Vivekanand College, Kolhapur

(Empowered Autonomous Institute)

Department of Electronics

Internal Examination Notice

Date: 20.02.2026

All the students of **B.Sc. III Major Electronics** are hereby informed that their internal examination for Semester VI will be conducted in offline mode as per attached schedule.

Paper Code	Section Title	Marks	Date	Time
DSC03ELE61	Industrial Instrumentation	10	Tuesday, 24/02/2026	11:30am-12.30pm.
DSC03ELE62	Advanced Microcontroller	10		01:00pm-02.00pm.
DSC03ELE63	Power Electronics	10	Wednesday, 25/02/2026	11:30am-12.30pm.
DSE03ELE61	Internet of Things (IoT)	10		01:00pm-02.00pm.

VIVEKANAND COLLEGE KOLHAPUR (Empowered Autonomous) ESTD JUNE 1964

(Dr. C. B. Patil)
HEAD
DEPARTMENT OF ELECTRONICS
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

Vivekanand College, Kolhapur

(Empowered Autonomous Institute)

Department of Electronics

Internal Examination Notice

Date: 20.02.2026

All the students of **B.Sc. III Minor Electronics** are hereby informed that their internal examination for Semester VI will be conducted in offline mode as per attached schedule.

Paper Code	Section Title	Marks	Date	Time
MIN03ELE61	IoT System Design	10	Wednesday, 25/02/2026	11:30am-12.30pm.

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(Dr. C. B. Patil)

HEAD

DEPARTMENT OF ELECTRONICS

VIVEKANAND COLLEGE, KOLHAPUR

(EMPOWERED AUTONOMOUS)

Vivekanand College, Kolhapur
(An Empowered Autonomous Institute)

B.Sc. III (SEM-VI) Major Electronics
Internal Exam Attendance Sheet 2025-26

Sr. No.	PRN	ROLL NO	Student Name	Date: 24/02/2026		Date: 25/02/2026	
				DSC03ELE61	DSC03ELE62	DSC03ELE63	DSE03ELE61
1	2023037250	8246	ATHANE SHREYA DEEPAK				
2	2023037257	8247	KHOPKAR PRATAMESH BABASAHEB				
3	2023037260	8452	NIGADE RUPESH MOHAN				
4	2020037107	8453	DEVEKAR VINAYAK DATTATRAYA				
5	2023037253	8454	KAMBLE PRAJWAL KIRAN				
6	2023037258	8455	MAHTO SURAJKUMAR SUBHASH				
7		8462	DESAI AKANKSHA ANIL				

Teacher Incharge 1 | Teacher Incharge 2 | Teacher Incharge 3 | Teacher Incharge 4

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Vivekanand College, Kolhapur
(An Empowered Autonomous Institute)

B.Sc. III (SEM-VI) Minor Electronics
Internal Exam Attendance Sheet 2025-26

Sr. No.	PRN	Roll No	Student Name	Date: 25/02/2026 MIN03ELE61
1	2023037222	8238	KAMBLE SAMRAT SURESH	
2	2023037283	8248	ATTAR NASHRA ABDULLAH	
3	2023037346	8249	BIRJE NAMRATA NARAYAN	
4	2023037353	8250	CHARANKAR SHARVARI SANJAY	
5	2023037354	8251	CHOUGALE SAKSHI SANTOSH	
6	2023037352	8252	CHOUGULE SWEJAL AMAR	
7	2023037284	8253	GAIKWAD URVEE UMESH	
8	2023037273	8254	GURAV SAHIL SAMIR	
9	2023037281	8255	KADAM PRITIKA SURESH	
10	2023037264	8256	KAMBLE SAKSHI SAGAR	
11	2023037265	8257	KANDALE AMRUTA ANANDRAO	
12	2023037266	8258	KANUGADE ANUSHKA SHIVLING	
13	2023037341	8259	LAHIGADE PARTH SAGAR	
14	2023037267	8260	MACHALE OMKAR SANGRAM	
15	2023037268	8261	MANE SATVIK VIKAS	
16	2023037269	8262	MNGOLI HANNAH DARWIN	
17	2023037342	8263	MORBALE VAISHNAVI PARSHRAM	
18	2023037270	8264	PATIL BHAKTI SAMBHAJI	
19	2023037343	8265	PATIL MADHURA ANANDA	
20	2023037344	8266	PATIL SANIKA DAGADU	
21	2023037272	8267	PATIL TEJAS POPAT	
22	2023037347	8268	PATIL UTKARSHA NITIN	
23	2023037274	8269	PATIL VIRAJ UTTAM	
24	2023037275	8270	PEDANEKAR SHIVAJI SATAPPA	
25	2023037349	8271	POWAR SANIKA ASHOK	
26	2023037350	8272	SAMRAT ALLI ASHRAF	

