G 1575 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2015

Fourth Semester

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

DIGITAL ELECTRONICS AND LOGIC DESIGN (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. Realise the logic expression $F = XY + YZ + \overline{X}\,Y\overline{Z}$ using NAND gates.
2. What are logic families ? Compare TTL and CMOS logic families.
3. What is a demultiplexer ? Explain with an example circuit.
4. Plot the K-map for $\overline{A}BC + A\overline{B}C + AB\overline{C} + ABC$.
5. Draw the full adder using half adders.
6. Subtract using (i) 2's complement method and (ii) 1's complement method : 1010101–110011.
7. Draw the D-flip-flop with the logic diagram and truth table and explain.
8. Convert an SR flip-flop into (i) D and ; (ii) T flip-flops.
9. Distinguish between RAM, ROM and PROM. Which is volatile ?
10. Draw the circuit diagram, output sequence and timing diagram of a 3 bit ring counter ?

(10 × 4 = 40 marks)

Part B

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

11. Explain the circuit diagram and working of a three-input TTL NAND gate. Why totempole output stage is used ? Sketch and explain its voltage transfer characteristics.

Or

12. What are universal logic gates ? Why they are called so ? Using them, show how (i) NOT ; (ii) AND ; (iii) OR ; (iv) EX-OR logics can be realised ?

Turn over

13. Using k-maps, obtain the SOP and POS forms for $Y = \bar{A}BC + \bar{A}\bar{B}C + ABC$. Implement using (i) only NOR gates ; (ii) Basic logic gates.

Or

14. Implement the following functions using decoder minimizing the number of inputs to be summed (a) $f_1 = \Sigma(0, 2, 3, 5, 6, 7)$; (b) $f_2 = \Sigma(1, 3, 4, 6, 7)$.

15. With a circuit diagram, explain the working of a 4 bit parallel binary adder.

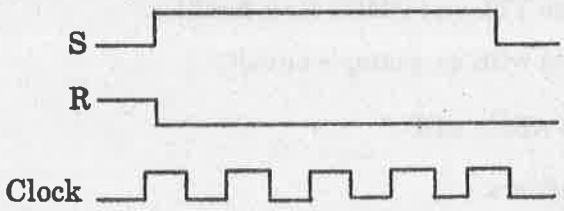
Or

16. With a neat circuit diagram explain the working of a 4 bit serial subtractor.

17. What is the race around condition ? How it is eliminated in master-slave circuit ? Draw a clocked MS JK flip-flop with asychronous inputs and explain.

Or

18. The figure below shows the input waveforms applied to S, R and clock terminals of an SR flip-flop. Draw the waveforms of Q and $\bar{Q}$. Explain the output states ?



19. Design a mod 12 binary counter using excitation table and K-maps. Draw its circuit and timing diagrams.

Or

20. Describe the internal structure of a ROM having square register array and capable of storing 1K bytes.

(5 × 12 = 60 marks)

G 1605 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2015

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. Check whether the system $y(n)=\frac{x(n-5)+x(n-7)}{x(n-2)\,x(n-3)}$ is linear or not ? Prove.
2. Explain causality and time invariance with respect to discrete time systems.
3. Find the Fourier transform of the rect function which is unity over the interval – 0.5 to + 0.5, and zero elsewhere.
4. Specify the Nyquist rate for the following signals :
   (a) $g(t) = \text{sinc}(400\,t)$.
   (b) $g(t) = \text{sinc}(400t) + \text{sinc}^2(400t)$.
5. Find the Discrete Fourier series for the periodic sequence $x(n)=2\cos(1.6\pi n)+\sin(2.4\pi n)$.
6. Find the Discrete Fourier series representation of a periodic sequence $x(n)=\{1,1,0,0\}$ with period N = 4.
7. Write any *four* properties of ROC.
8. From the definition of z-transform find the z-transform of $x(n)=\sinh(w_0 n)$, for $n\geq 0$.
9. Define and distinguish between random variable and random process.
10. Derive the relationship between CDF and PDF.

