\int_0^{\infty} \frac{\sin t - t\cos t}{t^3} dt = \pi/4$. (12 marks)

Or

14. (i) Find the finite sine transform of $f(x) = x^3$. (6 marks)

(ii) Find the cosine transform of $f(x) = \begin{cases} \cos x, & 0 < x < a \\ 0, & x > a \end{cases}$ (6 marks)

15. (a) Solve : $r - 2s + t = \sin(2x + 3y)$. (6 marks)

(b) Solve : $\left(D^2 + D^{1^2}\right)z = \cos mx \cos ny$. (6 marks)

Or

16. (a) Solve : $D(D + D' - 1)(D + 3D' - 2)\, z = x^2 - 4xy + 2y^2$. (9 marks)

(b) Solve : $r - s + p = 1$. (3 marks)

17. (a) If 15% of a normal population lies below the value 30 and 10% of the population lies above the value 42, calculate its Mean and Standard Deviation.

(6 marks)

(b) Fit a Poisson Distribution to :

x	:	0	1	2	3	4
f	:	43	38	22	9	1

(6 marks)

Or

18. (a) Six coins are tossed once. Find the probability of obtaining heads.

(i) exactly 3 times.
(ii) atmost 3 times.
(iii) atleast 3 times.
(iv) atleast once.

(8 marks)

(b) Given : X is a Poisson variate with $P(X = 2) = \frac{2}{3}P(X = 1)$. Find $P(X = 0)$ and $P(X \ge 2)$.

(4 marks)

19. (a) Test for the difference of variances for :

Method 1	:	20	16	27	26	22	23
Method 2	:	27	33	42	32	35	34	38

(6 marks)

(b) The 9 items of a sample have 45, 47, 50, 52, 48, 47, 49, 53, 51. Does the mean of these values differ significantly from the assumed mean 47.5 ?

(6 marks)

Or

Turn over

G 501 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2014

Fourth Semester

EN 010 402—PRINCIPLES OF MANAGEMENT

(Common to AI, AV, EC, EI, IC, IT, ME, MT, PO and PE Branches)

[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. Define MBO.
2. What is Trade union ?
3. What is CPM and PERT ?
4. State the types of Capital.
5. Define the principles of Marketing.

(5 × 3 = 15 marks)

Part B

Answer any **five** *questions.*
Each question carries 5 *marks.*

6. What do you understand by organizational chart ? Explain the basis of it.
7. What are the basic steps in planning the system in Personnel management ?
8. Explain briefly the product life cycle.
9. What are the elements of cost ? Explain.
10. Explain briefly various steps to promote Sales of a product.
11. What is meant by market research ? Explain.
12. What is meant by quality circle ?

(5 × 5 = 25 marks)

Turn over

Part C

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

13. What are the different types of organization structure used in industries ? Explain in details.

Or

14. What are the various functions of management ? Explain in details.

15. Discuss in details how industries will recruit and select manpower ?

Or

16. Write short notes on the following :

    (a) Quality circle functions.

    (b) Industrial disputes.

(6 + 6 = 12 marks)

17. Consider the details of a distance network as shown below :

Arc	Distance
1 – 2	8
1 – 3	5
1 – 4	7
1 – 5	16
2 – 3	15
2 – 6	3
2 – 7	4
3 – 4	5

Arc	Distance
3 – 6	6
4 – 5	8
4 – 6	12
5 – 8	7
6 – 8	9
6 – 9	15
7 – 9	12
8 – 9	6

(a) Construct the distance network.

(b) Find the shortest path from Node 1 to Node 9, using Dijkstra's algorithm.

(6 + 6 = 12 marks)

Or

18. The following tables provide cost and time estimates for a seven activity projects.

Activity (*i* - *j*)	Time estimate		Direct cost estimates (Rs.1000)	
	Normal (weeks)	Crash (weeks)	Normal (Rs.)	Crash (Rs.)
A (1-2)	2	1	10	15
B (1-3)	8	5	15	21
C (2-4)	4	3	20	24
D (3-4)	1	1	7	7
E (3-5)	2	1	8	15
F (4-6)	5	3	10	16
G (5-6)	6	2	12	36

You are required to :

(a) Draw the activity network of the project.

(b) Using the above information crash the activity step-by-step until all paths are critical.

19. What are the fixed capital and working capital ? Explain various factors affecting working capital.

Or

20. What is the component of cost of a product ? Explain in details.

21. Explain the different methods of sales forecasting used in industries.

Or

22. Write short note on the following :

    (a) Sale promotion.

    (b) Channel of distribution.