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Major

Vivekanand College, Kolhapur

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Internal Examination 2025-26

B.Sc. Part- III (Electronics) (Sem-VI) Course Code: DSC03ELE62

Course Name: Advanced Microcontroller

Date: 24/02/2026 **Marks:** 10

Q.1) A. Select correct alternative (one mark each) (02)

i) Standalone embedded system is _____

a) Digital watches b) Printer c) mobile phone d) None of these

ii) ATmegar 8A contains _____ bytes on-chip in system reprogrammable flash memory for program storage.

a) 4K b) 8K c) 16K d) 14K

Q. 2) Attempt any two (4 marks each) **(08)**

i) Explain the embedded system and its characteristics.

ii) List the features of AVR Atmega microcontroller.

iii) Explain the ports in the AVR microcontroller.

****

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VIVEKANAND COLLEGE, KOLHAPUR

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B.Sc. Part-III (Electronics) (Sem-VI)

Internal Examination Feb-2026 Course

Code: DSC03ELE61 Industrial

Instrumentation

Day: Tuesday | **Time: 11.30 AM to 12.30 PM**

Date: 24/02/2026 | **Marks: 10 Marks**

Q.1). Select the correct alternative (1 mark each) **(02)**

i. IC 8038 generates _____

A) Only square B) Only sine

C) Only triangle D) Sine, square, triangle

ii. Butterworth filter has _____

A) Ripple pass-band B) Flat pass-band

C) Oscillations D) Infinite gain

Q.2) Attempt any two (4 marks each) **(08)**

1) Explain concept of Signal Conditioning.
2) Write a short note on Data Logger.
3) Define lock range.
4) Explain Band Pass Filter.

****

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Vivekanand College, Kolhapur

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Internal Examination 2025-26 B.Sc. Part- III (Electronics) (Sem-VI)

Paper-XI: DSC03ELE63

Course Name: Power Electronics

Date: 25/02/2026 Marks: 10

Q.1) Select most correct alternatives for the following (one mark each) **[2 Marks]**

1. Power transistor is---------- controlled device.

   A) voltage B) current

   C) field D) none of the above

2. SCR terminals are ----------

   A) Emitter, anode, cathode B) Gate, anode , cathode

   C) Anode, MT1, MT2 D) Gate, MT1, MT2

Q.2) Attempt any TWO (Four marks each) **[8 Marks]**

1. Explain the basic structure and I-V characteristics of power diode.
2. Explain the structure and I-V characteristic of SCR.
3. State the names of different method used to turn on the SCR. Explain the gate triggering

----------**********----------

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VIVEKANAND COLLEGE, KOLHAPUR
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B.Sc. Part-III (Electronics) (Sem-VI)
Internal Examination Feb-2026
DSE03ELE61: Internet of Things (IoT)

Date: 25/02/2026 Marks: 10

Q.1) Select the correct alternative (one mark each) **(02)**

1. What is IoT?
   a) network of physical objects embedded with sensors
   b) network of virtual objects
   c) network of objects in the ring structure
   d) network of sensors
2. MQTT is _____
   a) Message Queue Telemetry Transport
   b) Messenger Queue Telemetry Transport
   c) Message Query Telemetry Transport
   d) None of these

Q.2) Attempt any TWO **(04)**

1. Explain logical design of IoT.
2. Describe any four applications of IoT.
3. Explain any four sensors used in IoT.

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Minor

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B.Sc. Part-III (Electronics) (Sem-VI)

Internal Examination Feb-2026

MIN03ELE61: IoT System Design

Date: 25/02/2026 Marks: 10

Q.1) Select the correct alternative (one mark each) **(02)**

1. In MQTT, messages are routed using_____

   a) Ports b) IP Address

   c) Topics d) URLs

2. HTTP is a_____

   a) Stateless protocol b) Stateful protocol

   c) Connection-oriented protocol d) secure protocol by default

Q.2) Attempt any TWO **(08)**

1. Give the comparison between IPV4 and IPV6
2. Write a note on Advanced Message Queuing Protocol (AMQP)
3. Explain MQTT protocol

