4E1325

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4E1325

B.Tech. IV Sem. (Main/Back) Examination, July - 2023
Electronics and Comm. 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**, Attempt any **five** questions out of **Seven** questions from **Part B** and **three** questions out of **Five** questions from **Part C**.*

Schematic diagrams must be shown wherever necessary. Any data 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. (As Mentioned in form No. 205).

PART - A

(Word limit 25)

All questions are **compulsory.** **(10×2=20)**

1. What do you mean by an "Analytic Function".
2. Define the term "Conformal Mapping".
3. State Cauchy's residue theorem.
4. State maximum - Modulus theorem.
5. Determine the poles of the function $f(z)=\frac{z^2}{(z-1)^2(z+2)}$.
6. Find the residue of the function $f(z)=\frac{\sin z}{z\cos z}$ at $z=0$.
7. Write an expression of the generating function for $P_n(x)$.
8. State orthogonal property of Bessel's function.
9. Define 'Linear Independence' of vectors.
10. Explain the term "Minimal Polynomial".

PART - B

(Word limit 100)

Attempt any **Five** questions. **(5×4=20)**

1. Prove that the function $u = x^3 - 3xy^2 + 3x^2 - 3y^2 + 1$ satisfies Laplace's equation and determine the corresponding analytic function $u + iv$.

2. Obtain the Laurent's series for the function $f(z) = \frac{1}{(4z - z^2)}$ in the region $0 < |z| < 4$.

3. Prove the following : $(2n+1)P_n = P'_{n+1} - P'_{n-1}$.

4. Prove the following : $2nJ_n(x) = x\,[J_{n-1}(x) + J_{n+1}(x)]$.

5. Define the term "Inner Product Spaces".

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

7. Let V be an inner product space and α, β be vectors in V. Prove that $\alpha = \beta$ if and only if $< \alpha, \gamma > = < \beta, \gamma >$ for every γ in V.

PART - C

Attempt any **Three** questions. **(3×10=30)**

1. Prove that the function $f(z) = \sqrt{|xy|}$ is not analytic at the origin, although the Cauchy - Riemann equations are satisfied at that point.

2. Using Cauchy's integral formula, evaluate the integral $\int_C \frac{\sin(\pi z^2) + \cos(\pi z^2)}{(z-1)(z-2)} dz$ where C is the circle $|z| = 3$.

3. Evaluate the following integral by contour integration :

   $\int_0^{2\pi} \frac{1}{(5 - 3\sin\theta)^2} d\theta$.

4. Prove that, when n is a positive integer, $J_n(x)$ is the coefficient of z^n in the expansion of $e^{\frac{x}{2}\left(z - \frac{1}{z}\right)}$ in ascending and descending powers of z.

5. Prove that the vectors (1,2,1), (2,1,0), (1,-1,2) form a basis of R^3.

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4E1303

B.Tech. IV Sem. (Main/Back) Examination, July - 2023
4AE1-02 Technical Communication/All branches

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

Instructions to Candidates:

*Attempt **all ten** questions from **Part A**, Attempt any **five** questions out of **Seven** questions from **Part B** and **three** questions out of **Five** questions from **Part C**.*

Schematic diagrams must be shown wherever necessary. Any data you feel missing 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).

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory. **(10×2=20)**

1. Mention two objectives of Technical communication.
2. What do you understand by the term **"Technical Document"**.
3. Define the term **"Technical Discourse"**?
4. Name different types of **"Technical Reports"**?
5. Distinguish between **Technical and non - Technical communication.**
6. Suggest two methods of enhancing **Listening communication skills.**
7. Mention any two ways for improving **Linguistic abilities** of engineering students.
8. What do you mean by **Information Development.**
9. What does **Structure of technical articles** stand for.
10. Mention the different types of **Technical Articles.**

PART - B

(Analytical/Problem solving questions)

Attempt any five questions **(5×4=20)**

1. Describe how to write a **Technical Project Proposal** in a step by step manner.
2. Recently your college held several competitions as part of Techfest celebrations. Write an article in 100-125 words on the topic 'The prize distribution' for your college magazine. Sign as sweety/suresh.
3. Write an E-mail to announce and congratulate your team as it has achieved the quarterly goal of reaching $500,000 in sales. Invent all relevant information.
4. What is the importance of **Communication Skills**? Discuss in detail.
5. On the basis of your reading of the passage given below, make **notes** in points only, using abbreviations, wherever necessary. Also, suggest a suitable title.