(6 + 6 = 12 marks)

[5 × 12 = 60 marks]

G 544 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2014

Fourth Semester

ENGINEERING MATHEMATICS—III (CMELRPTANSUF)

(Old Scheme—Supplementary/Mercy Chance—Prior to 2010 admissions)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*
Each full question carries 20 *marks.*
Use of Statistical tables is permitted.

1. (a) Solve $x^2\frac{dy}{dx}=3x^2-2xy+1$. (5 marks)

(b) Solve $\left(D^3+1\right)y=\sin\left(2x+3\right)$. (7 marks)

(c) Solve $\left(3x+2\right)^2\frac{d^2y}{dx^2}+3\left(3x+2\right)\frac{dy}{dx}-36y=3x^2+4x+1$. (8 marks)

Or

2. (a) Solve $x^2\frac{d^2y}{dx^2}+x\frac{dy}{dx}+y=\log x\sin\left(\log x\right)$. (8 marks)

(b) By method of variation of parameters solve $y''-2y'+2y=e^x\tan x$. (7 marks)

(c) Solve $\frac{d^2y}{dx^2}+y=\operatorname{cosec} x$. (5 marks)

3. (a) From the p.d.e. by eliminating the arbitrary function from $z=f\left(x+it\right)+g\left(x-it\right)$. (5 marks)

(b) Solve $px-qz=z^2+\left(x+y\right)^2$. (7 marks)

(c) A string is stretched and fastened to two points l apart motion is started by displacing the string in the form $y=a\sin\frac{\pi x}{l}$ from which it is released at time t = 0. Show that the displacement of any point at a distance x from one end at time t is given by $y\left(x,t\right)=a\sin\frac{\pi x}{l}\cos\frac{\pi ct}{l}$.

(8 marks)

Or

Turn over

4. (a) A rod of length l with insulated sides is initially at a uniform temperature u_0 its ends are suddenly cooled to 0°C and are kept at that temperature. Find the temperature function $u(x,t)$.

(8 marks)

(b) Solve $\frac{\partial^2 z}{\partial x^2} - \frac{\partial^2 z}{\partial x \partial y} - \frac{6\partial^2 z}{\partial y^2} = 0$. (5 marks)

(c) Solve $\left(p^2 + q^2\right) y = qz$. (7 marks)

5. (a) Using Fourier sine integral show that :

$$\int_0^\infty \frac{1-\cos \pi\lambda}{\lambda} \sin x\lambda \, d\lambda = \begin{cases} \frac{\pi}{2}, & 0 < x < \pi \\ 0, & x > \pi \end{cases}$$

(8 marks)

(b) Find the Fourier transform of $f(x) = \begin{cases} 1-x^2, & \text{of } |x|<1 \\ 0, & |x|>1 \end{cases}$ and use it to evaluate

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

(12 marks)

Or

6. (a) Find the Fourier cosine transform of e^{-x^2}. (8 marks)

(b) Using Parseval's identity show that $\int_0^\infty \frac{x^2 dx}{\left(1+x^2\right)^2} = \frac{\pi}{4}$. (12 marks)

7. (a) Out of 800 families with *four* children each how many families would you expect to have

(i) 2 boys and 2 girls. (ii) Atleast one boy.

(iii) No girl. (iv) Atleast 2 girls.

Assume equal probabilities for boys and girls.

(10 marks)

(b) Derive the mean and variance of Poisson distribution. (10 marks)

Or

8. (a) Fit a binomial distribution to the following data :

x :	0	1	2	3	4	5
	2	14	20	34	22	8

(12 marks)

(b) In a normal distribution 31% of the items are under 45 and 8% and over 64. Find the mean and standard deviation of the distribution.

(8 marks)

9. (a) The following figures refer to observations in live independent samples :

Sample I :	25	30	28	34	27	20	13	32	22	38
Sample II :	40	34	22	20	31	40	30	23	36	17

Analyse whether the samples have been drawn from the populations of equal mean.

(12 marks)

(b) A coin was tossed 400 times and returned heads 216 times. Test the hypothesis that the coin is ubiased.

(8 marks)

Or

10. (a) Two independent samples of sizes 7 and 6 had the following values :

Sample A :	28	30	32	33	31	29	34
Sample B :	29	30	30	24	27	28	

Examine whether the samples have been drawn from normal populations having the same variance.

(12 marks)

(b) A sample of 20 items has been 42 units and S.D. 5 units. Test the hypothesis that it is a random sample from a normal population with mean 45 units.