(10 × 4 = 40 marks)

Turn over

Part B

Answer **all** *questions.*

Each full question carries 12 *marks.*

11. (a) Prove that the response of an LTI system is governed by convolution sum. (5 marks)

(b) Solve the differential equation :

$$\frac{d^2y}{dt^2}(t)+5\frac{dy(t)}{dt}+4y(t)=\frac{dx(t)}{dt} \text{ given, } y(0)=0, \frac{dy}{dt}/_{t=0}=1, x(t)=e^{-2t}u(t).$$ (7 marks)

Or

12. (a) For the system $T[x(n)]=\sum_{k=n_0}^{n} x(k)$ determine whether the system is stable, causal, linear, time-invariant and memoryless ?

(5 marks)

(b) Solve the differential equation $y(n)=\frac{1}{4}y(n-1)-\frac{1}{8}y(n-2)=x(n)+x(n-1)$, given :

$$y(-1)=2, y(-2)=-1, x(n)=2^n u(n).$$ (7 marks)

13. (a) Determine appropriate Fourier representation for the following time domain signal :

$$x(t)=e^{-3t}\cos\pi t\, u(t).$$ (7 marks)

(b) For the analog signal $x_a(t)=3\cos 2000\pi t+5\sin 6000\,\pi t+10\cos 12000\,\pi t$, find the Nyquist rate. Also find the discrete time signal obtained from this if the signal is sampled at a rate f_s = 5000 Hz.

(5 marks)

Or

14. (a) A continuous system is described by $\frac{d^2y(t)}{dt^2}+5\frac{dy(t)}{dt}+6y(t)+\frac{dx(t)}{dt}=0$. Determine its frequency response.

(8 marks)

(b) Explain sampling and reconstruction of continuous time signals. (4 marks)

15. (a) The signal $x(n)=\{1,0,5\}$ is applied to a system with frequency response $H(\Omega)$ and the resulting output is $y[n]-\delta[n]-2\delta[n-1]-\delta[n-2]$. Find $H(\Omega)$.

(6 marks)

(b) Find the DTFS coefficients of the sequence $x(n)=\cos\left(\frac{6\pi}{13}n+\frac{\pi}{6}\right)$. (6 marks)

Or

16. (a) A LTI system has frequency response $H\left(e^{j\Omega}\right)=\frac{e^{j\Omega}}{1+\cos\Omega}$. Find the difference equation that connects the input and output.

(8 marks)

(b) State and prove linearity property of DTFS. (4 marks)

17. (a) State and prove any four properties of z-transform. (4 marks)

(b) Determine the inverse z-transform of $X(z)=\frac{z^2-3z}{\left(z^2-\frac{3}{2}z-1\right)}$, $\frac{1}{2}<|z|<2$. (8 marks)

Or

18. (a) Determine the step response of a continuous time LTI system described by the differential equation $\frac{d^2y(t)}{dt^2}+5\frac{dy(t)}{dt}+6y(t)=x(t)$ using Laplace transform.

(6 marks)

(b) Find the inverse Laplace transform of $X(s)=\frac{-5s-7}{(s+1)(s-1)(s+2)}$, with ROC $-1<R_e(s)<1$.

(6 marks)

19. The marginal probability density functions of two random variables X and Y are given below :

$$f_x(x)=\begin{cases}3\left(1-x^2\right), & \text{for } 0\le x\le 1\\ 0 & \text{, for } x<0, x>1\end{cases} \text{ and } f_y(y)=\begin{cases}3\left(1-y^2\right), & \text{for } 0\le y\le 1\\ 0 & \text{, for } y<0, y>1\end{cases}$$

Determine :

(a) Mean of random variables X and Y and

(b) Variance of random variables X and Y.

Or

20. The PDF is given by $f_x(x)=ae^{-b|x|}$, where x is a random variable whose values lie in the range $x=-\infty$ to $x=+\infty$. Determine the following :

(a) The relationship between a and b.

(b) The cumulative distribution function.

(c) The probability that the outcome lies between 1 and 2.

(5 × 12 = 60 marks)

G 1613 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2015

Fourth Semester

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

RELIABILITY AND HUMANITIES (LAS)

(Old Scheme – Prior to 2010 Admissions)

[Supplementary/Mercy Chance]

Time : Three Hours Maximum : 100 Marks

Statistical tables permitted.