Although environmental pollution can be caused by natural events such as forest fires an active volcanoes, use of the word pollution generally implies that the contaminants have an anthropogenic source - that is, a source created by human activities. Pollution has accompanied humankind ever since groups of people first congregated and remained for a long time in any one place. Indeed, ancient human settlements are frequently recognized by their wastes - shell mounds and rubble heaps, for instance, Pollution was not a serious problem as long as there was enough space available for each individual or group. However, with the establishment of permanent settlements by great numbers of people, pollution became a problem, and it has remained one ever since.

Cities of ancient times were often noxious places, fouled by human wastes and debris. Beginning about 1000 CE, the use of coal for fuel caused considerable air pollution, and the conversion of coal to coke for iron smelting beginning in the 17th century exacerbated the problem. In Europe, from the Middle ages well into the early modern era, unsanitary urban conditions favoured the outbreak of population - decimating epidemics of disease, from plague to cholera and typhoid fever. Through the 19th century, water and air pollution and the accumulation of solid wastes were largely problems of congested urban areas. But, with the rapid spread of industrialization and the growth of the human population to unprecedented levels, pollution became a universal problem.

By the middle of the 20th century, an awareness of the need to protect air, water, and land environments from pollution had developed among the general public. In particular, the publication in 1962 of Rachel Carson's book Silent Spring focused attention on environmental damage caused by improper use of pesticides such as

DDT and other persistent chemicals that accumulate in the food chain and disrupt the natural balance of ecosystems on a wide scale. In response, major pieces of environmental legislation, such as the Clean Air Act (1970) and the Clean water Act (1972 ; United states), were passed in many countries to control and mitigate environmental pollution.

6. Suggest some tried and tested techniques on how to **Revise** a technical text.

7. Fill in the blanks (Any four) :

1. He ..... (write) to me every month.

   a. is writing b. has been writing

   c. had been writing d. writes

2. There was nothing he could do ..... wait.

   a. and b. except

   c. otherwise d. than

3. This damaged building is ..... sale.

   a. in b. at

   c. on d. for

4. He ..... (be) weak in english in the beginning.

   a. being b. was

   c. been d. has been

5. He became ..... IAS officer.

   a. an b. a

   c. no article d. the

PART - C

(Descriptive/Analytical/Problem solving/Design Question)

Attempt any Three questions. **(3×10=30)**

1. What is technical communication? Discuss the different forms of communication.

2. What do you mean by minutes of meeting? What 8 things should the minutes of a meeting include?

3. Ankush Goyal, a resident of 315, Goal Chouraila, Mumbai reads an advertisement in the newspaper for the requirement of engineering graduates to market the products of a multinational company located in Mumbai. He decides to apply for the same. Write Ankush's application to the personnel manager, Larsen and Turbo Ltd. 365, Badlapur, Mumbai.

4. You are Ankush/Ankita. You partook in a program planned by 'Enterpreneurs Club'. You had the opportunity of listening to professionals about social entrepreneurship, Scalable startup entrepreneurship, Small business entrepreneurship, Large company entrepreneurship, Innovation entrepreneurship, etc. Write a report on the program of about 150-200 words for "Entrepreneurs Avenues' mentioning the importance of entrepreneurship.

5. Write a note on information Design.

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4E1326

B.Tech. IV-Sem. (Main/Back) Examination, July - 2023
Electronic Inst. and Control Engineering
4EI4-04 Analog Circuits
EC, EI

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

Instructions to Candidates:

*Attempt **all ten** questions from **Part A**, Attempt any **five** questions out of **Seven** questions from **Part B** and **three** questions out of **Five** questions from **Part C**.*

Schematic diagrams must be shown wherever necessary. Any data you feel missing 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).

PART - A

(Answer Should be given up to 25 Words only)

All questions are compulsory. **(10×2=20)**

1. State the advantage and disadvantage of FET over BJT.
2. Define slew rate and CMRR.
3. Why negative feedback is used mostly in operational amplifier circuits?
4. Draw the transfer characteristic of Op-Amp.
5. State Barkhausen Criterion for oscillation.
6. What are self bias circuits? Explain briefly.
7. Why BJT is preferred over FET for high frequency amplification purpose?
8. How many comparators are required in 4 bit flash type ADC?
9. What is the influence of voltage series feedback on input impedance?
10. What is cascode amplifier? Explain briefly.

