Chhatrapati Shahu Ji Maharaj
University, Kanpur

Answer Script Details
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Exam M.SC-III_ODD_EXAM_NOV_2025
Subject B010904T - Electronics-I (Elective)

Question wise Mark Summary

Q.No	Mark	Q.No	Mark	Q.No	Mark	Q.No	Mark
1A	4/5						
1B	4/5						
1C	4/5						
1D	4/5						
1E	4/5						
1F	4/5						
1G	4/5						
1H	4/5						
1I	4/5						
2	0/15						
3	11/15						
4	0/15						
5	0/15						
6	12/15						
7	0/15						
8	0/15						
9	0/15						

Chhatrapati Shahu Ji Maharaj University
Kanpur, Uttar Pradesh

PART-I

Date of Exam: 11/12/25 Shift: III Room No.: 22

Paper Code: B0109047 Subject: ELECTRONICS Year/Sem.: II/III

Name of Candidate: FARHEEN RAHMAN

Roll No.: 2 4 0 7 7 0 0 0 6 9 7

Signature of Candidate | Signature of Invigilator | COE Facsimile

PART-II

MARKS OBTAINED										
Q.	1	2	3	4	5	6	7	8	9	10
(a)										
(b)										
(c)										
(d)										
(e)										
(f)										
(g)										
(h)										
(i)										
(j)										
Total										
Total Marks in Figures									Max. Marks	
Total Marks in Words										

B0109047T

Paper Code

Signature of Evaluator

PART-III

Course: M.Sc.

Session: 2025-26 Year/Semester: II/III

Subject: ELECTRONICS-I

Paper Code: B0109047T

Exam Date: 11/12/25

Name of Candidate: FARHEEN RAHMAN

Father's Name: HABIB UR RAHMAN

महाविद्यालय का कोड College Code: KN04

परीक्षा केन्द्र का कोड Exam Centre Code: KN04

परीक्षा का प्रकार Type of Exam: Regular ● Ex. Student ○ Private ○ Back paper Exam ○

ANSWER BOOKLET NO. 11642253

B0109047T

Paper Code

PART-IV

नामांकन संख्या Enrollment Number: CSJMA240001309547

परीक्षार्थी अनुक्रमांक संख्या Candidate's Roll Number: 240770006997

पेपर कोड Paper Code: B0109047T

Signature of Candidate

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नोट : 1. परीक्षार्थी को निर्देशित किया जाता है कि आवरण पत्र के मुख भाग पर अंकित सभी निर्देशों को सावधानी पूर्वक पढ़ें।
2. बॉक्स में भरी जाने वाली प्रविष्टियाँ काली स्याही से शुरू की जायें। 3. गोलों को काले या नीले बॉलपेन से भरा जायें।

INSTRUCTIONS TO THE CANDIDATE FOR FILLING PART-I

1. Read the instructions carefully given on the answer script and admit card.
2. Write Date of Exam, Shift, Paper Code & Name of Subject Correctly.
3. Write Name & Roll No. Correctly.
4. Write Semester & Branch Correctly.

INSTRUCTIONS TO THE CANDIDATE FOR FILLING PART-III

1. Use blue or black ball point pen for writing alphabets & numerals in ☐ Boxes.
2. Carefully study the example before you start marking.
3. As shown in the example below blacken the circles completely.