VIVEKANAND COLLEGE KOLHAPUR (Empowered Autonomous) ESTD JUNE 1964

Major

Shreya Deepak Athane

॥ ज्ञान, विज्ञान आणि सुसंस्कार यांसाठी शिक्षण प्रसार ॥

– शिक्षणमहर्षी डॉ. बापूजी साळुंखे

8

VIVEKANAND COLLEGE, KOLHAPUR

(An Empowered Autonomous Institute)

Assignment

Student's Sign :	Athane
Seat No./ Roll No. :	8246
Seat No./ Roll No. In words	06311

प्र. क्र.
Q. No.

Q 1

1 1] Ic 8038 generates sine, square, triangle

1 2] Butterworth filter has flat pass band.

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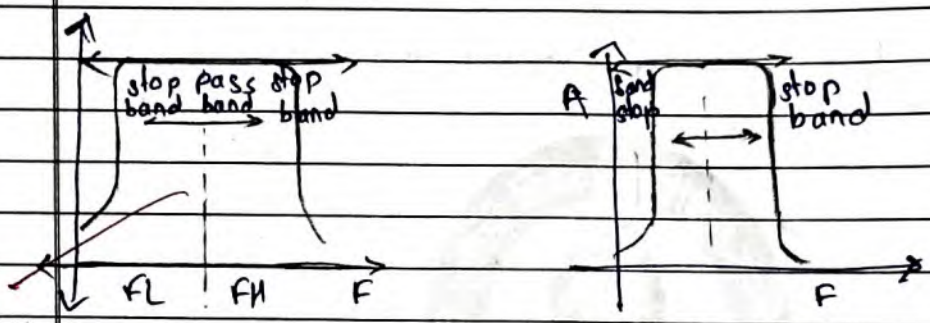
02	Section	Q. No.											
		Marks											

प्र. क्र.
Q. No.

Q 2)

4] Band pass filter –



3

Pass band betn two cutoff frequency FH and FL
1) $0 < F < F_L$
2) $F_H < F < \infty$

Bandwidth = $F_H - F_L \approx F_H$

Maximum gain while $0.707 \times A$ called 3dB
generate freqn FH and FL

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Section	Q. No.													03
	Marks													

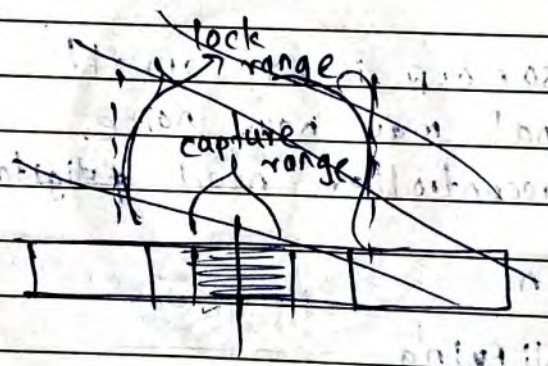
प्र. क्र.
Q. No.

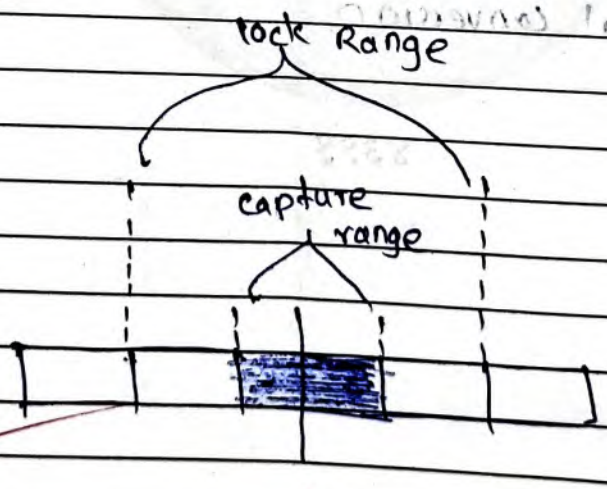
3) Lock Range Define –

The contamination lock with incoming signal called lock range

It is related to maximum phase difference that can be detected. lock range band of frequency above below PLL frequency running freq^n.

3





lock range
$= 2\Delta f_L$

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04	Section	Q. No.												
		Marks												

प्र. क्र.
Q. No.

Q 2

1)

signal conditioning is the process of modifying sensor o/p in suitable format for processing or control

• Need

sensor o/p is very small
signal may have noise.
microcontroller need digital signal.

