4E1325

Roll No. _____ Total No. of Pages: 3

4E1325

B. Tech. IV - Sem. (Main) Exam., - 2022
Electronics & Communication Engineering
4EC2 – 01 Advanced Engineering Mathematics - II
EC, EI

Time: 3 Hours **Maximum Marks: 70**

Instructions to Candidates:

Attempt all ten questions from Part A. Five questions out of seven questions from Part B and three questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

PART – A

(Answer should be given up to 25 words only) **[10×2=20]**

All questions are compulsory

Q.1 Check the function $f(z) = z^2$ is analytic or not.

Q.2 Define conformal transformation.

Q.3 Write Cauchy's derivative formula.

Q.4 If $C:|z| = \frac{5}{3}$, the evaluate $\int_C \frac{dz}{z-2}$,

Q.5 Write statement for the Cauchy's residue theorem.

Q.6 Find residue of $\frac{z^2}{z^2+4}$ at $z = -2i$.

Q.7 Write orthogonal property for Bessel's function.

Q.8 Show that $P_n(-1) = 1$

Q.9 Write standard basis of vector space R^2 over R.

Q.10 What do you mean by linear span?

PART – B

[5×4=20]

(Analytical/Problem solving questions)

Attempt any five questions (Word limit 100)

Q.1 Define analytic function and find the values of a, b, c and d such that the function -

$f(z) = x^2 + axy + by^2 + i(cx^2 + dxy + y^2)$ is analytic.

Q.2 By using the Cauchy's integral formula, evaluate the complex integral –

$$\int_{|z|=3} \frac{dz}{(z+1)^4}$$

Q.3 Find the residue of $\frac{z^2}{(z-1)(z-2)(z-3)}$, at z = 1, 2, 3 and infinity. Also show that their sum is zero.

Q.4 Show that –

$$j_{\frac{3}{2}}(x) = \sqrt{\frac{2}{\pi x}}\left[\frac{\sin x}{x} - \cos x\right].$$

Q.5 If $P_n(x)$ represents the Legendre's polynomial of order n, then show that –

$$nP_n(x) = xP'_n(x) - P'_{n-1}(x).$$

Q.6 Check the linear dependence/linear independence of the following set of vectors –

$S = \{(1, 0, 2, 1), (1, 3, 2, 1), (4, 1, 2, 2)\}$ in R^4.

Q.7 In R^3, let $v_1 = \{2, 1, 1\}$ and $v_1 = \{1, -1, 3\}$. Determine whether the vector $v = \{1, 5, -7\}$ belongs to Span $\{v_1, v_2\}$.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) **[3×10=30]**

Attempt any three questions

Q.1 Prove that the function defined by –

$$f(z) = \begin{cases} \frac{x^3y(y-ix)}{x^3+y^2}, & \text{if } z \neq 0 \\ 0, & \text{if } z = 0 \end{cases}$$

is not analytic at the origin although Cauchy-Riemann equations are satisfied at the origin.

Q.2 Represent the function $\frac{1}{(z-1)(z-3)}$ in powers of z which are valid for regions –

(a) $|z| < 1$,

(b) $1 < |z| < 3$ and

(c) $|z| > 4$

Q.3 Use method of contour integration to evaluate –

$$\int_0^{2\pi} \frac{d\theta}{a+b\sin\theta}, |a| > |b|.$$

Q.4 State and prove the Rodrigues formula for the Legendre's polynomials.

Q.5 Apply the Gram-Schmidt process to the vectors $\beta_1 = (1, 0, 1)$, $\beta_2 = (1, 0, -1)$, and $\beta_3 = (0, 3, 4)$ to obtain an orthonormal basis for $V_3(R)$ with the standard inner product.

4E1326

Roll No. _____ Total No. of Pages: 3

4E1326

B. Tech. IV - Sem. (Main) Exam., - 2022

Electronics & Communication Engineering

4EC4-04 Analog Circuits

EC, EI

Time: 3 Hours **Maximum Marks: 70**

Instructions to Candidates:

Attempt all ten questions from Part A. Five questions out of seven questions from Part B and three questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

PART – A

(Answer should be given up to 25 words only) **[10×2=20]**

All questions are compulsory

Q.1 Why conversion of an analog signal into an equivalent digital signal is essential?

Q.2 Why does an OP-AMP have high CMRR?

Q.3 What is the difference between cascaded and cascaded amplifier?

Q.4 How do series and shunt feedback differ from each other?

Q.5 Why power amplifiers are called large signal amplifiers?

Q.6 Explain, why positive feedback and not negative feedback is necessary to produce oscillations?

Q.7 Define offset voltage as applied to an OP-AMP.

Q.8 Why bias compensation is required?

Q.9 Why FET is called voltage controlled device?

Q.10 Why collector is made larger than emitter and base in BJT?