Correct method	Incorrect method
① ● ③ ④	✓ ✗ ◉ ⓓ

4. Make no Stray marks on this sheet.
5. **DO NOT WRITE OR MARK ON THE BAR CODE.**

परीक्षार्थी के लिए निर्देश

1. प्रवेश पत्र एवं उत्तर पुस्तिका पर दिये [illegible] निर्देशों को ध्यान से पढ़ें।
2. कवर पृष्ठ के दूसरी तरफ कुछ न लिखें।
3. उत्तर पुस्तिका के पृष्ठों पर दोनों तरफ [illegible] लिखें।
4. प्रश्न पत्र पर अपने अनुक्रमांक के अति[illegible]क्त कुछ न लिखें।
5. प्रश्न पत्र कोड एवं प्रश्न पत्र कोड सा[illegible]नी पूर्वक लिखें।
6. अपनी स्थिति स्पष्ट लिखें।
7. उत्तर पुस्तिका के पृष्ठों की संख्या [illegible]। अगर उत्तर पुस्तिका में पृष्[illegible] (1–24) से कम है या फटे हुए है, तो प[illegible]क्षा शुरू होने के पूर्व दूसरी उत्त[illegible] पुस्तिका ले लें।
8. प्रश्नपत्र को देख, यदि प्रश्नपत्र के वि[illegible] कोड, विषय का नाम तथा प्रश्न[illegible] में कोई त्रुटि है तो उसके परीक्षा शुरू [illegible]होने के 30 मिनट के अन्दर कक्ष[illegible] निरीक्षक को तत्काल सूचित करें, उ[illegible]के बाद विश्वविद्यालय द्वारा कोई कार्यवाही नहीं की जायेगी।
9. प्रश्नों के उत्तर लिखने के लिये पेंसिल [illegible] प्रयोग न करें।
10. B कोपी या अतिरिक्त ग्राफ नहीं दिया [illegible]यगा।

IN ORDER TO AVOID UFM (UNFAIR MEANS) :

1. The Roll No. and Answer Book no. found elsewhere or any other symbol found in the answer book will be treated as unfair means.
2. Any tempering of Bar Code and Booklet no shall be treated as Unfair Means.
3. Do Not bring the materials like slip of paper/mobile/digital diaries/ study material/ revision notes in examination hall. Possession of the mobiles/ digital diaries/ electronic watch and any other electronic gadget except memory less scientific calculator shall be considered as UFM case.
4. Do not keep or paste currency note in answer script it shall be consider as UFM.

INSTRUCTIONS TO T[illegible]E CANDIDATE

1. Read the instructions carefully [illegible]en on the Question Pape[illegible] Admit Card & Answer Script.
2. Do not write anything on back side [illegible] the cover page.
3. Write on both sides of pages of ans[illegible]er book.
4. Do not write anything on question [illegible]per except Roll Number.
5. Write Paper Code & Question Pap[illegible]ld carefully.
6. CHECK the number of pages (1-[illegible] or any other kind of damag[illegible] in your answer script, if found t[illegible]n change the answer scrip[illegible] immediately before the commenc[illegible]ent of examination.
7. CHECK the Question Paper for [illegible]ny kind of discrepancy e.g[illegible] Subject Code. Subject Name [illegible] Question of the Questio[illegible] Paper during first THIRTY MINU[illegible]S of the commencement [illegible] the exam, so that it can be cor[illegible]cted in TIME. After that n[illegible] corrections shall be entertained b[illegible]e university.
8. Do not use pencil for answering th[illegible]uestion.
9. Write status correctly e.g. those [illegible]pearing in carry over pape[illegible] should fill in status as Carry C[illegible]r. Those appearing as E[illegible] Students should fill in status as ex[illegible]
10. No supplementary answer book &[illegible]aph paper will be provided.

अनुचित साधन से बचने हेतु:

1. उत्तर पुस्तिका के निर्देशित स्थान को छोड़कर अनुक्रमांक एवं उत्तरपुस्तिका का क्रमांक कही और न लिखे तथा कोई भी चिन्ह न बनायें क्योंकि यह अनुचित साधन प्रयोग की परिधि में आता है।
2. उत्तर पुस्तिका के बारकोड अथवा उत्तर पुस्तिका संख्या पर छेड़ करने पर अनुचित साधन प्रयोग माना जायेगा।
3. परीक्षा कक्ष में निम्न वस्तुएं साथ न लायें, जैसे लिखे हुए कागज के टुकड़े, मोबाईल, डिजिटल डायरी, कोपी, पुस्तक यह सभी वस्तुएं जो अनुचित साधन के अन्तर्गत आती है। केवल संबंधित प्रश्नपत्र में ही मेमोरी लैस साइंटफिक केल्कुलेटर ले जाने की अनुमन्यता होगी।
4. उत्तर पुस्तिकाओं में रबायें न रखें न ही उत्तर पुस्तिका में विषकार्य। ऐसा करना अनुचित साधन प्रयोग की परिधि में आता है।

INSTRUCTIONS TO THE CANDID[illegible]E FOR FILLING PART-IV

1. Use blue or black ball point pen for w[illegible]ting alphabets & numberals in ☐ Boxes.
2. Use blue or black ball point pen for fi[illegible]g the circles.