2

• Fun^n

* Amplifying
* signal conversion

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Shreya Akhane

॥ ज्ञान, विज्ञान आणि सुसंस्कार यांसाठी शिक्षण प्रसार ॥

– शिक्षणमहर्षी डॉ. बापूजी साळुंखे

9/10

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Assignment

Student's Sign :	S D Akhane
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Seat No./ Roll No. In words	06303

प्र. क्र.
Q. No.

Q 1]

1] standalone embedded system is digital watches.

2] ATmega8A contains 8k bytes on-chip in system Reprogrammable flash memory for program storage.

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02	Section	Q. No.												
		Marks												

प्र. क्र.
Q. No.

Q 2 1)

• ~~dom~~ embedded system is defined as computer hardware system include embedded software

• characteristics of embedded system —

* It perform the task specific. they do same task repeatedly
* It perform the time specific, any machine time is set then it works accurately.
* low cost
* Highly stable
* High efficiency
* less power consume
* minimal user interface.
* microcontroller and microprocessor are used to design embedded system.
* They have minimal or no user interface.
* embedded system need connected
* periferals attach input and output devices

3

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Section	Q. No.													03
	Marks													

प्र. क्र.
Q. No.

Q2

2] Features of AVR ATmega8 microcontroller —

- ATmega8A contains 8k bytes on-chip In system reprogrammable flash memory for program storage.
- ATmega8A contains SRAM is 1k bytes
- EEPROM is 512 bytes.
- In ATmega8A has three ports i.e PORTB, PORTC and PORTD.
- In PORTB (8), PORTC (8) and PORTD (7)
- Total 23 ~~bytes~~ I/O lines are present in ATmega8A microcontroller.
- two exterior intrrupt sources located port D.
- three internal timers ~~/counters~~ two 8 bit, one 16 bit
- 3 integrated communication devices.

4

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04	Section	Q. No.												
		Marks												

प्र. क्र.
Q. No.

Q 2

3) In AVR microcontroller three ports
i.e PORTB, PORTC, PORTD,
In this AVR microcontroller one of the port select
i.e DDRB,

if DDRB = 0x01 PIN 0th output remaining i/p
if DDRB = 0x02, PIN 1st output remaining i/p
if DDRB 0x03, PIN 0th and 1st output remaining input

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Shreya Deepak Kawale

॥ ज्ञान, विज्ञान आणि सुसंस्कार यांसाठी विवेक उत्सव ॥

- विवेकानंदांचे आदर्श वाक्य

VIVEKANAND COLLEGE, KOLHAPUR

(An Empowered Autonomous Institute)

Assignment

Student's Sign	Kawale
Seat No / Roll No	8246
Seat No / Roll No in words	06298

Q. No

A 1

1) power transistor is current controlled device

2) SCR terminals are gate, anode, cathode

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02	Section	Q. No.												
		Marks												

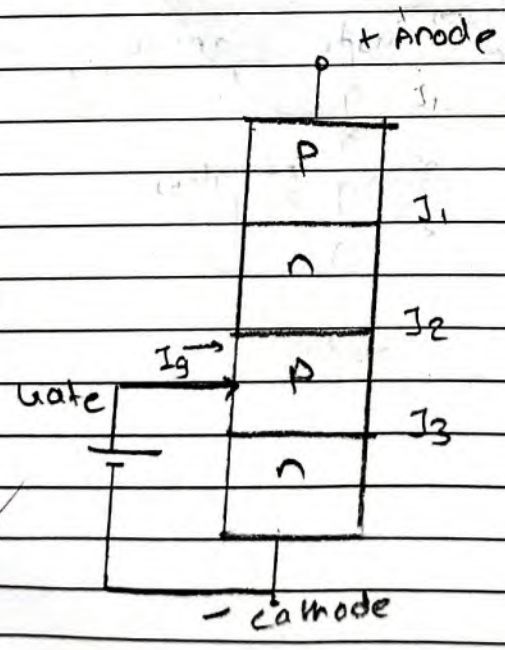
प्र. क्र.
Q. No.

