Electronics & Comp. Sci Enggi. 2nd Year To 3rd Year Apr_May 2025 (CBCS)

S.n	Year	Sem	Course	Dept.	Sub code	Subject
1	2	III	B Tech	ECS	91969	Engineering Mathematics III
2	2	III	B Tech	ECS	91970	Electronics Devices
3	2	III	B Tech	ECS	91972	Data Structures and Algorithms
4	2	III	B Tech	ECS	91971	Digital Electronics
5	2	IV	B Tech	ECS	79118	Environmental Studies
6	2	IV	B Tech	ECS	91975	Electronic Circuits
7	2	IV	B Tech	ECS	91976	Controls and Instrumentation
8	2	IV	B Tech	ECS	91977	Computer Network
9	2	IV	B Tech	ECS	91978	Microprocessors and Microcontrollers
10	2	IV	B Tech	ECS	91979	Discrete Structures and Automata Theory
11	3	V	B Tech	ECS	56537	Signal & System
12	3	V	B Tech	ECS	56538	Power Electronics
13	3	V	B Tech	ECS	56539	Computer Organization & Architecture
14	3	V	B Tech	ECS	56541	Sensors & Applications
15	3	VI	B Tech	ECS	56544	Digital Signal Processing
16	3	VI	B Tech	ECS	56545	PLC & Automation
17	3	VI	B Tech	ECS	56546	Software Engineering
18	3	VI	B Tech	ECS	56547	Python Programming
19	3	VI	B Tech	ECS	56550	Internet of Things(ECS)
20	3	—	—	—	01973	Database Mgt. System.

①

Seat No.	Ecs-3rd. Sem

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Total No. of Pages : 3

S.Y.B.Tech. (Part – II) (Semester – III)

Examination – May 2025

(Electronics and Computer Science)

ENGINEERING MATHEMATICS - III

Sub. Code : 91969

Day and Date : Monday, 05/05/2025 **Total Marks : 70**

Time : 10.30 am to 01.00 pm

Instructions : 1) Q.1 is compulsory.
2) Solve any 4 questions from remaining questions.
3) Use non-programmable calculator is permissible.
4) Figures to the right indicate full marks.
5) Assume suitable data, if required.

Q. 1. Solve MCQ's. **[10]**

1) The complementary function of $(D^3 - 3D^2 + 4)\,y = e^{3x}$ .....

A) $y = C_1e^{-x} - (C_2 + C_3x)\,e^{2x}$ B) $y = C_1e^{-x} + (C_2 - C_3x)e^{2x}$

C) $y = C_1e^{-x} + (C_2 + C_3x)\,e^{-2x}$ D) $y = C_1e^{-x} + (C_2 + C_3x)e^{2x}$

2) If $\varphi = xz^2 - 5yz + xz$ then $\nabla\varphi$ at $(1, -1, 2)$ .....

A) $6i - 10j + 11k$ B) $5i - 10j + 11k$

C) $6i - 10j + 10k$ D) $6i - 6j + 11k$.

3) Scalar cardinality of the fuzzy set $A(x) = \frac{0.5}{1} + \frac{0.4}{2} + \frac{1}{3}$ is .....

A) 1.9 B) 1.4 C) 2.0 D) 1.1

P.T.O.

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4) The Laplace transform of $e^{-2t}\cos 4t$ is .....

A) $\frac{s-2}{(s-2)^2+16}$ B) $\frac{s+2}{(s-2)^2+16}$

C) $\frac{s-2}{(s+2)^2+16}$ D) $\frac{s+2}{(s+2)^2+16}$

5) In Fourie expansion of $f(x) = 2 - \frac{x^2}{2}$, $0 \le x \le 2$, the value of constant $a0$ is .....

A) $\frac{1}{2}$ B) $-\frac{1}{2}$ C) $\frac{4}{3}$ D) $\frac{4}{3}$

Q. 2. a) Solve $(D^3 - 3D^2 + 3D - 1)y = e^x + x$. **[7]**

b) Solve $\frac{d^3y}{dx^3} - x^2\frac{d^2y}{dx^2} + 2x\frac{dy}{dx} - 2y = x^3 + 3x$ **[8]**

Q. 3. a) A vector field is given by $\bar{F} = (x^2 + xy^2)i + (y^2 + x^2y)j$. Show that $\bar{F}$ is irrotational and find its scalar potential. **[7]**

b) Define solenoidal and irrotational of vector. **[8]**

If $(x + 3y)i + (y - 2z)j + (ax + x)k$ is solenoidal then find the value of Constant a.

Q. 4. a) Define Fuzzy cardinality. Find the degree of subset hood for the fuzzy sets given by $A(x) = \frac{x}{x+1}$, $B(x) = 1 - \frac{x}{10}$, on **[7]**

$X = \{1, 2, 3, 4, 5, 6, 7\}$.

b) Given two fuzzy sets A and B **[8]**

$A(x) = \frac{0.6}{x_2} + \frac{0.8}{x_3} + \frac{0.9}{x_4} + \frac{0.7}{x_5} + \frac{0.1}{x_6}$,

$B(x) = \frac{0.7}{x_2} + \frac{0.5}{x_3} + \frac{0.2}{x_4} + \frac{0.1}{x_5} + \frac{0}{x_6}$

Find i) $\bar{A}$ ii) $A \cap \bar{B}$ iii) $\bar{A} \cap B$ iv) $\bar{A} \cap \bar{B}$ v) $A \cup (\bar{A} \cap \bar{B})$

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Q. 5. a) Find Fourier expansion of $f(x) = 4 - x^2$ in the interval (0, 2). **[7]**

b) i) Find L[$t\ cos2t\ cosht$]. **[8]**

ii) Find L $[\frac{1}{t}(1-cost)]$

Q. 6 a) If 10% bolts produced by a machine are defective, calculate the probability that out of a sample selected at random of 10 bolts, **[7]**

i) not more than one bolt will be defective.

ii) at least two.

iii) exactly two bolts will be defective.

b) In a sample of 1000 students, the mean and standard deviation of marks obtained by the students in a certain test are 14 and 2.5. assuming the distribution to be normal find the number of students getting marks **[8]**

i) between 12 and 15

ii) above 18

iii) below 8.