Part A

Answer **all** *questions.*

Each full question carries 20 *marks.*

1. (a) Two identical units A and B are operating in the standby mode. Assuming 100% reliability of the sensing and switching system, determine the reliability of the system for an operating time t. Simplify the function for the case $\lambda_A = \lambda_B$. Determine the MTTF of the system in both cases.

   (b) A system has four units of which three are connected in parallel and one is kept as standby. The units operating in parallel have failure rates λ_1, λ_2 and λ_3 per hour. The standby unit has a failure rate of λ_3 in operation and a zero failure rate during standby. A minimum of two units are required for the successful operation of the system. Evaluate the reliability of the system.

Or

2. (a) Two components with identical output characteristics are in operation in parallel. The second is added to increase the reliability of operation. The component failure rates are :

   component A : 0.02×10^{-3} t

   component B : 0.032×10^{-3} t.

   Find the system MTTF and reliability for an operating time of 1000 hour.

Turn over

(b) The following three units are in operation in parallel in the reliability sense :

Unit		Failure/h	Repair rate/h
A	...	0.004	0.1
B	...	0.005	0.15
C	...	0.003	0.06

If the system is operating in a one-out-of three parallel system, determine :

(i) System availability.

(ii) Frequency of system failure.

(iii) Mean down-time ; and

(iv) Mean up-time.

3. (a) Prove that the hazard model of a system having m components in parallel and each component with a constant failure rate can be approximated to a Weibull model.

(b) A system is composed of five identical independent elements in parallel. What should be the reliability of each element to achieve a system reliability of 0.96?

Or

4. The data below relates to the failures of terminations in a sample of 20 semiconductor devices. Each failure results from breaking of either the wire (W) or the Bond (B), whichever is weaker. The specification requirement is that fewer than 1% of terminations shall have strengths of less than 500 mg.

Failure load (mg)	B or W	Failure load (mg)	B or W
550	B	1250	B
750	W	1350	W
950	B	1450	B
950	W	1450	B
1150	W	1450	W
1150	B	1550	B
1150	B	1550	W
1150	W	1550	W
1150	W	1850	W
1250	B	2050	W

Estimate Weibull parameters for (i) Termination strength ; (ii) Wire strength ; and (iii) Bond strength. Comment on the results.

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

(b) Explain the concept of benchmarking.

Or

6. (a) Discuss how the project organisation, planning and scheduling help in quality and reliability assurance?

(b) Explain the concept of sequencing.

7. (a) Control charts for $\bar{X}$ and R are maintained on a certain quality characteristic of a manufactured product. The sub group size is 5. The values of $\bar{X}$ and R are computed for each subgroup. After 20 subgroups. $\Sigma\bar{X} = 3579$ and $\Sigma R = 186$. Compute the control limits for the above charts. If the process is under control, what is the process capability?

(b) Explain the significance of high spots and low spots in a p-chart.

Or

8. (a) A C-chart is used to monitor the number of surface imperfections on sheets of photographic film. The chart presently is set-up based on a $\bar{c}$ of 2.6 :

(i) Find 3-sigma control limits for this process.

(ii) Use Poisson's approximation table to determine the probability that a point will fall outside these control limits while the process is actually operating at a μ_c of 2.6.

(iii) If the process average shifts to 4.8, what is the probability of not detecting the shift on the first sample taken after the shift occurs?

(b) Explain the steps in construction of p-chart.

9. (a) Describe the Payment Wages and Minimum Wages act.

(b) Discuss the effects of workers participation in management.

Or

10. (a) Describe the Industrial Dispute Act.

(b) Explain the relationship between human behaviour and work environment.

(c) Explain any *one* wage incentive plan.

(5 × 20 = 100 marks)

17. (a) A signal $x(t) = \cos 200\,\pi t + 2\cos 320\,\pi t$ is ideally sampled at $f_s = 300$ Hz. If the sampled signal is passed through an ideal low pass filter with a cut-off frequency of 250 Hz, what frequency components will appear in the output ? Draw and label the spectra of $(i)\ x(t)$,

(i) $x_\delta(t)$, the ideally sampled signal ; and

(ii) Response of the ideal LPF.