Q 2

3] different methods of turn on SCR :-

* Forward voltage triggering
* Gate triggering
* Light triggering
* dv/dt triggering
* Temperature triggering

~~Explain~~ Gate triggering :-



3

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Section	Q. No.													03
	Marks													

प्र. क्र.
Q. No.

apply positive voltage between gate and cathode turn ON forward bias thyristor when positive voltage applied to gate ~~ter~~ terminal charge carriers injected in inner layer, reduce thickness of depletion layer. applied voltage increases injunction increases Gate current and forward breakover voltage are inversely proportional

Q 2

(1) power diode higher than 1 v which is higher than state ~~vol~~ voltage across low power diode (n⁻) drift layer

power diode reverse very small leakage current flow through it leakage current is independant of applied reverse voltage of leakage current flow due to thermally generated charges carrier reverse voltage reatches reverse breakdown voltage

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04	Section	Q. No.													
		Marks													

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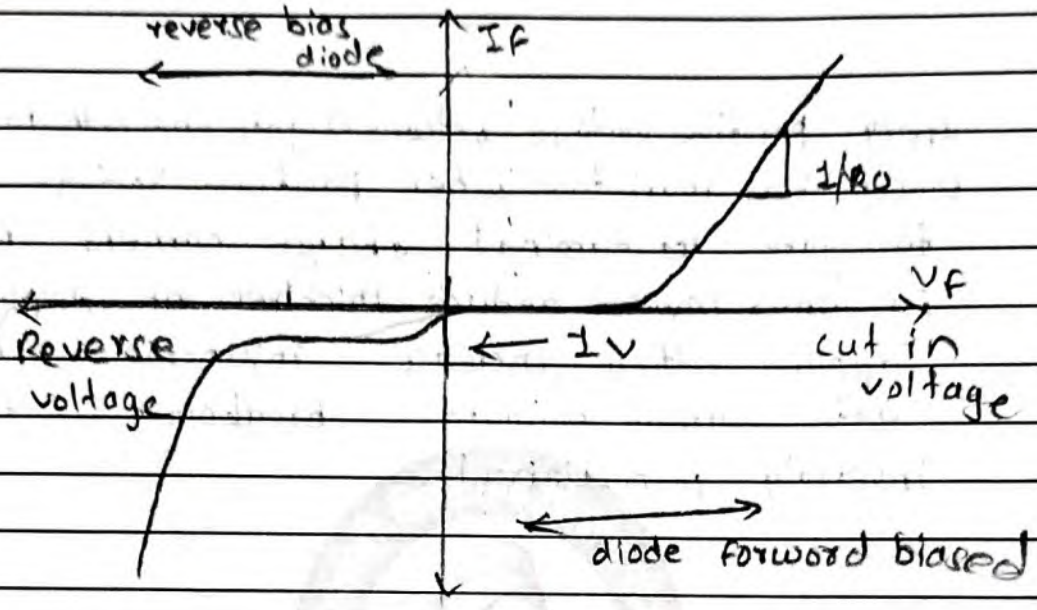
Q. No.



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Shreya Deepak Athane

6/10

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– शिक्षणमहर्षी डॉ. बापूजी साळुंखे

(अधिकारप्रदत्त स्वायत्त)
कोल्हापूर

VIVEKANAND COLLEGE, KOLHAPUR.

(Empowered Autonomous)

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Suppliment No. :	
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Centre	

प्र. क्र.
Q. No.

Q 1

1) a) Network of physical objects embedded with sensors.

1

2) MQTT is a) message queue telemetry transport

2

विवेकानंद कॉलेज
(अधिकारप्रदत्त स्वायत्त)
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ESTD
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1964
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02	Section	Q. No.												
		Marks												

प्र. क्र.
Q. No.

Q 2

2) Applications of IOT -

- smart farming -
* smart farming and smart mapping
* smart climate monitoring and forecast
* Drone of field monitoring
* smart predictive of crop and livestock

- Health and lifestyle -
* wearable electronic gazzetes health and fitness monitoring

(अधिकारप्रदत्त स्वायत्त)
कोल्हापूर

- Industry :-
* indore air quality monitoring
* machine diagnosis and prognosis

- Smart Building -
* multiple disparate building management
* High performance building
* Flexible building
* efficient Homes

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Section	Q. No.													03
	Marks													

प्र. No.

2

3. Sensors –

* Optical sensor – :
It convert light into electric signal measures physical quantity of light and transform digital form
* It involves no optical fibres
* Image ~~ras~~
* laser and led are two different types of light.

* Touch sensor –
electronic sencor detect operate switch when touched
sensors are used in lamps, touch screen of mobile etc.
Touch sensors are two types
- Resistive
- capacitive

all modern touch sensors are capacitive

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04	Section	Q. No.													
		Marks													

प्र. क्र.
Q. No.