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Seat No.	ECS-3rd Sem (2)

Total No. of Pages : 3

S.Y.B.Tech. (Part - II) (Semester -III)

Examination, May -2025

ELECTRONICS AND COMPUTER SCIENCE

Electronics Device (New)

Sub. Code : 91970

Day and Date : Tuesday, 06/05/2025 **Total Marks : 70**

Time : 10:30 a.m. to 01:00 p.m.

Instructions : 1) Questions No. 1 is compulsory.
2) Solve any 4 questions from remaining questions.
3) Use of non-programmable calculator is permissible.
4) Figures to right indicate full marks.
5) Assume suitable data, if required.

Q1) Solve MCQ's. **[10]**

1) The electrons in the _____ Band are responsible for the flow of current.
   A) Valence band
   B) Conduction band
   C) First orbit
   D) None of these

2) Which material of the following is an acceptor impurity?
   A) Arsenic B) Silicon
   C) Germanium D) Boron

3) With increase in the reverse bias, the width of the depletion region _____.
   A) Increases B) Decreases
   C) Remains constant D) None of these

4) The breakdown voltage of germanium diode is _____ than that of silicon diode.

A) Less B) Greater

C) Equal D) None of these

5) The maximum efficiency of full wave rectifier is _____.

A) 40% B) 81.2%

C) 48.2% D) 50%

6) The _____ Configuration is the most prepared one.

A) CB B) CE

C) BB D) CC

7) The arrow symbol in the transistor is placed on _____ terminal.

A) Collector B) Base

C) Emitter D) Drain

8) FET is a _____ type of device.

A) Bipolar B) Multipolar

C) Unipolar D) None of these

9) If α of transistor is 0.8, calculate β.

A) 0.4 B) 5

C) 4 D) 2

10) The filter capacitor is placed in _____.

A) Series with load

B) Parallel with load

C) Vicinity with load

D) None of these

Q2) A) Explain V-I characteristics of Zener diode and write its applications. [7]

B) What is clamper circuit? Explain negative clamper with neat diagram. [8]

Q3) A) Explain input and output characteristics of transistor in common emitter (CE) configuration. [7]

B) Explain construction, symbol, working principle and V-I characteristics of Photo diode. [8]

Q4) A) Define αdc and βdc in relation to bipolar junction transistor and derive their inter-relation. [7]

B) What is DC load line? Explain with neat sketch. [8]

Q5) A) What are the types of field effect transistors? Explain drain characteristics of JFET. [7]

B) Write difference between JFET and MOSFET. Write an application of MOSFET. [8]

Q6) A) Calculate the emitter current I_e for a transistor connected in Common Emitter (CE) Configuration, given β=35 and I_B=20 μA. [7]

B) What are types of rectifiers? Explain the operation of bridge rectifier with appropriate waveform. [8]

Seat No.	

Total No. of Pages : 03

S.Y.B.Tech. (Part - II) (Semester - III)
Examination, MAY 2025
Electronics and Computer Science
Data Structure and Algorithm (New)
Sub. Code : 91972

Day and Date : Wednesday, 07.05.2025 **Total Marks : 70**

Time : 10.30 a.m. to 1.00 p.m.

Instructions : 1) Question No. 1 is compulsory.
2) Solve any 4 questions from remaining questions.
3) Use non-programmable calculator is permissible.
4) Figures to right indicates full marks.
5) Assume suitable data, if required.

Q.1) Solve MCQ's **(10)**

1) What is a data structure?
A) A programming language.
B) A collection of algorithms.
C) A way to store and organize data.
D) A type of computer hardware.

2) How is an array initialized in C language?
A) int a [3] = {1, 2, 3}; B) int a = {1, 2, 3};
C) int a [] = new int [3]; D) int a (3) = [1,2,3];

3) Which of the following is a linear data structure ?
A) Array B) Binary trees
C) AVL trees D) graph

4) Which of the following sorting algorithms can be used to sort a random linked list with minimum time complexity?

A) Quick Sort B) Heap sort

C) Merge sort D) Insertion sort

5) Which one of the following nodes is considered the top of the stack if the stack is implemented using the linked list?

A) First node B) Second node

C) Last node D) None of these

6) Which of the following options is true if implementation of Queue is from the linked list?

A) In enqueue operation, new nodes are inserted from the beginning and in dequeue operation, nodes are removed from the end.

B) In enqueue operation, new nodes are inserted from the end and in dequeue operation, nodes are deleted from the beginning.

C) In enqueue operation, new nodes are inserted from the end and in dequeue operation, nodes are deleted from the end.

D) Both (A) and (B).