	1	8	1	5	4	3	2	1	6	9
0	○	○	○	○	○	○	○	○	○	○
1	●	○	●	○	○	○	○	●	○	○
2	○	○	○	○	○	○	●	○	○	○
3	○	○	○	○	○	●	○	○	○	○
4	○	○	○	○	●	○	○	○	○	○
5	○	○	○	●	○	○	○	○	○	○
6	○	○	○	○	○	○	○	○	●	○
7	○	○	○	○	○	○	○	○	○	○
8	○	●	○	○	○	○	○	○	○	○
9	○	○	○	○	○	○	○	○	○	●

Note - If your Roll No. is of 10 digits. Ple[illegible]e leave first three colum[illegible]

Paper Code

B 0 1 0 9 0 4 T

01

Section-A

Short Answer Type Questions

Answer no. 1 (A)

Standing Wave Ratio - When incident wave and reflected wave are combine together then forms a variation pattern of voltage and current is called as standing wave.

The ratio of standing wave defined as the maximum voltage or current to minimum voltage or current along the transmission line. It is represented by 'SWR'.

$$SWR = \frac{\text{Maximum amplitude of voltage}}{\text{minimum amplitude of voltage}}$$

$$SWR = \frac{V_{max}}{V_{min}}$$

SWR in terms of reflection coefficient is -

$$SWR = \frac{1 + |\gamma|}{1 - |\gamma|}, \quad S \geq 1$$

When factor S is greater than one unit then Transmission line which is corresponding to SWR will be flat.

where,

γ = reflection coefficient of T-line.

Answer no. 1(B)

Reduction of Noise - We reduced the unwanted background noise by the following way with using some important unit.

Twister pair cable better than parallel conductor lines.

→ for the unwanted noise reduction we prefered twister pair cables because these old patter radio FMs has high efficiency and directivity.

→ We use not more parallel conductor lines like transmission line due to its high power and bandwidth.

→ parallel conductor lines having component like (L) inductance, (R) resistance, (G) conductance and (C) capacitors these all are very high consumption component these not carry low frequency signal that's why we use twister pair cables or co-axial cables.

→ Twister pair cable is type of transmission line which has more and more applications like TV, communication, Radio, Co-axial cables etch that's why we use prefferred this than conductor lines.

Paper Code T B 0 1 0 9 0 4 T 03

Answer no. 1 (C)

Function of Antenna in communication System

An Antenna is transducer structure which transferred electromagnetic energy to the receiver antenna.
Function of Antenna are the following-

→ As Receiver Antenna - The basic function of any antenna is the receiving the em wave signal from transmission antenna and convert it again into the eletrical signal in free-space.

→ As fed component - An antenna has capable to received signal from source and fed in the antenna for converting it into eletrical signals.

→ As Direction Finding - Antenna is used as detector to find the source location at time when frequency is known.

→ As Loop Antenna - loop antenna has high gain and directivity and high power so antenna is used for loop antenna.

→ Transfer Signal → Transmission antenna gives the electric signal

in free space and this electromagnetic waves received in the receiver antenna.

Answer no. 1 (D)

Signal-to-Noise ratio - The signal to noise ratio is the ratio of power of the signal to power of noise (unwanted background noise) corresponding to the communication system.

Signal-to-noise ratio (SNR) is written as -

$$SNR = \frac{P_s}{P_n} \quad -①$$

where,

P_s = Power of signal

P_n = Power of noise

SNR is expressed also in decibel

$$SNR_{dB} = 10\log_{10}\left(\frac{P_s}{P_n}\right) \quad -②$$

we know power,

$$P = I^2R$$

$$P = \left(\frac{V}{R}\right)^2 R$$

$$P = \frac{V^2}{R}$$

we know, $SNR = \frac{P_s}{P_n}$

for signal, $P_s = \frac{V_s^2}{R}$

for noise, $P_n = \frac{V_n^2}{R}$

put these in equation ②, we get

$$SNR = 10\log_{10}\left(\frac{V_s^2/R}{V_n^2/R}\right)$$

$\therefore \log m^n = n\log m$

$$\boxed{SNR_{dB} = 20\log\left(\frac{V_s}{V_n}\right)}$$

where,

V_s = voltage of signal

V_n = voltage of noise

Answer no. 1(E)

Accumulator Function in 8085 Microprocessor–

Accumulator is register-A which is an importantant unit of inertnally initiated operation. It is 8-bit storage unit which hold the signal for some time.

