Hall Ticket Number :										

R-17

Code: 7G343

II B.Tech. II Semester Supplementary Examinations August 2021

Analog Communications

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five* full questions by choosing one question from each unit (5x14 = 70 Marks)

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UNIT–I

1. a) Derive the expressions of various power calculations involved in AM. 8M
   b) Draw the frequency spectrum of AM with relevant expressions. 6M

OR

2. a) What is Costas Loop? How it can be used in the detection of DSBSC signals. 7M
   b) A 400W carrier is modulated to a depth of 75%. Find the total power of the following modulation schemes by assuming the modulating signal is sinusoidal. i. AM ii. DSBSC 7M

UNIT–II

3. a) Write about single tone Frequency modulation with relevant expressions. 7M
   b) Draw the frequency spectrum of NBFM with required expressions. 7M

OR

4. a) Describe the principle of operation of Balanced Discriminator with neat sketches. 7M
   b) Calculate the BW of a commercial FM transmission by assuming Δf=75 KHz & W= 15 KHz and also calculate the modulation index. 7M

UNIT–III

5. a) Compare the noise performance of DSB-SC and SSB-SC 7M
   b) Write short note on Threshold effect in Angle Modulation System 7M

OR

6. a) Prove that the FOM for AM is less than one. 8M
   b) Summarize the threshold effect in Angle modulation. 6M

UNIT–IV

7. a) Write short notes on Classification of Radio transmitters 7M
   b) Discuss about RF section and its features. 7M

OR

8. a) Draw the block diagram of AM transmitter using low level modulation and explain the significance of each block 8M
   b) Explain about selection of Intermediate frequency. 6M

UNIT–V

9. a) Write about TDM with its block diagram. 7M
   b) Describe the method of generation of PWM signals with neat schematics. 7M

OR

10. a) With the aid of the block diagram, briefly explain Frequency division multiplexing? 7M
    b) Explain about detection of PPM signal and mention its merits and demerits? 7M

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Hall Ticket Number :										

R-17

Code: 7GC43

II B.Tech. II Semester Supplementary Examinations August 2021

Complex Variables and Special Functions

(Common to EEE & ECE)

Max. Marks: 70 Time: 3 Hours

Answer *any five* full questions by choosing one question from each unit (5x14 = 70 Marks)

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UNIT–I

1. a) Symmetry of Beta function B(m, n)=B(n, m) 7M

   b) Evaluate $\int_0^1 \frac{x^2}{\sqrt{1-x^5}}dx$ in terms of B function 7M

OR

2. a) Find real and imaginary parts $\cot z$ 7M

   b) Find all the roots of $\sin z = 2$ 7M

UNIT–II

3. Determine P such that the function $f(z)=\frac{1}{2}\log\left(x^2+y^2\right)+i\,Tan^{-1}\left(\frac{px}{y}\right)$ be an analytic function 14M

OR

4. Find an analytic function whose real part is $e^{-x}\left[x\sin y - y\cos y\right]$ 14M

UNIT–III

5. Evaluate $\int_c \left(y^2+2xy\right)dx+\left(x^2-2xy\right)dy$ where c is the boundary of the region by $y=x^2$ *and* $x=y^2$ 14M

OR

6. Expand $Log\, z$ by Taylor's series about z=1. 14M

UNIT–IV

7. a) Find the poles and Residues at each pole $\frac{ze^z}{(z-1)^3}$ 7M

   b) Use Residue theorem to find the number of zeros of the polynomial $z^{10}-6z^7+3z^3+1$ if $|z|<1$ 7M

OR

8. Evaluate $\int_c \frac{e^{2z}}{(z-1)(z-2)}dz$ where c is the circle $|z|=3$ 14M

UNIT–V

9. Find the bilinear Transformation which maps the point (-1, 0, 1) into the points (0, i, 3i). 14M

OR

10. Find the image of the region in the z-plane between the lines y=0 and $y=\frac{®}{2}$ under the Transformation $w=e^z$. 14M

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Hall Ticket Number :										

R-17

Code: 7G344

II B.Tech. II Semester Supplementary Examinations August 2021

Field Theory and Transmission Lines

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five* full questions by choosing one question from each unit (5x14 = 70 Marks)

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UNIT–I

1. a) Define co-ordinate system? Explain different types of co-ordinate systems. 10M

   b) Write a short note on following: i) Stoke's theorem ii) Divergence theorem. 4M