7) In a circular queue implementation using array of size 5, the array index starts with 0 where front and rear values are 3 and 4 respectively. Determine the array index at which the insertion of the next element will take place:

A) 5 B) 0

C) 1 D) 2

8) A graph with all vertices having equal degree is known as a .....

A) Multi graph B) Complete graph

C) Regular graph D) Simple graph

9) Which one of the following techniques is NOT used in the Binary tree?

A) Traversal B) Randomized Preorder traversal

C) Postorder traversal D) Inorder traversal

10) The column sum in an incidence matrix for a directed graph having no self-loop is .....

A) 0 B) 1

C) 2 D) equal to the number of edges.

Q.2) A) Explain application of Stack. Convert infix to postfix ((A+B) + C* (D-E))/F. (7)

B) Define stack and queue in detail. Give an example for both. (8)

Q.3) A) What is circular Linked List? List various operations of Circular List and explain any one operation. (7)

B) List the different types of Linked list. Explain each with appropriate diagrams. (8)

Q.4) A) Write algorithm for inserting and deleting a node from Binary Search Tree. (7)

B) List and explain various type of Binary Tree with appropriate diagrams. (8)

Q.5) A) Explain operation of Queue with algorithm and program. (7)

B) Write Depth First Traversal Algorithm for Graph. Explain the algorithm with suitable example (8)

Q.6) A) Explain Binary Search and Compare Linear search and Binary Search. (7)

B) List Sorting Techniques and Explain any two Techniques with suitable Examples. (8)

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Seat No.	ECS- 3rd-Sem

(4)

Total No. of Pages : 03

S.Y.B.Tech. (Part - II) (Semester - III)
Examination, MAY 2025
(Electronics and Computer Science)
Digital Electronics (New)
Sub. Code : 91971

Day and Date : Thursday, 08.05.2025 **Total Marks : 70**

Time : 10.30 a.m. to 1.00 p.m.

Instructions : 1) Question No. 1 is compulsory.

2) Solve any 4 questions from remaining questions.

3) Use of non-programmable calculator is permissible.

4) Figures to right indicates full marks.

5) Assume suitable data, if required.

Q.1 : Solve MCQ's **(10)**

1) Which number system has a base 16?

A) Hexadecimal B) Octal

C) Binary D) Decimal

2) Convert $(312)^4$ into decimal.

A) $(201)_{10}$ B) $(202)_{10}$

C) $(203)_{10}$ D) $(204)_{10}$

3) In combinational circuits, output depends on .....

A) Previous output B) Present inputs

C) Previous inputs. D) Both (A) and (B)

4) Which of the following gives the correct number of multiplexers required to build a 32 × 1 multiplexer?

A) Two 16 × 1 mux B) Three 8 × 1 mux

C) Two 8 × 1 mux D) Three 16 × 1 mux

5) What will be the output from a D flip-flop if the clock is low and D = 0?

A) 0 B) 1

C) No change D) Toggle between 0 and 1

6) Which of these flip - flops cannot be used to construct a serial shift register?

A) D-flip flop B) SR flip-flop

C) T flip-flop D) JK flip-flop

7) Moore machine has ..... states than a mealy machine.

A) Fewer B) More

C) Equal D) Negligible

8) What happens if the input is high in FSM?

A) Change of state B) No transition in state

C) Remain in a single state D) Invalid state

9) In CMOS logic circuit, the p-MOS transistor acts as :

A) Pull down network B) Pull up network

C) Load D) Short to ground

10) What is the purpose of 'module' keyword in Verilog?

A) To define new data type

B) To define new function

C) To define new hardware module

D) To define new system task

Q. 2) A) What is Base or Radix of number system? Solve the following (7)

i) (11011.101)2 = ( )10 ii) (163.875)10 = ( )2

iii) (756.603)8 = ( )16

B) Draw a logic symbol and construct the truth table for each of the following gates. (8)

i) Two input NAND gate ii) Three input OR gate

iii) Two input EX-NOR gate iv) NOT gate

Q.3) A) What is Multiplexer ? Design 4 × 1 multiplexer with truth table and gate diagram. (7)

B) Explain Half subtracter and Full subtractor with truth table and logic gate diagram. (8)

Q. 4) A) What is level triggered flip flop? Explain the operation of J-K flip flop with NAND gates. (7)

B) Explain synchronous counter with block diagram and signal diagram. (8)

Q. 5) A) Explain the operation of CMOS NAND and NOR gates with circuit diagram. (7)

B) Explain D flip flop with excitation table, state table and state diagram by using Mealy and Moore model. (8)

Q. 6) A) What would be the output of the following : a=4'b1010, b=4'b1111. (7)

i) a & b ii) a && b iii) & a iv) a>>1 v) a>>>1

vi) y = {2{a}}, vii) a ^ b

B) Explain gate level modeling of 4 × 1 multiplexer with diagram. (8)

Seat No. B.S- 4th Sem

(5)

QP-5805

Total No. of Pages : 5

MAR_APR 2025 SUMMER EXAMINATION

2354 Bachelor of Science

Sub. Name: ENVIRONMENTAL STUDIES

Sub. Code: 94282/91270/67043/78928/79089 /79118/83229/84775/91147/91155 /91166/91246/91270/91294/91308 /91437/91457/91555/91656/91966 /92943/93227/77942/93448/93546 /94220/94787/94884/96146/83818

Day and Date: MAY ,11-05-2025

Time: 02:30 PM To 05:30 PM

Total Marks: 70

Instructions: 1. All questions are compulsory
2. Draw neat labelled diagrams wherever necessary
3. Figures to the right indicate full marks