(8 marks)

(b) Give the chebyshev filter transfer function and its magnitude response and explain.

(4 marks)

Or

18. Design a second order low pass Butterworth filter with a cut-off frequency of 1 KHz. Choose appropriate data as required, stating them clearly.

19. (a) Find the inverse z-transform of $X(z) = \dfrac{z^4 + z^2}{\left(z - \frac{1}{2}\right)\left(z - \frac{1}{4}\right)}$, ROC $= \dfrac{1}{2} < |z| < \infty$. (6 marks)

(b) Using Laplace Transform, solve the equation, $\dfrac{d^2x(t)}{dt^2} + 5\dfrac{dx(t)}{dt} + 6\,x(t) = \delta(t) + 6\,u(t)$, with

$x(0) = 1$ and $\dfrac{dx(0)}{dt} = 2$.

(6 marks)

Or

20. An LSI system is described by the difference equation

$y(n) - \dfrac{3}{4}y(n-1) + \dfrac{1}{8}y(n-2) = x(n) + x(n-1)$ with $y(-1) = 0$ and $y(-2) = -1$.

Find (a) the natural response of the system (b) the forced response of the system ; and (c) the frequency response of the system for a step input.

(5 × 12 = 60 marks)

G 1523 (Pages : 4) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2015

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. Calculate the average power of the signal $x(t) = A\sin(w_0 t + \phi)$, $-\infty \le t \le \infty$.

2. Find the Fourier transform of $x(t) = e^{-a|t|}$; $a > 0$.

3. Prove that Discrete-Time-Fourier Transform is periodic with period 2π.

4. Compare Butterworth and Chebyshev filter functions.

5. State any three properties of Region of convergence.

(5 × 3 = 15 marks)

Part B

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

6. If 'E' is the energy of the signal $x(t)$, what is the energy of $x(2t)$ and $x\left(\frac{t}{2}\right)$?

7. Show that the sum of two sinusoids is periodic provided that their frequencies are integral multiples of a fundamental frequency w_0.

8. Using Fourier Transform, find the differential equation description for the system having impulse response $h(t) - \left(2e^{-t} - 3e^{-5t}\right)u(t)$.

Turn over

9. Design a low pass Chebyshev filter whose 3 dB cut off frequency is w_c, and the gain drops to –50 dB at $3w_c$.

10. Find the Laplace Transform of the signal $x(t) = e^{-2t}\, u(t) + e^{3t}\, u(t)$. Also find the ROC.

(5 × 5 = 25 marks)

Part C

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

11. (a) Prove the following :—

(i) The power of the energy signal is zero over infinite time. (3 marks)

(ii) The energy of the power signal is infinite over infinite time. (3 marks)

(b) Given :

$$\left.\begin{aligned} x(t) &= 1, && 0 \le t < 1 \\ &= e^{-t}, && t \ge 1 \\ &= 0 && \text{otherwise} \end{aligned}\right\}$$

Plot

(i) $x(2t-3)$. (2 marks)

(ii) $x(2.5\,t - 0.5)$. (2 marks)

(iii) $x(2 - 1.5\,t)$. (2 marks)

Or

12. (a) State and prove commutative and distributive properties of convolution sum. (6 marks)

(b) Determine the natural response, forced response and output of system described by difference equation,

$y(n) + 3y(n-1) = x(n) + x(n-1)$ if input is $x(n) = \left(\frac{1}{2}\right)^n u(n)$ and $y(-1) = 2$.