OR

2. a) Define Electric potential? Derive the expression for Electric potential. 7M

   b) Determine the Divergence and curl vector field as $T=10r \sin_2\theta\ 2\cos\Phi$. 7M

UNIT–II

3. a) Write and explain different kinds of current density's with suitable diagrams and expressions. 7M

   b) In a cylindrical conductor of radius 2mm,the current density varies with distance from the axis according to $J= 10^3\ e^{-400r} A/m^2$. Find the total current I. 7M

OR

4. a) Derive the expressions for resistance of conductor with uniform cross section 7M

   b) If $J=1/r^3\ (2\cos\theta a_r + \sin\theta\ a\theta)\ A/m^{2,}$ calculate the current passing through

      i) A hemispherical shell of radius 20cm,$0<\theta<\pi/2$, $0<\Phi<2\pi$

      ii) A spherical shell of radius 10cm 7M

UNIT–III

5. a) Derive the force equation due to current element. 7M

   b) Write Maxwell's equations for static EM fields. 7M

OR

6. State and prove Biot savart's law ,using Biot savart's law derive an expression for magnetic field strength H due to a finite &Infinite filamentary conductor carrying a current I and placed along Z-axis at appoint P on Y–axis .hence deduce the magnetic field strength for the length of the conductor extending from $-\infty+\infty$. 14M

UNIT–IV

7. a) Define the wave? List out the different medias and Give the properties of different medias. Write the E&H equations in those medias. 7M

   b) A uniform plane wave propagating in medium has $E= 2\ e^{-\alpha z} \sin(10^8 t - \beta z)\ a_y$ V/m. If the medium is characterized by $\epsilon_r=1$, $\mu_r = 20$ and $\sigma=3$ S/m. Find α , β and H. 7M

OR

8. a) Derive the relation between E& H in a uniform plane wave. find the value of intrinsic impedance of free space . 7M

   b) In free space $H= 0.1\cos(2x10^8 - \beta_z)\ a_{y\ A/m,}$ calculate i) β, λ and T ii) the time t_1 takes by the wave to travel a distance of $\lambda/8$. 7M

UNIT–V

9. a) Define transmission line? And explain different types of transmission line with neat sketches. 8M

   b) Discuss about infinite line concept. 6M

OR

10. a) Derive the expression for the input impedance of a transmission line of length. 7M

    b) A loss less line of 300Ω is terminated by a load of $Z_{R.}$ if the VSWR at 200MHZ is 4.48,and the first V_{min} is located at 6 cm from the load .calculate the reflection coefficient and Z_R 7M

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Hall Ticket Number :										

R-17

Code: 7GA41

II B.Tech. II Semester Supplementary Examinations August 2021

Managerial Economics and Financial Analysis

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five* full questions by choosing one question from each unit (5x14 = 70 Marks)

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UNIT–I

1. Define Managerial Economics. Explain its Nature and Scope 14M

OR

2. Define 'Demand' and Explain the factors that influence the demand of a product. 14M

UNIT–II

3. Define Break-even Analysis. Discuss its Objectives and Assumptions. 14M

OR

4. Explain cost-output relationship in short run and Long run. 14M

UNIT–III

5. a) What are the salient features Partnership firm? 7M

   b) Explain Different kinds of partners 7M

OR

6. What is Business Organization? Discuss Forms of Public Enterprises. 14M

UNIT–IV

7. Determine the Pay Back Period for the information given below:
   a) The project cost is Rs. 20,000
   b) The life of the project is 5 years
   c) The cash flows for the 5 years are Rs.10,000, Rs.12,000; Rs.13,000; Rs.11,000; and Rs. 10,000 respectively and Tax rate is 20%. 14M

OR

8. Define Capital. Describe Sources of Raising Capital to the firm. 14M

UNIT–V

9. Define Financial Accounting. Explain different types of Financial Statements. 14M

OR

10. How are ratios classified for the purpose of financial analysis? Explain any two types of ratios under each category? 14M

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Hall Ticket Number :										

R-17

Code: 7G342

II B.Tech. II Semester Supplementary Examinations August 2021

Pulse and Digital Circuits

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five* full questions by choosing one question from each unit (5x14 = 70 Marks)