Q1) Solve following MCQ. **[10]**

I. A species not definitely located in the wild and never sighted even once in the last 50 years is called—
ज्या प्रजाती जंगलात निश्चितपणे नसतात आणि गेल्या 50 वर्षात एकदाही न पाहिलेल्या प्रजातीला म्हणतात —
A. exotic
परस्थ
B. Extinct
नामशेषत्व/विनाश झालेले
C. Endangered
अस्तित्व धोक्यात असलेले
D. Rare
दुर्मिळ

II. Noise is measured using sound meter and the unit is-----
ध्वनी मीटर वापरून आवाज मोजला जातो आणि युनिट ------ आहे
A. Hertz
हर्ट्झ
B. Kilogram
किलोग्राम
C. Joule
जूल्य
D. Decibel
डेसिबल

III. The darker zone in lakes where light penetration is negligible is called
तलावांमध्ये गडद क्षेत्र जेथे प्रकाश आत प्रवेश करणे नगण्य आहे असे म्हणतात
A. Limnetic zone
खुले क्षेत्र

B. Littoral zone
किनाऱ्याचे मूलस्थान क्षेत्र
C. Profundal zone
खोल क्षेत्र
D. None of the above
वरीलपैकी काहीही नाही

iv. The study of interrelatioship between living and non-living organisms and environment is called
सजीव आणि निर्जीव जीव आणि पर्यावरण यांच्यातील परस्परसंबंधांच्या अभ्यासाला ----म्हणतात
A. Ecosystem
परिसंस्था
B. Environment
पर्यावरण
C. Ecology
परिस्थितीकी
D. All of the above
वरील सर्व

v. The food chain starts with dead organic matters----------
मृत सेंद्रिय पदार्थांसह हि अन्नसाखळी सुरु होते
A. Detritus food chain
मृतोपजीवी अन्नसाखळी
B. Grazing food chain
चराऊ अन्नसाखळी
C. uniform food chain
समांतर अन्नसाखळी
D. None of the above
वरीलपैकी काहीही नाही

vi. The development of a bare area without any life form is called----
जेथे जीवांचे अस्तित्व नाही अशा ओसाड जागेच्या विकासची प्रक्रिया म्हणजे -----
A. Reaction
प्रतिक्रिया
B. Nudation
ओसाड जागेचा विकास
C. competition
स्पर्धा
D. stabilisation
स्थिरीकरण

vii. 'Smog' is a mixture of----------
स्मॉग ---------- चे मिश्रण आहे
A. Dust and Gas
धूळ आणि वायू
B. Smoke and dust

धूर आणि धूळ

C. Snow and fog
बर्फ आणि धुके

D. Smoke and fog
धूर आणि धुके

viii. Noise pollution limits at silent area in night is------
रात्री शांत परिसरात ध्वनी प्रदूषणाची मर्यादा आहे ------

A. 45 dB
B. 85 dB
C. 55 dB
D. 25 dB

ix. D.O. in water stands for-----
पाण्याच्या संदर्भात D.O. म्हणजे-----

A. Degraded Oxygen
B. Degraded organic
C. Dissolved Oxygen
D. None of the above

x. Following is example of National Park in India-----
भारतातील राष्ट्रीय उद्यानाचे उदाहरण खालीलपैकी आहे-----

A. Kaziranga from Assam
आसाममधील काझीरंगा
B. Nanda Devi from Uttarakhand
उत्तराखंडमधील नंदा देवी
C. Anamalai area from Tamil Nadu
तामिळनाडूतील अनामलाई क्षेत्र
D. None of the above
वरीलपैकी काहीही नाही

Q2) Answer any three from the following खालीलपैकी कोणतेही तीन उत्तर द्या [15]

a. Q1. Define natural resources & add a note on non-renewable resources.
Q2. Write a note on ecological pyramids of Biomass.
Q 3. Discuss environmental ethics and resource use.
Q4. Briefly explain water harvesting and watershed management.
Q.5. Explain genetic, species and ecosystem diversity with examples.

प्रश्न १. नैसर्गिक संसाधनांची व्याख्या करा आणि नूतनीकरणीय संसाधनांवर एक टीप जोडा.

प्रश्न २. जैववस्तुमानाच्या मनोऱ्याबद्दल एक टीप लिहा.
प्रश्न ३. पर्यावरणीय नीतिमत्ता आणि संसाधनांचा वापर यावर चर्चा करा.
प्रश्न ४. पाणी संकलन आणि पाणलोट क्षेत्र व्यवस्थापन थोडक्यात सांगा.
प्रश्न ५. उदाहरणांसह जनुकीय विविधता ,प्रजातीय विविधता व परिसंस्था विविधता स्पष्ट करा.

Q3) Write Short note on any three कोणत्याही तीनवर लहान टीप लिहा [15]

a. Q1. Disaster Management
Q2. Climate change
Q3. Population explosion
Q4. Noise pollution
Q5. Biomass energy
Q1. आपत्ती व्यवस्थापन
Q2. हवामान बदल
Q3. लोकसंख्येचा स्फोट
Q4. ध्वनी प्रदूषण
Q5. जैववस्तुमानीय ऊर्जा

Q4) List the functions of producers, consumers and decomposers in an ecosystem with examples [10]
OR
Describe the threats to biodiversity and the various methods used in the Conservation of Biodiversity.
परिसंस्थेतील उत्पादक, ग्राहक आणि विघटक यांची कार्ये उदाहरणासह सूचीबद्ध करा.
किंवा
जैवविविधतेलाअसलेले धोके आणि जैवविविधतेच्या संवर्धनासाठी वापरल्या जाणाऱ्या विविध पद्धतींचे वर्णन करा.