* Speed sensors -
used to detecting speed of any object or vehicle motion called speed sensor.

* PIR sensors -
passive infared sensors tracking measurement infrared light radiating from object field of view known pyroelectric sensors

2

विवेकानंद कॉलेज
(अधिकारप्रदत्त स्वायत्त)
कोल्हापूर
VIVEKANAND COLLEGE KOLHAPUR (Empowered Autonomous)
ESTD JUNE 1964

Minor

10/10

॥ ज्ञान, विज्ञान आणि सुंसस्कार यासाठी शिक्षण प्रसार ॥
– शिक्षणमहर्षी डॉ. बापूजी साळुंखे

(अधिकारप्रदत्त स्वायत्त)
कोल्हापूर

VIVEKANAND COLLEGE, KOLHAPUR.
(Empowered Autonomous)

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	38079
Centre	Vivekanand College Kolhapur.

MIN03ELE61: IoT System Design

प्र. क्र.
Q. No.

Q. 1.

1] In MQTT, messages are routed using _____

Ans. ~~b) IP Address~~

c) Topics

2] HTTP is a _____

Ans. a) Stateless protocol

Q. 2.

3] MQTT - Message Queuing Telementry Transport Protocol.

① It is the publish-subscribe communication model based light weight messaging protocol for use in conjunction with the TCP/IP protocol

② It provides connectivity between application and middle wares on one side & networks and communication on the other side.

③ A message broker [illegible] the publish

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02 Section	Q. No.												
	Marks												

प्र. क्र.
Q. No.

subscribe messaging patterns.

(4) A topic to which a client is subscribed is updated in the form of messages and distributed the message broker.

(5) Designed for remote connections, limited bandwidth, small-code footprint.

MQTT components.

✓ Publishers : Lightweight sensors.

✓ Subscribers : Applications interested in the sensor data.

✓ Broker : Connect publishers and subscribers and classify sensor data into topics communication.

~~Contain~~

04

MQTT Protocol

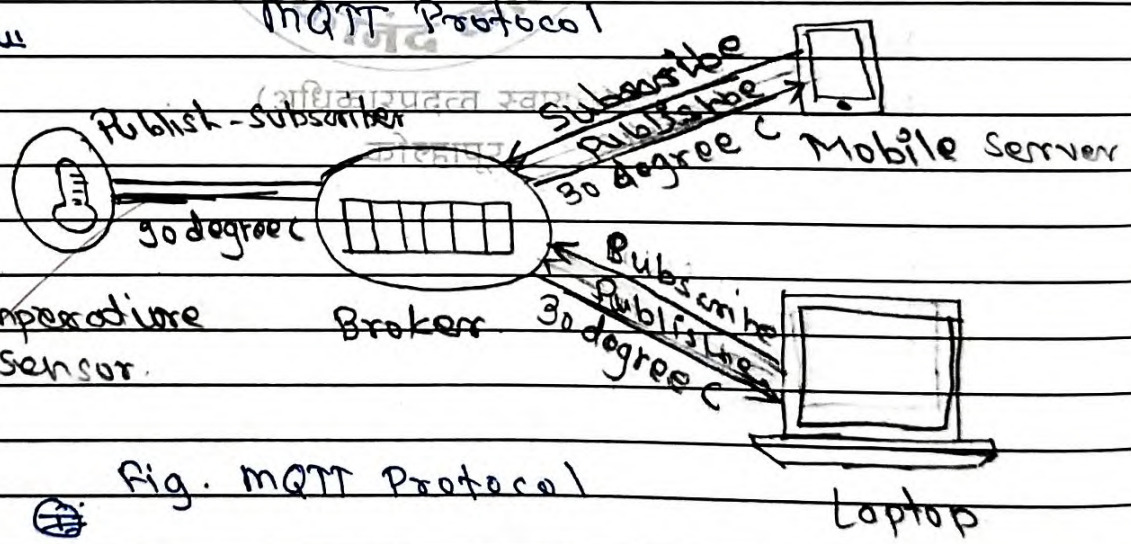

Fig. MQTT Protocol

(3)

- The potocol uses a publish/subscribe architecture
- Publish/subscribe is event-driven and enables messages to be pushed to clients
- The central communication point is the MQTT broker, which is in charge of dispatching all messages between the senders

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प्र. क्र.
Q. No.

and rightful receivers.