(8 marks)

[5 × 20 = 100 marks]

20. (a) A random process provides measurements x between the values 0 and 1 with a PDF of

$f_X(x) = 12x^3 - 21x^2 + 10x$, for $0 \le x \le 1$

$= 0$ otherwise.

Determine the following :

(i) $P\left[X \le \frac{1}{2}\right]$ and $P\left[X > \frac{1}{2}\right]$.

(ii) Obtain a number K such that $P[X \le K] = \frac{1}{2}$.

(8 marks)

(b) Define mean or average or expected value of a random variable. Explain how it is calculated for continuous and discrete random variables.

(4 marks)

[5 × 12 = 60 marks]

G 578 (Pages : 4) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2014

Fourth Semester

Branch : Electronics and Communication/Applied Electronics and Instrumentation/Electronics and Instrumentation/Information Technology

SIGNALS AND SYSTEMS (L, A, S, T)

(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. Determine the odd and even parts for the following signals :

(a) $x(t) = u(t+1)$. (b) $x(t) = 2 + 3t + 4t^2 + 5t^3 + 6t^4$.

2. Check whether the following system is linear or not ? Prove the same :

$$y(n) = \frac{x(n-1) + x(n-2)}{x(n-3)\ x(n-4)}.$$

3. State and prove the frequency shifting property of continuous Time Fourier Transform.

4. Find the Fourier Transform of $P(t) = \sum_{n=-\infty}^{\infty} \delta(t - n\tau)$, τ - fundamental period.

5. Find the DTFT of $x(n) = \left(\frac{1}{3}\right)^n u(n)$.

6. Find the frequency response of the following LTI system : $h(t) = -\delta(t+1) + \delta(t) - \delta(t-1)$.

7. Find the z-transform with ROC $x(n) = 3e^{-2n} u(n) + 2\left[4^n u(-n)\right] + 5\delta(n)$.

8. What are the conditions to be satisfied by a function to be Laplace Transformable ?

9. Determine whether the function given by the expression $f_x(x) = \begin{cases} 0, & x < 2 \\ \frac{1}{18}(3 + 2x), & 2 \le x \le 4 \\ 0, & x > 4 \end{cases}$ is a density function ?

10. Define random process and explain ensemble and sample function.

(10 × 4 = 40 marks)

Part B

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

11. (a) Find the convolution of $x(n)$ and $h(n)$ where $x(n) = \left\{1, \underset{\downarrow}{2}, 3, 4\right\}$ and $h(n) = \left\{\underset{\downarrow}{2}, 3, 1, 1\right\}$. (5 marks)

(b) Find the output response of the system described by the differential equation

$$\frac{d^2y(t)}{dt^2} + 7\frac{dy(t)}{dt} + 12y(t) = \frac{dx(t)}{dt} + x(t).$$ (7 marks)

Or

12. (a) Consider the system $y(t) = x(t)\cos w_0 t$. Determine whether the system is memory less, causal, linear, time-in-variant and stable. (7 marks)

(b) Evaluate the frequency response for the LTI system represented by $h(n) = (-1)^n\left[u(n+2) - u(n-3)\right]$. (5 marks)

13. Derive the Parseval's theorem. Using the same find the energy of the signal $x(t) = e^{-\alpha t}\,u(t)$ and also energy in the frequency band $|w| \leq 0.5$ rad/sec. (12 marks)

Or

14. (a) Find the frequency response of a continuous system described by

$$\frac{d^2y(t)}{dt^2} + 5\frac{dy(t)}{dt} + 6y(t) = -\frac{dx(t)}{dt}.$$

(7 marks)

(b) The signal $x(t) = 2\cos(200\,\pi t) + 6\cos(180\,\pi t)$ is ideally sampled at a frequency of 150 samples per second. The sampled version $x_\delta(t)$ is passed through a unit gain ideal low-pass filter with a cut-off frequency of 110 Hz. What frequency components will be present in the output of the filter ? Write down an expression for its output signal.

(5 marks)

15. (a) Find the DTFT of $x(n) = \left(\frac{1}{2}\right)^n u(n)$ and plot its magnitude and phase spectrum.

(7 marks)

(b) Find the output of the system whose impulse response $h(n) = \left(\frac{1}{2}\right)^n u(n)$, using Fourier Transform, the input to the system is $x(n) = \left(\frac{1}{3}\right)^n u(n)$.

(5 marks)

Or

16. Find the DTFT of the following signals :

(a) $x[n] = a^{|n|}$.

(b) $x[n] = a^{-n}\,u[-n-1]$; $|a| < 1$.

(c) $x[n] = \sin(w_0\,n)$; $w_0 = \frac{2\pi}{5}$.