Q5) Explain in detail the Water (Prevention and Control of Pollution) Act [10]
OR
Give an account of Ecological succession concerning causes and types.
पाणी (प्रदूषण प्रतिबंध आणि नियंत्रण) कायद्याचे तपशीलवार वर्णन करा.
किंवा
कारणे आणि प्रकाराच्या संदर्भात परिसंस्थीय बदलांचा लेखाजोखा द्या/ वर्णन करा.

Q6) Discuss any two environmental movements in India. [10]
OR
What is Solid waste Management? Explain its Causes, effects and control measures
भारतातील कोणत्याही दोन पर्यावरण चळवळींची चर्चा करा.
किंवा
घनकचरा व्यवस्थापन म्हणजे काय ? त्याची कारणे, परिणाम आणि नियंत्रण उपाय स्पष्ट करा.

End Of Question Paper

Important Note for Chief Exam Officer / SRPD Coordinator / Sr Supervisor/ Student -
This Question Paper may be distributed for following Subjects as common code.

Seal No. Ecs-4th Sem

(6)

QP-5853

Total No. of Pages : 3

MAR_APR 2025 SUMMER EXAMINATION

11731 Bachelor of Technology (NEP-2.0)

Sub. Name: Electronic Circuits

Sub. Code: 91975

Day and Date: MAY ,13-05-2025 **Total Marks: 70**

Time: 10:30 AM To 01:00 PM

Instructions: 1. Assume suitable data wherever necessary and mention it boldly
2. Draw neat labelled diagrams wherever necessary

Special Inst.: 3. Question 1 is compulsory
4. Answer any four from the remaining

Q1) Solve following MCQ. **[10]**

i. The input based impedance of a common source MOSFET is ____?
A. High
B. Low
C. Zero
D. Minimum

ii. Full form of CMRR is
A. cascade mode ratio relate
B. cascade make resistance ration
C. Common mode rejection ratio
D. closed mode rejection ratio

iii. If ground is applied to the (+) terminal of an inverting op-amp, the (–) terminal will:
A. Not need an input resistor
B. Virtual short
C. Virtual ground
D. Have high reverse current

iv. Find the output voltage of an ideal op-amp. If V1 and V2 are the two input voltages
A. VO= V1-V2
B. VO= A×(V1-V2)
C. VO= A×(V1+V2)
D. VO= V1×V2

v. Which of the following is not the characteristic of ideal OPAMP
A. Av=∞
B. BW=∞
C. Output Resistance is Zero

P.T.O.

D. Input Resistance is Zero

vi. How will be the output voltage obtained for an ideal op-amp?
A. Amplifies the difference between the two input voltages
B. Amplifies individual voltages input voltages
C. Amplifies products of two input voltage
D. None of the mentioned

vii. Determine the expression of output voltage for inverting summing amplifier consisting of four internal resistors? (Assume the value of internal resistors to be equal)
A. Vo = -(RF/R)×(Va +Vb+Vc+Vd)
B. Vo = (RF/R)×(Va +Vb+Vc+Vd)
C. Vo = (R/ RF)×(Va +Vb+Vc+Vd)
D. None of the mentioned

viii. In a phase shift oscillator, the frequency determining elements are .....
A. L and C
B. R, L and C
C. R and C
D. None of the above

ix. Pin number 3 in IC555 timer is for
A. Reset
B. output
C. +Vcc
D. Ground

x. What is the difference between an astable multivibrator and a monostable multivibrator?
A. The astable is free running
B. The astable needs to be clocked
C. The monostable is free running.
D. none of the above

Q2) A. Small signal Analysis of the dual input balanced output. [7]
B. MOSFET Differential amplifier with active load [8]

Q3) A. Draw internal Block diagram of OP-AMP and Explain the blocks. [7]
B. Explain Virtual short and Virtual ground concepts [8]

Q4) A. With neat diagram explain the types of negative feedback. [7]
B. Explain Voltage to current converter with floating load & ground load [8]

Q5) A. With neat diagram explain RC phase shift Oscillator [7]
B. With neat diagram explain ZCD [8]

Q6) A. Draw internal Block diagram of IC555 and Explain its pin configurations [7]

B. Explain the operation of monostable multivibrator [8]

End Of Question Paper

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1] (1154) B.Tech. CBCS (91975) Electronic Circuits Part 2 SEM 4

Seat No. ECS-2nd Sem

QP-5894

Total No. of Pages : 3

MAR_APR 2025 SUMMER EXAMINATION

11731 Bachelor of Technology (NEP-2.0)

Sub. Name: Controls and Instrumentation

Sub. Code: 91976

Day and Date: MAY ,15-05-2025 **Total Marks: 70**

Time: 10:30 AM To 01:00 PM

Instructions:

Special Inst.:
1. Q. 1 is compulsory
2. Solve any 4 questions from remaining questions.
3. Use non-programmable calculator is permissible.
4. Figures to the right indicate full marks.
5. Assume suitable data, if required.