(6 marks)

13. (a) For the continuous time periodic signal $s(t) = 2 + \cos 2t + \sin 4t$, determine the fundamental frequency w_0 and the Fourier series coefficients c_n such that $x(t) = \sum_{n=-\infty}^{\infty} c_n\, e^{-jnw_0 t}$

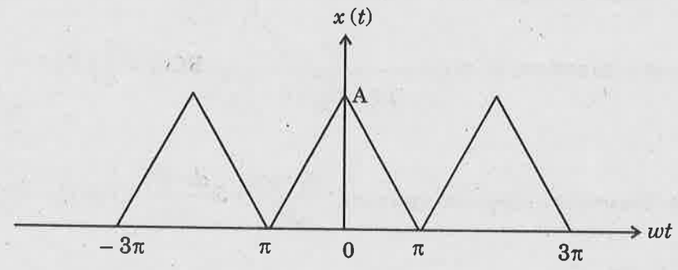
(6 marks)

(b) Show that the magnitude spectrum of every periodic function is symmetrical about the vertical axis passing through the origin, and the phase spectrum is antisymmetrical about the vertical axis passing through the origin.

(6 marks)

Or

14. Find the trigonometric and exponential Fourier series for the waveform shown below :



15. (a) Explain the scaling and time domain convolution properties of DTFT. (4 marks)

(b) Find the DTFT of $x(n) = \left(\frac{1}{2}\right)^n u(n-4)$. Also, find the magnitude and phase spectra.

(8 marks)

Or

16. Find the frequency response of :

(a) $h(t) = -\delta(t+1) + \delta(n) - \delta(t-1)$. (6 marks)

(b) $h(n) = (-1)^n \left[u(n+2) - u(n-3)\right]$. (6 marks)

G 1552 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2015

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. What is the need for modulation ?
2. Define envelope detector.
3. List out the characteristics of radio receivers.
4. State Bayes theorem.
5. Define noise temperature.

(5 × 3 = 15 marks)

Part B

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

6. Define with relevant equations mean and moment of a random process X(t).
7. Explain how ring modulator can be used to generate DSB-SC modulation.
8. Briefly explain about the characteristics of receivers.
9. A random variable has PDF given by $f_x(x) = 2 \exp(-2x)$ for $x \geq 0$. Find the probability that it will take a value between 1 and 3 ?
10. Derive an expression for overall equivalent noise temperature of the cascaded stages.

(5 × 5 = 25 marks)

Part C

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

11. Give the comparison between AM, FM and PM in detail.

Or

12. Derive an expression for single tone sinusoidal FM wave. Find its spectrum.

Turn over

13. Explain the operation of super heterodyne receiver in detail.

Or

14. Explain about : (a) Filter method ; (b) phase shift method.

15. Explain high level and low level AM transmitters with neat diagrams.

Or

16. Explain FM stereo transmitter and receiver.

17. Define Gaussian distribution. Discuss the properties of Gaussian process.

Or

18. Write short notes on : (a) Statistical averages ; (b) Expectation probability models.

19. What is meant by signaling techniques ? Explain inter channel and common channel signaling techniques.

Or

20. Write short notes on ; (a) Shot noise ; (b) Resistor noise ; (c) White noise ; and (d) Additive noise.

(5 × 12 = 60 marks)

G 1517 (Pages : 2) Reg. No.....

Name.....

Common to All branches

B.TECH. DEGREE EXAMINATION, MAY 2015

Fourth Semester

EN 010 402—PRINCIPLES OF MANAGEMENT

(Common to AI, AU, EC, EI, IC, IT, ME, MT, PO, PE and ST 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. Mention the objectives of control function.
2. List the advantages of training.
3. What are the three time estimates of PERT ?
4. What are the functions of financial management ?
5. List four different types of market.

(5 × 3 = 15 marks)

Part B

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

6. Explain different steps in planning.
7. What are the benefits of quality circle to the employees ?
8. Explain the different stages of product life cycle.
9. Explain different methods of costing with examples.
10. Write a note of sales promotion and sales forecasting.

(5 × 5 = 25 marks)

Part C

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

11. Explain the following functions of management :—

    (i) directing.

    (ii) staffing.

    (iii) communicating.

Or

Turn over

12. Differentiate between line organisation and stagg organisation. Write the advantages and disadvantages of both types.

13. Explain what do you understand by recruitment. What are the different sources of recruitment ? What are the merits and demerits of recruitment through these sources ?