17. (a) Consider the signal $x(t) = e^{-4t}\,u(t-1)$. Evaluate its Laplace Transform X (*s*) and find its ROC. (6 marks)

(b) Determine the values of the finite numbers A and to such that the LT of $g(t) = Ae^{-5t}\,u(t-t_0)$ has the same algebraic form as X (*s*) in the above part 17 (a). What is the ROC corresponding to G (*s*) ? (6 marks)

Or

18. Determine the Z-transform of the signal $x[n] = a^n\,u[n]$ and depict the ROC and the locations of poles and zeros in the Z-plane.

(12 marks)

19. Given two random processes X (*t*) and Y (*t*) as

$X(t) = Z_1(t) + 3Z_2(t-\tau)$, $Y(t) = Z_2(t+\tau) + 3Z_1(t-\tau)$. Here $Z_1(t)$ and $Z_2(t)$ are independent white noise processes each with a variance = 0.5. Determine (a) autocorrelation functions of X (*t*) and Y (*t*) and (b) cross-correlation function of X(*t*) and Y(*t*).

(12 marks)

Or

G 586 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2014

Fourth Semester

Branch : Electronics and Communication / Applied Electronics and Instrumentation / Electronics and Instrumentation Engineering

RELIABILITY AND HUMANITIES (L, A, S)

(Old Scheme—Prior to 2010 Admissions)

[Supplementary/Mercy Chance]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*

Each full question carries 20 marks.

1. (a) Define and explain (i) failure rate ; (ii) failure density ; and (iii) reliability. (6 marks)

(b) The CFL has a uniform failure rate of 0.00002 per hour. What is its reliability for a specified period of service of (i) 2000 hours ; (ii) 5000 hours ; and (iii) 10,000 hours ?

(6 marks)

(c) A parallel system is composed of 10 identical components. If the system reliability P(5) is to be 0.9, find how poor can the components be ?

(8 marks)

Or

2. (a) Explain MTBF ? Explain how components may have an extremely high MTBF and a comparatively short mean life.

(8 marks)

(b) Calculate the probability of survival of SMF battery having to operate for 500 hours and which consists of four subsystems having the following MTBF :

Subsystem A : MTBF = 5000 hours.

Subsystem B : MTBF = 10000 hours.

Subsystem C : MTBF = 15000 hours.

Subsystem D : MTBF = 15000 hours.

(12 marks)

Turn over

3. (a) Explain different periods, with reference to the bath tub curve. (10 marks)

(b) Describe any two hazard models used for failure analysis. (10 marks)

Or

4. (a) Explain how Weibull model can be used for failure analysis. (10 marks)

(b) With suitable sketches, describe the linearly increasing hazard model. (10 marks)

5. (a) What are the factors that has to be considered for manufacturing a quality product with reliability ? Explain with an example. (15 marks)

(b) Mention and describe different steps of bench marking. (5 marks)

Or

6. (a) Explain the concept of quality function deployment. State the relationship of QFD to other tools. (15 marks)

(b) What are the objectives of quality circles ? (5 marks)

7. (a) Explain the steps in constructing a C chart ? (5 marks)

(b) Draw a P chart for the following data. Explain your conclusion :

Sample (each of 100 units)	1	2	3	4	5	6	7	8	9	10
No. of defective	13	10	8	8	7	7	9	10	11	7

(15 marks)

Or

8. (a) "$\bar{\bar{X}}$ and R charts always go hand in hand." Elaborate. (5 marks)

(b) Subgroup of 5 item each are taken from a manufacturing process at regular intervals. A certain quality characteristic is measured and $\bar{\bar{X}}$ and R values computed for each subgroup. After 25 subgroup $\Sigma \bar{x} = 357.5$, $\Sigma R = 8.80$. Assume that all the points are within the control limits on both the charts. The specifications are 14.4. ± 0.4.

(i) Compute the control limits for $\bar{\bar{X}}$ and R chart.

(ii) What is the process capability ?

(iii) Determine the percentage rejections, if any ?

(15 marks)

9. (a) Explain the major types of wage payment. (5 marks)

(b) What are the causes and effects of industrial fatigue ? Explain any *two* cases of elimination of fatigue. (8 marks)

(c) Explain incentive ? Describe any two wage incentive plans. (7 marks)

Or

10. (a) Explain the interaction between human behaviour and work environment. (5 marks)

(b) Explain the two-factor theory of motivation. (8 marks)

(c) What are the causes and effects of industrial disputes ? (7 marks)

[5 × 20 = 100 marks]