Accumulator function is given by –

Works as ALU— Accumulator is store and data and hold it for the next signal by using arithmatic and logical unit.

Arithmetic and Logical operation—

Accumulator operates arithmatic and logical operation for the system.

Result of operation— After holding the data from input device, all the result automatically stored in accumulator.

Store the signal— Accumulator doing all operation which is instructed by input device and after holding it store all the data without any instruction.

Restore the violate data— Accumulator itself operates without any instruction with the help of ALU and restore the violate data of the system.

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Answer no. 1 (F)

Externally Initiated Operation

There are four types of externally initiated operation signals in the 8085 microprocessor

1 - RESET
2 - HOLD
3 - READY
4 - INTERRUPT

RESET - Reset signal initiate the central processing unit (CPU)

RESET IN — microprocessor in active mode
RESET OUT — 8085 µP is reset

HOLD - Hold signal triggered the buses and releases them.

HOLDR (Hold Request)
HLDA (Hold acknowledgement)

READY - CPU waits for slow external devices

If READY signal = 0
then 8085 stop operating

INTERRUPT - It going to another signal ISR and jump to it.

INR	non- maskable
RST 7.5	maskable
RST 6.5	maskable
RST 5.5	maskable
TRAP.	high priority by 8085 microprocessor

Answer no. 7 (G)

Operation of Two Cavity Klystron-

Two cavity klystron is a microwave amplifier also the oscillator.

It works on the principle of velocity modulation which decreases the eletron beam strength.

Operation mechanism of two cavity klystron is following ways-

Electron Gun - Generates the electrons and make the eletron beam of straight in direction.

Drift Space - With RF signal are combined with electrons which is emitted by eletron gun then then a beam of electron move in to

cavity (carrier) of klystron and reaches the beam in catcher cavity

Energy Transfer- These eletrons beam releaked energy and goes to second cavity to produce an oscillation. This eletrons transfer the energy into second cavity making it oscillation energy.

Oscillation - After transfer energy beam goes into cavity by second cavity and here transfer the energy is done which make oscillations.

Collector - Colletor collect all the oscill-ations which are produced in catcher cavity.

This is the complete operation mechanism of klystron.

Answer no. 1 (H)

Atmospheric Effect on propagation

Atmospheric effect disturb the microwave transmission signal by possibility two reason-

1) Fading Attenuation - The variation in the strength of microwave signal due to the atmospher (cloud, fog, reflection) effect is called fading which cause the attenuation in the signal.

Signals are absorbed by the dust particles, gas and many more things. Signal reflected by ground, building and wind or water etch

Two main types of fading are -

Flat fading

Absorption fading

Reflection and Absorption - microwave signals easily absorb by gas molecules or hydrogen geses which are present in troposphere. It can easily reflect by the rain water, ground, mirrors and building etch which cause the signal attenuate.

Answer no. 1 (I)

Function of Detector → In microwave communication system detectors provide the main

role for finding attenuation in signal.

There are some important role of detector in communication system.

1) Demodulation - Detector seperates the original signal (audio, video, data) from modified carrier waves.

2) Attenuation - It stops the attenuation of signal by prouding RF signals. in the antenna.

3) Noise Reduction - It also reduce the background noise and enhance the signal-to-noise ratio.

4) Frequency detector - By detecting frequency of the given signal it operats the antenna in active mode for transmission and for reception.

Section - B

Long Answer Type Questions

Answer no. 3

Modes of Electromagnetic Wave Propagation

Electromagnetic wave propagation is the transferring of em energy from radio station to the receiver antinna enabling wireless communication system using ground wave, space wave and sky wave.