4] Each client that publishes a messages to the broker, includes a topic into the message.
· The topic is the routing information for the broker.

5] Each client that wants to receive messages subscribes to certain topic & the broker delivers all messages with the matching topic to the client.

6] The clients don't have to know each other. They only communicates over the topic.

7] This architecture enables highly scalable solutions without dependencies between the data producers & the data consumers

Applications -

- Facebook messagers uses MQTT for online chat.
- Amazon Webservices uses Amazon IOT with MQTT.
- Microsoft Azure IOT Hub uses MQTT as its main protocol for telemetry messages. The EVERYTHING IOT platform uses MQTT as an M2M protocol for millions of connected products.

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VIVEKANAND COLLEGE KOLHAPUR (Empowered Autonomous) ESTD JUNE 1964

04 Section	Q. No.													
	Marks													

Q. 2.

प्र. क्र. Q. No.		Features.	IPv4	IPv6
	1)	Address length	32-bit address	128-bit
	2)	Address Format	Decimal Format (e.g. 192.168.1.1)	Hexadecimal format (e.g. 2001:0db8:1
	3)	Deployment	1981	1988.
	4)	Address	32-bit	128-bit
	5)	Connection Integrity	End-to-end integrity is unachievable	End-to-end integrity is achievable.
	6)	Flow Identification	Not available	Uses flow label field in header for packet flow identification.
04	7)	Checksum field	Present	Not present
	8)	Transmission scheme	supports broadcast	Use multicast and anycast: no broadcast.
	9)	Header size	vaiable: 20-60 bytes.	Fixed: 40 bytes.
	10)	Conversion.	Can be converted to IPv6	Not all IPv6 can be converted to IPv4.
	11)	Field Structure	4 field separated by (.)	8 field separated by (:)
	12)	Example	192.168.1.1	2001:0db8:1

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Name :- Sahil Samir Gurav. 08/10

॥ ज्ञान, विज्ञान आणि सुंसस्कार यासाठी शिक्षण प्रसार ॥
- शिक्षणमहर्षी डॉ. बापूजी साळुंखे

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प्र. क्र.
Q. No.

Internal Examination
Sub:- Electronics.
MIN03ELE61

Q1)

1) In MQTT, messages are routed using _____
→ c) Topics

02

2) HTTP is a _____
→ a) Stateless protocol

Q2)

1)

→ Features	IPV4	IPV6
1) Address Length	32 bit address	128 bit address
2) configration	Manual and DHCP (Dynamic Host configuration protocol) configration	Automatic configration will happen in IPV6

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3)	Addressing structure	4 sub parts divided /separated by by dot (.)	8 parts divided or separated by colons (:)
4)	LVSM support	The IPV4 supports LVSM (Large variable subnet Masking.)	The IPV6 does not support LVSM (Large variable subnet masking.)
5)	Data bytes	32 bit Data	128 bit data
6)	IP address transfer	The IPV4 address can be converted into IPV6.	Not every IPV6 address converted into IPV4.

2)

—) Advanced Message Queuing Protocol (AMQP) :-

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3)

→ Message Queuing Telemetry Transfer (MQTT) :-

The MQTT protocol works on ~~the~~ publish - subscriber model where the publisher and subscriber are connected with each other with third party known as broker in MQTT.

As the broker works as a filter wall betn the publisher and subscriber, making the publisher unaware of who is the subscriber.

The publisher pubishes the data / info / material the broker distributes that data / info / material to the subscriber.

The broker works as a mediator maintaining the privacy betn publisher and subscriber.

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Sub:- MINO3ELE61 : IOT system Design

प्र. क्र. Q. No.

Q1

1. c) Topics

2. a) stateless protocol

02

Q2. 1

Features	IPV4	IPV6
Address bit	32-bit	128-bit
Address Type	Decimal Type ex. (198.162.0.0.1)	Hexadecimal TYPE ex (2001:dble:5001:)
development	1981	1998
configuration	Manual configuration & DHCP (Dynamic Host configuration protocol) configuration	Auto configuration and renumering.
integrity	~~End-to-end~~ built-in	~~end~~ [redacted]

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	intigrity. codend like tools like IPsec needed.	IPsec integrity for Identification and authentication
header size	variable : 20 - 60 byte	Fixed : 40 byte
Flow identification	Not required	it is required for the proxy for Flow identification.
Fragmentation	it is used sender and router	it used only by the sender
example	128.122.0.1	2000:Dblc:100S

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Q2.