Or

14. What is industrial fatigue ? What are the causes ? How they are overcome ?

15. Describe the scope and objectives of production management. What are the different types of production systems ?

Or

16. A small project consists of 7 activities whose time estimates are listed below :

Activity		t_o	t_m	t_p
1 – 2	...	1	1	7
1 – 3	...	1	4	7
1 – 4	...	2	2	8
2 – 5	...	1	1	1
3 – 5	...	2	5	14
4 – 6	...	2	5	8
5 – 6	...	3	6	15

(i) Draw the project network and identify the critical path.

(ii) Find the expected time and variance of each activity.

(iii) What is the probability that the project will be completed at least three weeks earlier than expected ?

17. What are the objectives and functions of financial management ? Explain.

Or

18. (a) Define capital. What are the different types ? Explain their important features.

(b) Write a note on standard costs.

19. (a) Explain different steps in advertising. Explain the media of advertisement.

(b) What are the different types of competitive situations found in a market ?

Or

20. Explain the different steps in marketing research. What is the importance of marketing research ?

(5 × 12 = 60 marks)

G 1559 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2015

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 Input offset voltage.
2. Draw the circuit diagram of a balanced-output differential amplifier.
3. Define SVRR.
4. Explain the condition for Oscillation.
5. Draw basic PLL topology.

(5 × 3 = 15 marks)

Part B

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

6. Discuss the characteristics of an ideal OP-AMP.
7. Draw and explain the simplified equivalent circuit of an OP-AMP.
8. Explain differential amplifier.
9. Discuss first order high pass filter with circuit diagram.
10. Explain ADC and DAC.

(5 × 5 = 25 marks)

Part C

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

11. With a block diagram explain Wilson current mirror.

Or

12. Discuss AC, analysis of a dual input balanced output differential amplifier.

Turn over

13. Differentiate between Inverting and Non-inverting amplifier with diagrams.

Or

14. Explain DC and AC analysis of Cascode amplifier.

15. With a neat diagram, explain Wein Bridge oscillator.

Or

16. Explain Schmitt trigger with circuit diagram.

17. Differentiate between Band pass and Band elimination filters.

Or

18. Explain Biquadriatic filters.

19. Discuss Voltage Controlled Oscillator (VCO).

Or

20. With a neat diagram, explain Ramp type ADC.

(5 × 12 = 60 marks)

G 1585 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2015

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. Explain the need for modulation in Electronic communications.
2. Define, compare and contrast between AM and FM indices.
3. Define and differentiate between the high level and low level AM.
4. Explain how the pre-emphasis and de-emphasis networks improve the noise performance of the receiver.
5. What is the function of the balanced modulator in the Armstrong modulation systems ?
6. Explain how the use of RF amplifier improves the signal-to-noise ratio of a superhet receiver.
7. What do you mean by companding ? What are its advantages ?
8. Describe a pilot carrier system.
9. Distinguish between pulse and tone dialling.
10. What is DTMF ? What are its merits ?

(10 × 4 = 40 marks)

Part B

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

11. A 500 W, 800 kHz carrier is amplitude modulated by two sine waves of 220 Hz and 2.2 kHz to depths of 40% and 50% respectively. Calculate the :

    (i) total power transmitted ;

    (ii) each side band power ;

    (iii) total bandwidth of the modulated wave; and

    (iv) Draw the spectrum of the above modulated wave.

Or

12. Starting from fundamentals, derive expression for an FM wave and identify the frequency components present in it. Discuss its spectrum.

13. Draw the complete block diagram of the Armstrong frequency modulator system and explain the function of the mixer and multiplier shown. In what circumstances can we dispense with the mixer ?

Or

14. With appropriate circuit diagrams, explain the principle of operation of base modulated and collector modulated AM generators.

15. Describe the circuit diagram of a mixer used with an AM receiver and explain its working when the receiver is tuned to a radio station of 620 kHz.

Or

16. Using circuit diagrams, show how the Foster-seely discriminator is derived form the balanced slope detector, and how in turn, the ratio detector is derived from the discriminator. In each step stress the common characteristics, and show what it is that makes each circuit different from the previous one.

17. Use a circuit diagram to help in an explanation of how a balanced modulator is able to demodulate SSB signals.

Or

18. Compare the three main systems of SSB generation by drawing up a table of the outstanding characteristics of each system.