There are three types of propagation-

a- Ground wave propagation
b- Space wave propagation
c- Sky wave propagation

a- Ground wave propagation-

Ground wave propagation is the direct line of sight propagation. It can occur by the reflection of ground also.

When the elutromagnetic wave travels along the surface

of the earth's curvature is known as ground wave.

When radio signal moves in free space then some part of incoming signal is direct react to receiver called as Direct wave.

And remaining part of signal may reflected by graind and reach the receiver called reflected wave.

Maximum strength - When direct wave and incident wave come together then in same phase then instructive interference occur which cause increasing the strength of signal.

Minimum strength - when both wave come together but in opposite phase then destructive interference occure which reduce signal strength.

To make maximum strength antinna should be taken as $\lambda/4$ for ground wave.

It operate the minimum frequency 3MHz

Application → Military Surveillance
Navigation
TV communication

2) Space wave propagation - This propag-ation done with the troposphere layer.
Space wave propagation also known as 'troposphere propagation'
It can be done by very high frequency. 3 - 300MHz

The radio signal go through in the space by transmission antenna and it reflected back to earth from the troposphere layer.
After reflection it get in the earth surface that wave is known as 'space wave propagation'

Applications - TV
Radio or FMs
Radar
Satellite communication

3) Sky Wave propagation - The incoming radio signal directed towards the sky at ionospheric region and reflected back perpendicularly at the earth surface is known as sky wave and this process is called as sky wave propagation.
The ionosphere has a frequency which is known as

critical frequency.

$$f_c = \sqrt{1 - \frac{81N}{f}}$$

where

$$\boxed{f_c = 9\sqrt{N}}$$

f_c = critical frequency
N = density of particles

also maximum usable frequency is.

$$\boxed{f_{MUF} = \frac{\cos\theta}{f_c}}$$

where,

f_c = critical frequency
f_{MUF} = maximum usable frequency

This frequency and sky wave propagation causes the long distance transmission and broadcasting.

Application- International Broadcasting
longer distance Transmission

From all these three propagation Space wave propagation is prefered than ground wave and sky wave due to highest frequency range.