PART - B

(Analytical/Problem Solving questions)

Attempt any Five questions. **(5×4=20)**

1. Find the output voltage of the circuit as shown in figure.1

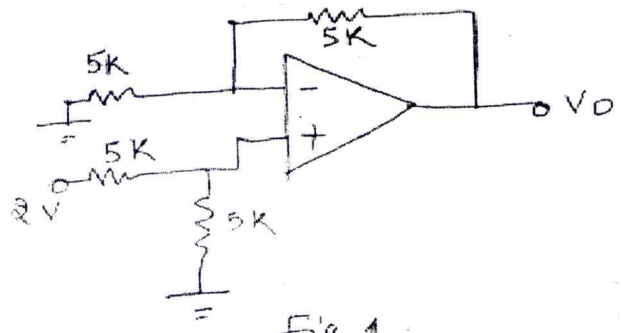

Fig 1

2. Compare various configurations of BJT (i.e. CC, CB, and CE) with respect to voltage gain (A_v), current gain (A_I), input impedance (Z_i), output impedence (Z_0) and applications.
3. What is Schmitt trigger? How it is different from inverter? State its application also.
4. Find the transistor currents in the circuit as shown in Figure 2. A silicon transistor withh $\beta = 100$ and $I_{Co} = 2\times10^{-5}$ mA is under consideration.

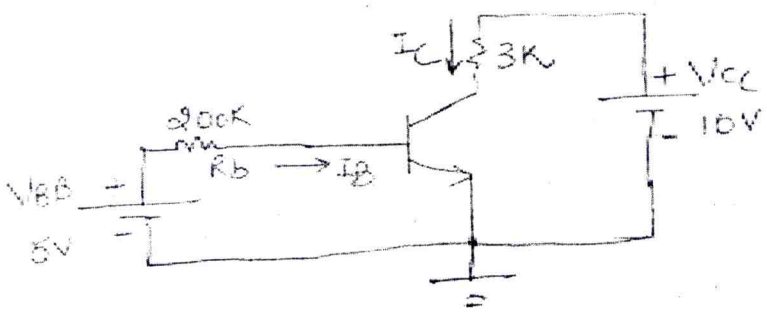

Fig2.

5. What is switched capacitor circuits? Explain briefly.
6. Explain Hybrid - π common emitter? Transistor model.
7. An 8 bit digital ramp ADC with have 40 mV resolution and a clock of 2.5 MHz. Find the output of ADC when 6V is applied to ADC input.

PART - C

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any Three questions. **(3×10=30)**

1. a. What is precision rectifier? Explain briefly.
   b. Find the output voltage of circuit as shown in figure.3.

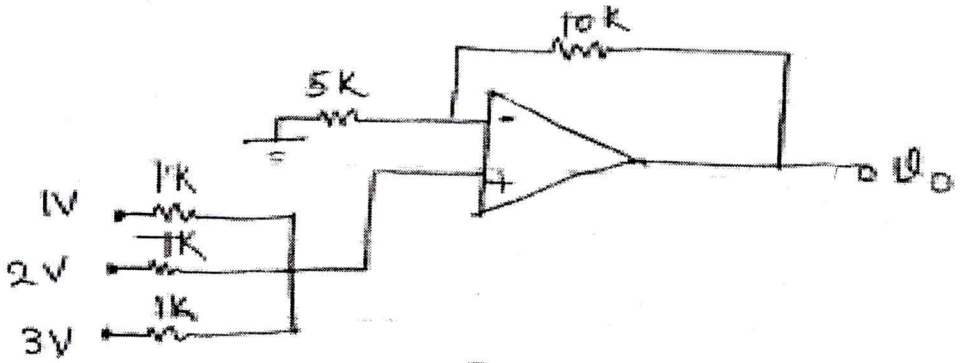

Fig. 3

2. a. Draw the diagram of colpitt oscillator and explain its working in brief. **(4)**
   b. Design a low pass butter worth active filter for cutt off frequency of 10KHz.
3. The circuit of figure. 4 has following parameters : $R_{C1} = 3k$, $R_{C2} = 500\,\Omega$; $R_e = 50\ \Omega$, $R' = R_s = 1.2k$, $h_{fe} = 50$, $h_{ie} = 1.1$ K and $h_{re} = h_{oe} = 0$.
   Find :
   a. Voltage gain with feedback (A_{vf}).
   b. Input resistance with feedback (R_{if}).
   c. The resistance seen by voltage source and
   d. The output resistance.