Q1) Solve following MCQ. **[10]**

I. Laplace transform of a step function is
   A. 1
   B. 1/s^2
   C. 0
   D. 1/s

II. The number of roots in the left half of the s-plane of the given equation s^3 + 3s^2 + 4s + 1 = 0 is
   A. One
   B. Three
   C. Two
   D. Zero

III. The system with the open loop transfer function 1/s(1+s) is:
   A. Type 2 and order 1
   B. Type 1 and order 1
   C. Type 0 and order 0
   D. Type 1 and order 2

IV. A system has a single pole at origin. Its impulse response will be:
   A. Constant
   B. Ramp
   C. Decaying exponential
   D. Oscillatory

V. If a system is given unbounded input then the system is:
   A. Stable
   B. Unstable
   C. Not defined

[1] (20)

P.T.O.

D. Linear.

vi. Modbus is a _____ type of communication protocol.

A. Parallel
B. Serial
C. Hybrid
D. None of the above

vii. The graph of RTD is

A. Linear
B. Nonlinear
C. exponential
D. parabolic

viii. What is stand alone data acquisition systems often called?

A. Data Blogger
B. Data Logger
C. Data Vlogger
D. Digital Blogger

ix. The capacity of data acquisition system (DAQ) can be specified in terms of_____

A. number of control elements
B. number of channels
C. number of interfaces
D. number of functions

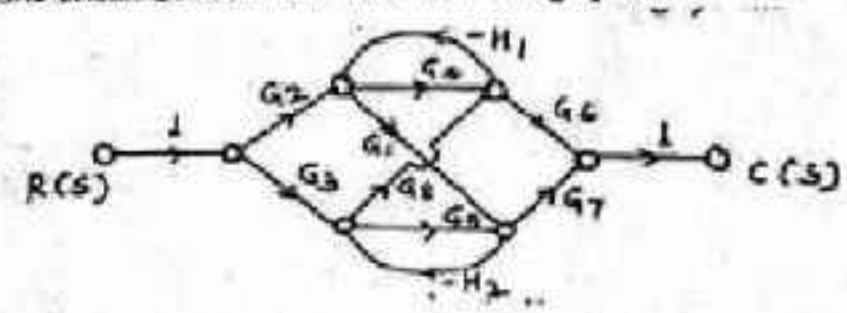
x. Telemetry includes data transfer over _____

A. Wireless modes
B. Optical fibre link
C. Computer link
D. All of the mentioned

Q2) [15]

a. Explain block diagram algebra. Describe any four rule of block diagram algebra. **[7]**

b. Obtain the overall transfer function of following system. **[8]**



Q3) [15]

a. What is steady state error? Derive the formula and explain Kp, Kv & Ka. [7]

b. Determine the stability the for given equation and state whether it is stable or unstable. [8]

i. $s3+6s2+12s+8=0$

ii. $s5+s4+2s3+2s2+3s+5=0$

Q4) [15]

a. What is Bode plot & state the steps for Bode plot. [7]

b. Write short note on USB protocol and MODBUS [8]

Q5) [15]

a. Define transducers and give classification of it with one example each. [7]

b. State and explain thermocouple in detail. [8]

Q6) [15]

a. What are the key components of a typical SCADA system architecture? [7]

b. Explain multichannel DAS system with the help of block diagram. [8]

End Of Question Paper

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1] (1154) B.Tech. CBCS (91976) Controls and Instrumentation Part 2 SEM 4

Seat No. BCS - Letter Sem

(8)

QP-6011

Total No. of Pages : 3

MAR_APR 2025 SUMMER EXAMINATION

11731 Bachelor of Technology (NEP-2.0)

Sub. Name: Computer Network

Sub. Code: 91977

Day and Date: MAY ,19-05-2025 **Total Marks: 70**

Time: 10:30 AM To 01:00 PM

Instructions: 1. Assume suitable data wherever necessary and mention it boldly
2. Draw neat labelled diagrams wherever necessary
3. Figures to the right indicate full marks
4. Use of Scientific calculator is allowed

Special Inst.: 1) Q.1 is compulsory.
2) Solve any 4 questions from remaining questions

Q1) Solve following MCQ. **[10]**

i. Which is not a application layer protocol?
A. HTTP
B. SMTP
C. FTP
D. TCP

ii. TELNET is a _____ client-server application program.
A. specific-purpose
B. general-purpose
C. both a and b
D. none of the above

iii. The formal protocol that defines the MTA client and server in the Internet is called _____.
A. SMTP
B. SNMP
C. TELNET
D. none of the above

iv. _____ is the standard mechanism provided by TCP/IP for copying a file from one host to another.
A. TELNET
B. SMTP
C. TFTP
D. none of the above

v. DHCP client and servers on the same subnet communicate via _____
A. UDP broadcast

B. UDP unicast
C. TCP broadcast
D. TCP unicast

vi. What is DHCPv6?
A. Dynamic Host Conformation Protocol version 6
B. Deactivate Host Configuration Protocol version 6
C. Deactivate Host Conformation Protocol version 6
D. Dynamic Host Configuration Protocol version 6

vii. An IPv6 address is made of 128 bits divided into eight ____-bits blocks.
A. 4
B. 6
C. 12
D. 16

viii. When a collection of various computers appears as a single coherent system to its clients, what is this called.
A. mail system
B. networking system
C. computer network
D. distributed system

ix. Which of the following developed IPv6
A. The Internet Engineering Task Force (IETF)
B. The Institute of Electrical and Electronics Engineers (IEEE)
C. Massachusetts Institute of Technology (MIT)
D. All of above

x. For the control connection, FTP uses the _____ character set
A. regular ASCII
B. EBCDIC
C. NVT ASCII
D. none of the above