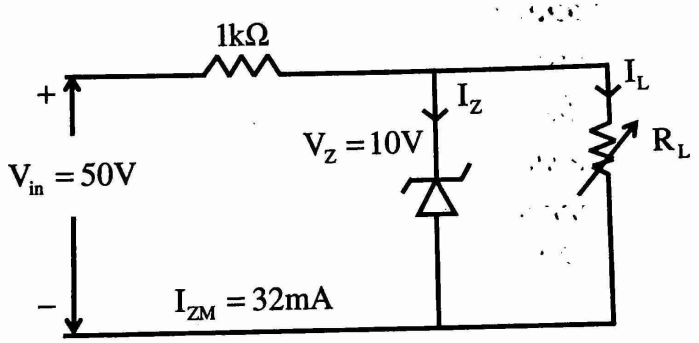
PART – B

(Analytical/Problem solving questions) **[5×4=20]**

Attempt any five questions (Word limit 100)

Q.1 Compare the characteristic of transistor amplifiers in three possible configurations.

Q.2 For the circuit given below determine the range of R_L and I_L that will result in V_{RL} being maintained at 10 volt



Q.3 Draw the circuit for Wien bridge oscillator and hence obtained its condition of sustained oscillations.

Q.4 The input terminals of an OP-AMP are connected to voltage signal of strength 745 μv and 740 μv respectively. The gain of OP-AMP in differential mode is 5×10^5 and its CMRR is 80 dB. Calculate the output voltage and percentage error due to common mode.

Q.5 Explain successive approximation type $\frac{A}{D}$ converter.

Q.6 Draw the circuit diagram of voltage series feedback amplifier and derive the expressions for input and output impedance.

Q.7 Explain the working of Astable multivibrator with neat circuit diagram.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) **[3×10=30]**

Attempt any three questions

Q.1 (a) Draw the circuit of a common-emitter amplifier with emitter bias (or self-bias). Derive relation for stability factor $\int = \frac{\partial I_C}{\partial I_{CO}}$ for such a circuit.

(b) In above circuit let V_{CC} = 20 volt, R_E =lkΩ and $\beta = 100$ for silicon transistor. Design the values for different resistors in the circuit, so that S=10 & I_C=2mA.

Q.2 (a) Draw the V-I characteristic of P-N junction diode and show how temperature change affect the characteristic.

(b) A class 'A' power amplifier user a transformer as a coupling device, the transformer has a turn ratio of 10 and the secondary load is 10Ω. If the zero signal collector current is 100 mA. Find the maximum output power.

Q.3 Determine the following in OP-AMP –

(a) Slew rate

(b) Input offset current

(c) Input bias current

(d) Power supply rejection ratio (PSRR)

(e) Common mode rejection ration (CMRR)

Q.4 Explain the Barkhausen criterion for sustained oscillations. Draw the circuit of RC phase shift oscillator, describe its working and find frequency of oscillations.

Q.5 Write short notes on following –

(a) Cross over distortion

(b) Brief account of feedback topologies

(c) Transistor biasing schemes

4E1327

Roll No. _____ Total No. of Pages: 2

4E1327

B. Tech. IV - Sem. (Main) Exam., - 2022
Electronics & Communication Engineering
4EC4 - 05 Microcontrollers
EC, EI

Time: 3 Hours **Maximum Marks: 70**

Instructions to Candidates:

Attempt all ten questions from Part A. Five questions out of seven questions from Part B and three questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

PART – A

(Answer should be given up to 25 words only) **[10×2=20]**

All questions are compulsory

Q.1 Why AD_0-AD_7 lines are multiplexed? Explain.

Q.2 What is the difference between microprocessor and microcontroller?

Q.3 Differentiate between Flash memory and Cache memory.

Q.4 What is interrupt service routine?

Q.5 Explain the various steps involved while executing CALL instruction with an example.

Q.6 What is the difference between software interrupt and hardware interrupt?

Q.7 What do you mean by embedded processor?

Q.8 Give comparison between memory mapped I/O and I/O mapped I/O.

Q.9 What is the function of ALE signal in 8085 microprocessor?

Q.10 Define Access time.

PART – B

(Analytical/Problem solving questions) **[5×4=20]**

Attempt any five questions (Word limit 100)

Q.1 Explain with example the various addressing modes of 8051.

Q.2 Explain different types of jump instructions used in 8086 microprocessor.

Q.3 How physical address is generated in 8086 microprocessor.

Q.4 What is RISC processor? Discuss its advantages and disadvantages in detail.

Q.5 What do you mean by the term addressing mode? What are different addressing modes supported by 8051?

Q.6 Explain the operation of the following instructions and specify addressing mode and number of machine cycle required:

(a) DAA

(b) DAD B

(c) XTHL

(d) CNC addr

Q.7 Write a program in 8085 microprocessor to find the smallest number from a given block of data.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) **[3×10=30]**

Attempt any three questions

Q.1 Explain DMA controller with the help of proper block diagram.