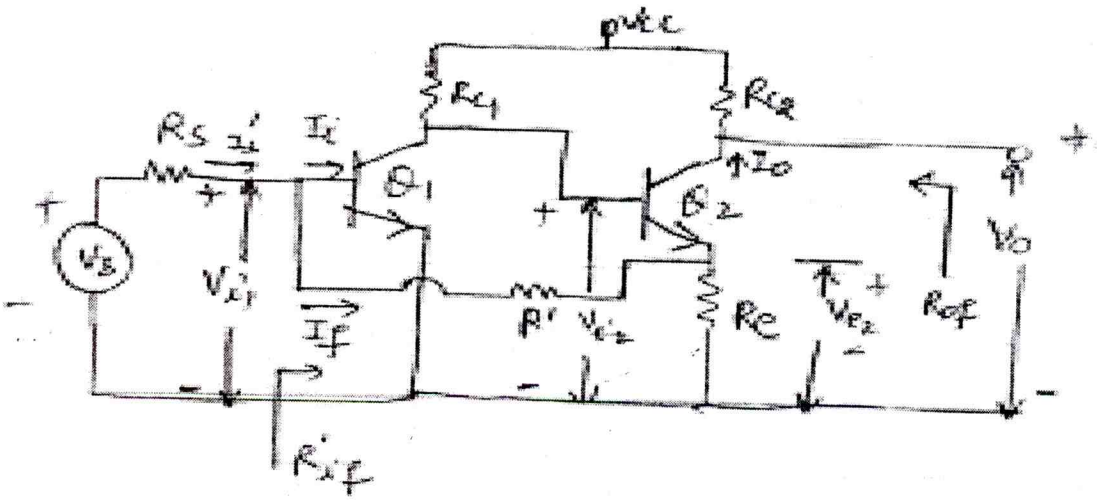

Fig 4

4. a. Explain FET small signal model.
   b. What is pinch off region in FET? Explain briefly.
5. Write short note on following :
   i. Gain and phase margin.
   ii. Transconductance amplifier.

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B.Tech. IV Sem. (Main/Back) Examination, July - 2023
Electronics and Comm. Engineering
4EC4-05 Microcontrollers
EC, EI

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

Instructions to Candidates:

*Attempt **all ten** questions from **Part A**, Attempt any **five** questions out of **Seven** questions from **Part B** and **three** questions out of **Five** questions from **Part C**.*

Schematic diagrams must be shown wherever necessary. Any data 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. (As Mentioned in form No. 205)

PART - A

(Word Limit 25)

All questions are **compulsory.** **(10×2=20)**

1. What is special function register?
2. What are the ways to mask an interrupt in 8051?
3. What is Assembler?
4. What is interrupt service routine?
5. What are the difference between memory mapped I/O and I/O mapped I/O scheme?
6. Why is a latch required to interface and output devices with 8085?
7. What is program counter (PC) and stack pointer (SP)?
8. What is the size of SP register?
9. Why cash memory is required?
10. How many different buses are used in 8085 microprocessor?

PART - B

(Word Limit 100)

Attempt any **Five** questions. **(5×4=20)**

1. Explain absolute jump, long jump, short jump in context to 8051 micro controller?
2. Differentiate between parallel and serial interfaces?
3. Write a programme to arrange a block of binary numbers in decending order?
4. Differentiate between micro controller and micro processor?
5. What do you mean Arithematic processors? Explain in brief?
6. Explain the concept of A/D converters?
7. Differentiate between CISC and RISC processors?

PART - C

Attempt any **Three** questions. **(3×10=30)**

1. a. Explain addressing modes of 8085 microprocessor?
   b. Give one example each for one byte, two byte and three byte instructions of 8051?
2. Give the salient features of 8085 microprocessors and also explain the architecture of 8085 with the help of its internal block schematic diagram?
3. a. What are the criteria to be considered before interfacing memory to a processor?
   b. What is the difference between fixed port and variable port addressing of 8086?
4. a. List the interrupt resources for 8085 processor and list their priorities?
   b. Two 8 bit unsigned numbers are stored in memory locations 9000 H and 9001 H multiply them and store the result in memory location 9002 H and 9003 H with the most significant bits in 9003 H.
5. Explain ARM microcontroller interface design with suitable diagram?