3. MQTT Protocol :-

- MQTT (messaging queuing Telimetry Transfee) protocol. it is based on client service model.
- it is lightweight.
- it is also used in TCP IP protocol.
- it is mainly used for remote controller, limited bandwidth and small code footprint devices such as sensors in IOT system.

Key points :-

1 communication model :- MQTT is basically used client server model (unlike the HTTP used in request/response).
- it is used. event-driven and message are pushed to the client

2. mainly components are used :-

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1. publisher :- it is used system or devices to send data.
2. subscriber :- Application to use receive sendee -s data.
3. broker :- it is central service of publisher and subscriber. and it is connected the publisher and subscriber. manage message delivery.

3. working :-

1) publisher send a particular topic to subscribee.

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2) subscriber receive those topic
3) broker receive those topic and send all subscriber of that topic.
4) client do not communicate directly: it is communicate through the broker.

4) examples :-
1) ~~extends~~ limited bandwidth.
2) power requirements.

Q2.2. AMQP (Advanced Message Queuing protocol.
- it is basend publish-subscriber model.
- it is used trasfer layer in TCP protocol.
- it is overhead is low
- AMQP is QOS Level is Yes (delivery quanties)
- latency is very Low
- scalability is very High
- Best of used is

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प्र. क्र.
Q. No.

Q. 1)

1)

→ In MQTT, messages are routed using b) IP address.

2)

→ HTTP is a a) stateless protocol.

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Q. 2)

1)

→

IPV4	IPV6
1) it is address is 32 bit	it is Addess is 128 bit.
2) Manual and DHCP (Dynamic host configuration protocol)	Auto configuration and renumbering supported.
3) 1981 - Deployment	1998 - Deployment.
4) performed by sender and Router	performed only ~~sender~~ by sender.
5) end to end integrity and unachievable	5) end to end integrity and achievable.
6) variable bit 20-60 byte	fixed ~~bytes~~ 40 bytes.
7) checksum ~~field~~ field present	checksum field is Absent.

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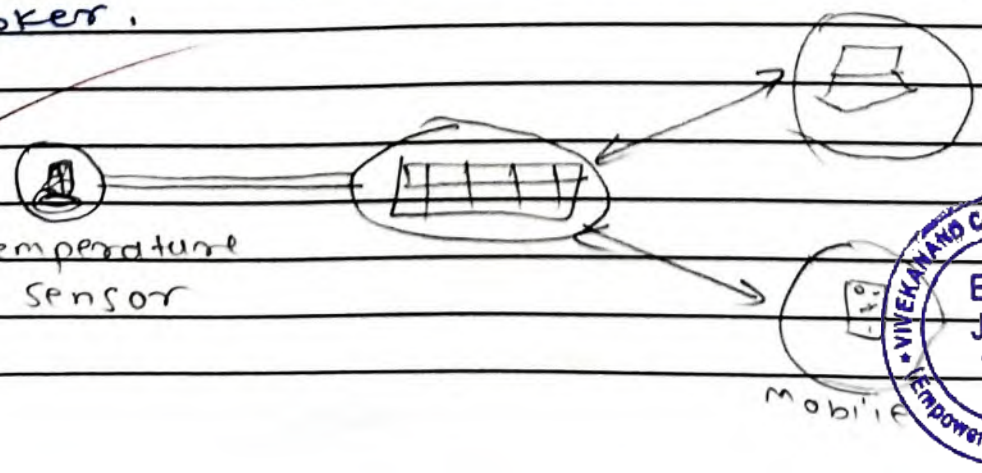
Q. 3)

→ MQTT :- MQTT is the message queue Telemantry Transport. used in IoT devices. That is internet of things. it is Request Response model. and it has 2 main subpart

1) publisher / subscriber
2) request Response.

- so the publisher - subscriber is ~~control by~~ controled from broker.
- broker is handle publish - subscriber ~~in~~ devices. publish is sent to the data ~~and~~ ~~subscr~~ physically and subscriber is Reciving the data from publish ~~&~~ through the broker.
- it works over ~~the~~ UDP that is user datagram protocol.
- it is Request model. ~~that~~ the Request is sent over the ~~dat~~ device and Recive the data from the publish.
- For use in Conjuction with the TCP/IP protocol.
- From of messages and distributed ~~and~~ by the messages broker.



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