19. With a neat block diagram, explain the operation of a single line analog SLIC board.

Or

20. With neat diagrams, explain how scanning of an image is done in the FAX transmitter ? How it is communicated through telephone line and how the image is recovered at the receiver ?

(5 × 12 = 60 marks)

G 1535 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2015

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 Error correcting and detecting codes. Mention their applications.
2. Define and explain : (1) Propagation delay ; (2) Fan in ; and (3) Emitter coupled logic.
3. What is the difference between combinational logic and sequential logic circuits ? Explain.
4. Mention the potential applications of counters. Explain any *two* in detail.
5. Draw the block diagram of PLA and explain it.

(5 × 3 = 15 marks)

Part B

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

6. State and explain Demorgan's theorem.
7. Explain the subfamilies of CMOS in detail.
8. Differentiate latch from FFs. Explain the difference.
9. Explain the types of ROM in detail.
10. Differentiate Static Hazard from Dynamic Hazard. Explain the difference.

(5 × 5 = 25 marks)

Part C

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

11. (i) Explain : (1) BCD ; (2) XS 3 code with examples.

    (ii) Explain Binary and octal number systems with examples.

Or

Turn over

12. (i) Explain the limitation of K map.

    (ii) State and prove all the Boolean law's.

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

    (ii) Draw a basic ECL inverter and explain it in detail.

Or

14. Explain the characteristics of TTL and CMOS logic families, NMOS NOR gate in detail.

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

Or

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

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

17. Explain the design steps of MOD n synchronous counter with an example.

Or

18. (i) Explain the types of shift register with neat diagrams.

    (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 CPLD and explain in detail.

Or

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

    (ii) Write a technical note on "ASIC-categories".

(5 × 12 = 60 marks)

G 1595 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2015

Fourth Semester

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

ELECTRONIC CIRCUITS—II (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. Draw the *r*-parameter equivalent circuit of a CE transistor and define the parameters.
2. Three stages of RC coupled amplifiers, each with lower cut-off frequency of 100 Hz are cascaded calculate the resultant lower cut-off frequency of the cascaded combination.
3. State the four properties of Emitter follower.
4. Starting from fundamentals, derive equation to prove that the gain of the amplifier with negative feedback is independent of the active device parameters.
5. State and explain piezoelectric effect as used in crystal oscillators.
6. Draw the circuit of a tuned collector oscillator.
7. Compare and contrast the base and collector triggering used in a monostable multivibrator..
8. List the applications of schmitt trigger.
9. What is harmonic distortion ? Give its reason.
10. With a block diagram, describe how a fictions amplifier can be used to get constant current charging in a linear sweep generator.

(10 × 4 = 40 marks)

Part B

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

11. Draw the circuit of a two stage RC coupled amplifier and design it for a voltage gain of 800.

Or

12. With neat circuit diagrams, describe the single and double tuned amplifiers and discuss their applications.

Turn over

13. With block diagrams, describe which of the basic gains is independently being controlled in the four types of topologies of the negative feedback amplifiers ? With the help of expressions, discuss what happens to the input resistance in each case.

Or

14. With neat circuit diagram, explain the advantages of a darlington emitter follower. Derive equations for its R_i, A_v and A_i ?

15. Draw the circuit diagram of RC phase-shift oscillator, using BJT. Obtain its h-parameter equivalent circuit. Derive condition for oscillations.

Or

16. Draw and explain the circuits of :

    (i) wienbridge oscillator and

    (ii) Crystal oscillator assembled using BJT.

17. Describe the working of a self biased transistorised monostable multivibrator with base triggering. Derive expression for its pulse width.

Or

18. Describe the working of a self biased transistorised schmitted trigger. Design the circuit for LTP = + 2V, UTP = +4V, and draw the waveforms.

19. Explain the working of a class B push pull complementary symmetry power amplifier with its transfer characteristics. Derive expression for its efficiency.

Or

20. With circuit diagrams and waveforms, explain how linear sweep voltage is obtained from a Boot strap sweep generator. Derive the expression for its sweep period.

(5 × 12 = 60 marks)