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Roll No. _____ [Total No. of Pages : 2

4E1328

B.Tech. IV Sem. (Main and Back) Examination July - 2023
Electronics and Communication Engineering
4EC3-06 Electronic Measurement and Instrumentation

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

Instructions to Candidates:

*Attempt **all ten** questions from **Part A**, Attempt any **five** questions out of **Seven** questions from **Part B** and **three** questions out of **Five** questions from **Part C**.*

Schematic diagrams must be shown wherever necessary. Any data you feel missing 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).

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory. **(10×2=20)**

1. Define the terms of accuracy and precision.
2. What do you mean by random errors?
3. What are the applications of Q meters.
4. Draw the basic diagram of eletronic multimeters.
5. What are the applications of CRO?
6. What are the merits and demerits of sine wave generators?
7. Draw the block diagram of harmonic distortion analyzers?
8. Differentiate the primary and secondary transducers.
9. What do you mean by RTD? Draw its characteristics.
10. What are the applications of strain gauges?

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PART - B

(Analytical/Problem solving questions)

Attempt any five questions. **(5×4=20)**

1. Explain the systematic error with suitable examples.
2. Explain the RF Power and voltage measurements with suitable diagrams.
3. Explain the shielding and grounding with suitable diagrams.
4. Explain the different types of CRO probes.
5. Explain the working and applications of sweep frequency generators.
6. Draw and explain the various characteristics of thermocouples.
7. What do you mean by LVDT? Explain its working merits and demerits and applications also.

PART - C

(Descriptive/Analytical/Problem solving/Design questions)

Attempt any Three questions. **(3×10=30)**

1. Explain the Gaussian error analysis with suitable diagrams and examples.
2. Explain the diagram of vector impedance meter with merits, demerits and applications.
3. Explain the construction and working of sampling oscilloscopes with suitable diagram, merits and demerits.
4. Explain the block diagram and working of spectrum analyzers with applications.
5. Explain the following with suitable diagram : -
   a. Load cell.
   b. Ultrasonic flow meters.

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B.Tech. IV- Sem. (Main/Back) Examination, July - 2023
Electronics and 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**, Attempt any **five** questions out of **Seven** questions from **Part B** and **three** questions out of **Five** questions from **Part C**.*

Schematic diagrams must be shown wherever necessary. Any data 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. (As Mentioned in form No. 205).

PART - A

(Word limit 25)

All questions are **compulsory.** **(10×2=20)**

1. List the advantages and disadvantages of Digital modulation schemes.
2. What is the need for modulation?
3. Define the sensitivity, Selectivity, and fidelity of superheterodyne receivers.
4. Give any two advantages of FM and AM.
5. Give the definition of shot noise and thermal noise.
6. What is the T-1 carrier system?
7. Draw the block diagram of the communication system.
8. What is the need for pre - emphasis and de - emphasis?
9. List out the applications of pulse modulation techniques.
10. What are sampling and Nyquist criteria?

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PART - B

(Word limit 100)

Attempt any **Five** questions. **(5×4=20)**

1. Draw the block diagram of the superheterodyne receiver and explain its working.
2. a. Explain the following line codes for 110101101.
   i. Unipolar RZ and NRZ.
   ii. Polar RZ and NRZ.
   iii. Bipolar RZ and NRZ.
3. Draw the block diagram of the transmitter and receiver of QPSK.
4. With a neat block diagram explain the PCM transmitter and receiver.
5. Explain the quantization error and derive an expression for the maximum signal - to - noise ratio in the PCM system.
6. Draw the block diagram of ADM and explain its working.
7. Explain the terms slope overload and granular noise in Delta modulation.

PART - C

Attempt any **Three** questions. **(3×10=30)**

1. Define the standard form of amplitude modulation and derive its equation and power relation. Explain the following in brief w.r.t. AM.
   i. Envelope detector.
   ii. Square law detector.
   iii. Balance Modulator.
2. Draw the block diagram of phasing/third method of generation of SSB-SC signals and detection of SSB - SC signals and briefly explain it. Also, write the applications for SSB - SC.
3. Define the term equivalent noise figure and noise temperature, also derive an expression for equivalent noise figure and noise temperature of a cascaded amplifier.
4. Write short notes on any two :
   i. MSK.
   ii. Frequency and phase modulation.
   iii. BPSK and FSK.
   iv. PAM, PDM/PWM, and PPM.
5. a. What is optimum detection? Discuss the working of matched filter with suitable expressions.
   b. Explain the maximum likelihood sequence detector (Viterbi Receiver).