Q.2 Draw and explain the virtual memory organization.

Q.3 Explain ARM microcontroller interface design.

Q.4 Draw and explain the architecture of 80486 processor.

Q.5 Draw pin diagram of 8085 microprocessor and explain its various pins.

GITS 13/9/22

4E1328

Roll No. _____ Total No. of Pages: 2

4E1328

B. Tech. IV - Sem. (Main) Exam., - 2022
Electronics & Communication Engineering
4EC3 – 06 Electronics Measurement & Instrumentation

Time: 3 Hours **Maximum Marks: 70**

Instructions to Candidates:

Attempt all ten questions from Part A. Five questions out of seven questions from Part B and three questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

PART – A

(Answer should be given up to 25 words only) **[10×2=20]**

All questions are compulsory

Q.1 Define the terms of Limits of errors.

Q.2 What do you mean by probable error?

Q.3 Draw the basic diagram of Q meters.

Q.4 What do you mean by shielding and grounding?

Q.5 What are the applications of sampling oscilloscopes?

Q.6 What are the applications, merits and demerits of sweep frequency generators?

Q.7 Draw the block diagram of heterodyne wave analyzers.

Q.8 Differentiate the active and passive transducers.

Q.9 What do you mean by LVDT? Draw its Characteristics.

Q.10 What are the applications, merits and demerits of strain gauges?

PART – B

(Analytical/Problem solving questions) **[5×4=20]**

Attempt any five questions (Word limit 100)

Q.1 Explain the Gaussian error analysis with suitable diagrams.

Q.2 Explain the RF power & voltage measurements with suitable diagrams.

Q.3 Draw and explain the circuit diagram of electronic multimeters.

Q.4 Explain the different types of CRO Probes?

Q.5 Explain the working and applications of frequency synthesized signal generators.

Q.6 What do you mean by see-back effect? Draw and explain the various characteristics of thermocouples.

Q.7 What do you mean by piezoelectric transducers? Explain its working, merits and demerits & applications also.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) **[3×10=30]**

Attempt any three questions

Q.1 Explain the following errors with suitable examples –

(a) Random errors

(b) Systematic errors

Q.2 Explain the diagram of vector impedance meter with merits, demerits and applications.

Q.3 Explain the construction and working of storage oscilloscopes with suitable diagram, merits and demerits.

Q.4 Explain the block diagram of frequency selective wave analyzers with applications.

Q.5 Explain the following with suitable diagram.

(a) RTD

(b) Bourdon Tubes

4E1329

Roll No. _____ Total No. of Pages: 2

4E1329

B. Tech. IV - Sem. (Main) Exam., - 2022
Electronics & Communication Engineering
4EC4-07 Analog and Digital Communication
EC, EI

Time: 3 Hours **Maximum Marks: 70**

Instructions to Candidates:

Attempt all ten questions from Part A. Five questions out of seven questions from Part B and three questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

PART – A

(Answer should be given up to 25 words only) **[10×2=20]**

All questions are compulsory

Q.1 What is VSB? Where is it used?

Q.2 Differentiate random variable and random process.

Q.3 Define noise in communication.

Q.4 State the sampling theorem.

Q.5 What is Quantization in PCM System?

Q.6 What is Nyquist criterion?

Q.7 Define modulation index.

Q.8 List any four advantages of TDM.

Q.9 Define Inter Symbol Interference.

Q.10 Define slope overload distortion in delta modulation.

PART – B

(Analytical/Problem solving questions) **[5×4=20]**

Attempt any five questions (Word limit 100)

Q.1 Determine the signal to quantization ratio of a delta modulator for a sinusoidal signal with a bit rate of 64 kbps and input signal bandwidth of 4 kHz.

Q.2 Describe the role of pre-emphasis and de-emphasis circuit in SNR improvement.

Q.3 Explain the generation and demodulation of PAM signals with suitable block diagram.

Q.4. Find the percentage of power saved in SSB when compared with AM system.

Q.5 Explain coding and decoding of a PCM signal.

Q.6 Explain PSK sketch the waveform of PSK for binary sequence 1100101.

Q.7 What are digital modulation tradeoffs? Explain optimum filter.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) **[3×10=30]**

Attempt any three questions

Q.1 Draw the block diagram and describe the operation of a delta modulator. What are its advantages and disadvantages compared to a PCM system?

Q.2 Define modulation index for FM and PM and obtain the relation between modulation index and modulating signal for FM and PM.

Q.3 Explain maximum likelihood sequence detection with suitable block diagram.

Q.4 What do you mean by optimum detector? Find the impulse response of optimum detector in the presence of additive white noise.

Q.5 What is multiplexing in communication system? Describe the multiplexing hierarchy for digital multiplexing.