Section-C

Long Answer Type Question

Answer no. 6

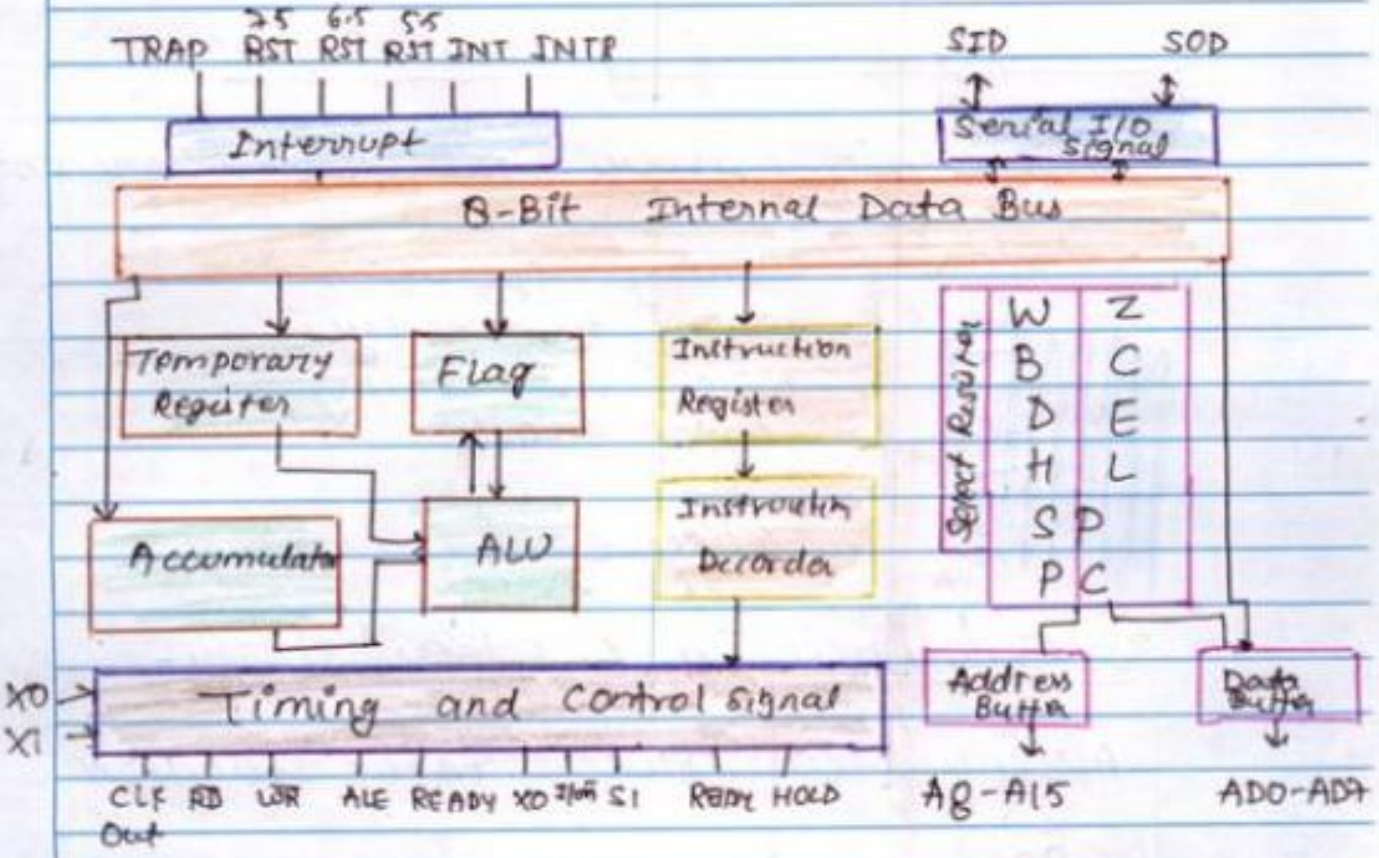
8085 Microprocessor

The 8085 microprocesor is invented by 'Intel'. This is 40-pin IC chip that contains the central processing unit as CPU.
It operates at 8-bit data
It works on +5V power supply

8085 Architecture

The internal logical circuit design is known as architecture.
In 8085 microprocesor, 40-pins are present which groups into 6-group which are as follows-

1- Address Bus
2- Data Bus
3- Control and status signal
4- frequency and power supply signals
5- Externally Initiated Operations
6- Serial I/O ports



Block Diagram of 8085

1) Address and Data Bus

provides the address of A8-A15 which are unidirectional.
AD0-AD7 are bidirectional has capable capability to address the 8085 uP.
Data bus 8-bit or 8 groups of lines uses in this 8085

2) Control and status signal-

This unit / group has four component

$IO/\overline{M}$	memory operation
$\overline{WR}$	con'ti to memory
$\overline{RD}$	Read to memory
ALE	Logic enable
X0	on
X1	active

3) Frequency and Power supply-

Mainly contribute three function

SO	Signal on
S1	signal off
Vcc and Vss	power voltage
CLK (OUT)	clock pulse out the system

4) Externally Initiated signals-

It has four sig[illegible] to operate the microprocessor 8085.

RESET	has two signal Reset In Reset out
HOLD	hold the signal to next instruction

READY — triggered by external effect of CPU

INTERRUPT has five unit contains.

INTR	Interrupt request
INTRR	Interrupt acknowledgement
TRAP	non- maskable to 8085 µP.
RST 7.5	Restart
RST 6.5	Restart
RST 5.5	Restart the signal corresponding to 8085 microprocessor

5) Serial I/O ports -

This Input and output port gives the signal to 8-bit data addressing

SID	Serial Input data
SOD	Serial Output data

These are all 6 groups contribute the Important role in 8085 microprocessor and make the 40-pins IC circuit for usable units and operations.

Paper Code

B0109047T

20

Do Not Write anything in this Portion

Paper Code

B 0 1 0 9 0 4 T

21

Do not write anything in this portion

Paper Code

B 0 1 0 9 0 4 T

22

Do Not Write anything in this Portion

X

Paper Code

B 0 1 0 9 0 4 T

23

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Paper Code

B 0 1 0 9 0 4 T

24

Do Not Write anything in this Portion