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UNIT–I

1. a) Discuss the application of Attenuator as a CRO probe 8M

   b) Define the following:

   i) Linear wave Shaping ii) Lower cutoff frequency iii) Rise time 6M

OR

2. A 10 Hz square wave is fed to an amplifier. Calculate and plot the output waveform under the following conditions. The lower 3-dB frequency is a) 0.3 Hz b) 3 Hz c) 30Hz 14M

UNIT–II

3. a) State and Prove the clamping circuit theorem. 8M

   b) Explain the operation of a two level diode clipper with the help of circuit diagram? 6M

OR

4. a) Explain the diode switching times with their neat diagrams 10M

   b) Explain piecewise linear characteristics of the diode 4M

UNIT–III

5. Draw the circuit diagram of Fixed Bias Bistable Multivibrator and explain its operation with the help of wave forms at base and collector 14M

OR

6. Find the Lower and Upper Threshold voltage for Schmitt trigger circuits with following data. Assume transistors with h_{fe}=30, V_{cc}=12V, R_{c1}=4K, R_{c2}=1K, R_1=2K, R_s=1K, R_2=6K, R_e=3K 14M

UNIT–IV

7. a) How is linearity corrected through adjustment of the driving waveform for a Current Time Base Generator 8M

   b) What are the applications of Time Base Generators 6M

OR

8. a) Illustrate the working principle of Bootstrap time base generator 7M

   b) Explain transistor Miller time base generator with neat diagram 7M

UNIT–V

9. a) Explain about unidirectional sampling gate with neat sketch 8M

   b) Discuss the advantages and disadvantages of Unidirectional sampling gate 6M

OR

10. a) Verify the truth table of CMOS NOR gate with neat sketches 10M

    b) What are the applications of sampling gates? 4M

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Hall Ticket Number :										

R-17

Code: 7G341

II B.Tech. II Semester Supplementary Examinations August 2021

Random Variables and Random Processes

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five* full questions by choosing one question from each unit (5x14 = 70 Marks)

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UNIT–I

1. a) Discuss the Independent and mutually exclusive events with an example each. 8M

   b) A fair coin is tossed 4 times. Find the probability for the longest string of heads appearing to be three as a result of the above experiment 6M

OR

2. A missile can be accidentally launched if two relays A and B both have failed. The probabilities of A and B failing are known to be 0.01 and 0.03, respectively. It is also known that B is more likely to fail (probability 0.06), if A has failed.
   a) What is the probability of an accidental missile launch?
   b) What is the probability that A will fail, if B has failed?
   c) Are the events “A fails” and “B fails” statistically independent? 14M

UNIT–II

3. a) Find the mean and variance of Binomial random variable 7M

   b) Explain about Moments about the origin and Central Moments with necessary equations 7M

OR

4. a) The random variable x has characteristic function given by $\phi(t) = 1 - (t),(t) \leq 1 = 0,(t) > 1$ Find the density function of random variable X. 7M

   b) Define Moment Generating Function and state and prove any 3 properties. 7M

UNIT–III

5. a) Explain the joint conditional density function with relevant expressions 7M

   b) Two random variables Y1,Y2 are defined as $Y1 = X\cos\theta + Y\sin\theta$, $Y2 = -X\sin\theta + Y\cos\theta$ Find the co-variance between Y1 and Y2 7M

OR

6. a) State and explain the central limit theorem 10M

   b) State all the properties of joint probability density function. 4M

UNIT–IV

7. a) When do you call two random processes to be jointly wide sense stationary? 6M

   b) Given the Autocorrelation function of the processes:

   $$R_{XX}(\tau) = 25 + \frac{4}{1 + 6\tau^2}$$

   Find the mean and variance of the process X(t). 8M

OR

8. a) Explain the concept of time average and ergodicity. Write the conditions for a random process to be ergodic in mean and autocorrelation 8M

   b) Discuss about stationarity and elaborate various types of stationarity 6M

UNIT–V

9. a) Derive the expression for power density spectrum of a random process 7M

   b) The autocorrelation function of a random process $RXX(\tau) = 4\cos(\omega_o\tau)$, where ω_o is a constant. Obtain its power spectral density. 7M

OR

10. a) If $Y(t) = A.\text{Cos}(w_0t+\theta)+N(t)$, where ‘θ’ is a uniform random variable over $(-\pi,\pi)$, and N(t) is a band limited Gaussian white noise process with PSD=K/2. If ‘θ’ and N(t) are independent, find the PSD of Y(t). 8M

    b) State and Prove wiener khinchine relation. 6M

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