Q2) a Explain error detecting codes with example :1. Parity. 2 Checksums 3. Cyclic redundancy checks (CRC's). [8] **[15]**
b. Explain CSMA/CD and CSMA/CA protocols. [7]

Q3) a. Explain unicast, multicast and broadcast addressing in short with example. [7] **[15]**
b. Write a short note on: 1. Byte count. 2.flag bytes with byte stuffing. 3. Flag bits with bit stuffing 4. Physical layer coding violations. [8]

Q4) a. The UDP header in hexadecimal format is as: 0045000D0058FE20 obtain the following form it. [8] **[15]**
1.Source port number 2. Destination port number 3. Total length

4.Lengh of the data 5. Name of client process

b. What is default masks for class a, b.c addressing. Discuss the address resolution protocol. [7]

Q5) a. Write a short note on [7] [15]

a. UDP b. TCP

b. Briefly describe IP datagram header format with neat diagram. [8]

Q6) a. A block of addresses is granted to a small organization. We know that one of the addresses is 205.16.37.39/28. [7] [15]

a. What is the first address in the block.
b. Find the last address for the block.
c. Find the number of addresses.

b. Explain the duties of transport layer and socket indetail. [8]

End Of Question Paper

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1] (1154) B.Tech. CBCS (91977) Computer Network Part 2 SEM 4

Seat No. E&E 4th. Sem (9)

QP-6030

Total No. of Pages : 2

MAR_APR 2025 SUMMER EXAMINATION

11731 Bachelor of Technology (NEP-2.0)

Sub. Name: Microprocessors and Microcontrollers

Sub. Code: 91978

Day and Date: MAY ,21-05-2025

Total Marks: 70

Time: 10:30 AM To 01:00 PM

Instructions: 1. Assume suitable data wherever necessary and mention it boldly
2. Draw neat labelled diagrams wherever necessary

Special Inst.: Q.1 is compulsory.
Solve any 4 questions from remaining questions.

Q1) Solve MCQ's (1 marks each) [10]

I. The intel 8085 microprocessor is a _____ processor [1]
a) 8 bit b)16 bit c) 32 bit d) 4 bit

II. The register AX is formed by grouping _____ [1]
a) AH & AL b) BH & BL c) CH & CL d) DH & DL

III. The BIU prefetches the instruction from memory and store them in _____ [1]
a) Queue b) Register c) Memory d) Stack

IV. INC destination, increments the content of destination by _____ [1]
a)1 b)2 c)30 d)41

V. If MN/MX is low, then 8086 operates in _____ mode [1]
a) Minimum b) Maximum c) Both a and b d) Medium

VI. In which mode do all the Ports of the 8255 PPI work as Input-Output units for data transfer? [1]
a) BSR mode b) Mode 0 of I/O mode c) Mode 1 of I/O mode d) Mode 2 of I/O mode

VII. Mostly ____ bit is an 8051 microcontroller. [1]
a)2 b)4 c)6 d)8

VIII. On power up, the 8051 uses which RAM locations for register R0- R7 [1]
a) 00-2F b) 00-07 c) 00-7F d) 00-0F

IX. The 8051 has _____ parallel I/O ports [1]
a) 2 b)3 c) 4 d) 5

X. An alternate function of port pin P3.0 (RXD) in the 8051 is [1]
a) Serial port input b) Serial port output
c) Memory write strobe d) Memory read strobe

Q2) a) Explain the architecture of 8086 with neat diagram 7M [15]
b) Draw a memory segmentation of 8086 and explain with advantages 8M

Q3) a) Define addressing mode? Explain register, immediate and base plus register addressing mode in 8086 with an example 7M [15]
b) List the 8086 Logical instructions set and explain any three. 8M

Q4) a) Draw and explain a minimum mode write timing diagram of 8086 system 7M [15]
b) Differentiate between Minimum mode maximum mode 8086 microprocessor 8M

Q5) a) Draw a block diagram and explain 8259 7M [15]
b) Write the following programs
i)Write a test program for the 8051 chip to toggle all the bits of P0,P1 and P2 after
a delay
ii)Write a program to generate a square waveform from bit0 of port1 8M

Q6) a) List the instruction sets of 8051 and explain any three logical instructions with examples 7M [15]
b) Explain architecture of 8051 with neat diagram 8M

End Of Question Paper

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1] (1154) B.Tech. CBCS (91978) Microprocessors and Microcontrollers Part 2 SEM 4

QP-6080

Seat No. ECS- 4th Sem (10)

Total No. of Pages : 4

MAR_APR 2025 SUMMER EXAMINATION

11731 Bachelor of Technology (NEP-2.0)

Sub. Name: Discrete Structures and Automata Theory

Sub. Code: 91979

Day and Date: MAY ,23-05-2025 **Total Marks: 70**

Time: 10:30 AM To 01:00 PM

Instructions: 1. Assume suitable data wherever necessary and mention it boldly
2. Draw neat labelled diagrams wherever necessary
3. Use of Scientific calculator is allowed

Special Inst.: Q1 is Compulsory
Answer any 4 questions from remaining questions

Q1) Solve following MCQ. **[10]**

i. **If A = {1, 2, 3} and B = {2, 3, 4}, then A ∩ B is:**
A. {1, 4}
B. {1, 2, 3, 4}
C. {2, 3}
D. {1, 2}

ii. **A function that is both injective and surjective is called:**
A. Partial
B. Bijective
C. Constant
D. Identity

iii. **Which of the following is not a type of tree?**
A. Binary tree
B. Spanning tree
C. AVL tree
D. Loop tree

iv. **Which of the following is not a type of Finite State Machine with output?**
A. Moore Machine
B. Mealy Machine
C. Turing Machine
D. FSM with outputs

v. **An NFA is said to recognize a language if:**
A. All paths lead to start state
B. There is at least one accepting path for a string
C. It has no final states

D. Every path is accepting

vi. What does a DFA (Deterministic Finite Automaton) consist of?

A. A single final state
B. A unique transition for each symbol from a state
C. No start state
D. Multiple transitions for the same input from a state

vii. Which operation is not used in regular expressions?

A. Union
B. Concatenation
C. Kleene Star
D. Subtraction

viii. A regular grammar is:

A. Context-sensitive
B. Right-linear or left-linear
C. Free of any rules
D. Always ambiguous

ix. In PDA transitions, which of the following is used?

A. State, input, stack
B. State, output
C. State, grammar rule
D. State, derivation

x. A CFG in Chomsky Normal Form has productions of the form:

A. $A \rightarrow a$
B. $A \rightarrow BC$
C. $A \rightarrow a \mid BC$
D. All of the above

Q2) A. Out of 120 students surveyed it was found that 20 students have studied French,50 students have studied English, 70 students have studied Hindi, 5 students have studied English & French, 20 students have studied English & Hindi, 10 students have studied Hindi & French, and only 3 have studied all 3 languages. Find how many students have studied **[7]**

i. French alone.
ii. English alone.
iii. Hindi alone.
iv. English but not Hindi.
v. Hindi but not French.

B. Answer the following: **[8]**

I) All students are hardworking and some students are lazy" write the given quantifier in symbolic form and apply the negation to the obtained quantifier.

ii) Let D={1,2,3,.....,9} Determine truth value of each of the following

statement;

a) $\forall x \in D$; $x+4<15$

b) $\exists x \in D$; $x+4=10$

c) $\forall x \in D$; $x+4 \leq 10$

d) $\exists x \in D$; $x+4>15$

Q3) A. Digraph of a relation 'R' on set A=[1,2,3] is given in Fig (a). Determine whether 'R' is equivalence or not. **[7]**

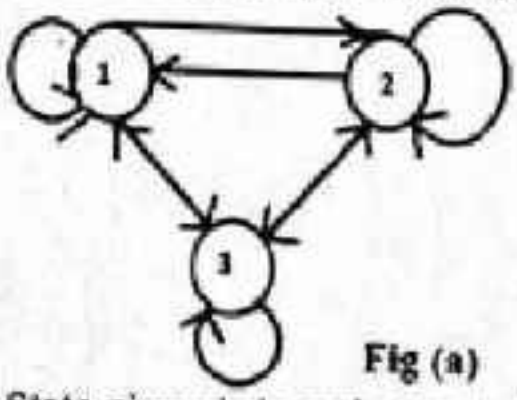

Fig (a)

B. State pigeonhole and extended pigeonhole principle. Find the minimum number of students in the class to be sure that 3 of them are born in same month. **[8]**

Q4) A. Define the following terms with example: **[8]**

1. Bipartite Graph
2. Planar Graph
3. Complement of Graph
4. Degree of Vertex

B. Answer the following: **[7]**

i) List different types of trees & explain any 1 of them.

ii) With respect to given graph shown in Fig (b) find the following:

a) Draw Hamiltonian circuit and Hamiltonian path

b) Is it a Hamiltonian Graph.

c) Is it a Eulerian Graph.

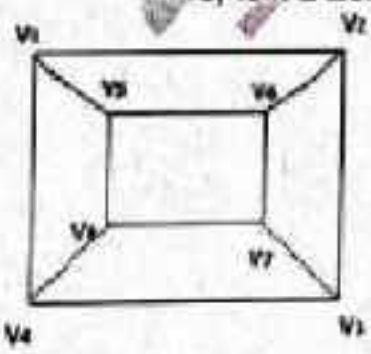

Fig (b)

Q5) A. List and explain various applications of automata theory. **[7]**

B. Construct a DFA that accepts set of all strings over {a,b} of strings, **[8]**

1. Starting with a
2. Starting with ab
3. With abb as substring
4. Ends with ab

Q6) A. Convert Finite Automata into Regular expression of given transition diagram shown in Fig (c). [7]

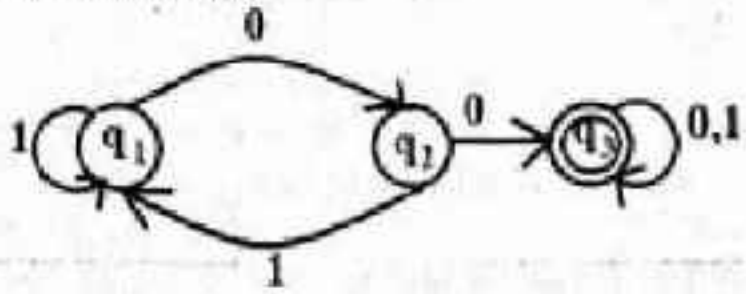

Fig (c)

B. Define Right most derivation. Consider a grammar **X→X+X | X*X | X | a,** obtain **a+a*a** using Right most derivation along with its derivation tree. [8]

End Of Question Paper

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