



Paper ID : 261573

Printed Page: 1 of 2

Subject Code:BCIT061

Roll No:

BTECH

(SEM. VI) THEORY EXAMINATION 2025-26

ENERGY HARVESTING TECHNOLOGIES AND POWER MANAGEMENT FOR IOT
DEVICES

TIME: 3 HRS

M.MARKS: 70

Note: Attempt all Sections. In case of any missing data; choose suitably.

SECTION A

Q1. Attempt all questions in brief.

(2 × 7 = 14)

Q No.	Question	CO	LEVEL
a	Define the term "Energy Harvesting".	CO1	K1
b	List any two types of photovoltaic cell technologies.	CO1	K1
c	Name two common piezoelectric materials used in energy harvesting.	CO2	K1
d	What is the primary role of a transducer in an energy harvester?	CO2	K1
e	State the basic principle of electromagnetic energy harvesting.	CO2	K1
f	Mention one non-linear technique used for vibration control.	CO2	K1
g	Identify two major power sources for Wireless Sensor Networks (WSN).	CO3	K1

SECTION B

Q2. Attempt any three of the following.

(7 × 3 = 21)

a	Explain the process of electric power generation in semiconductor PV cells.	CO1	K2
b	Discuss various strategies used for enhancing the performance of piezoelectric energy harvesters.	CO2	K2
c	Describe the role of micro-fabricated coils and magnetic materials in electromagnetic energy harvesting.	CO2	K2
d	Elaborate on the power generation and conversion mechanisms specifically for WSN.	CO3	K2
e	Analyze the implementation of energy harvesting systems in Bio-MEMS based applications.	CO4	K2

SECTION C

Q3. Attempt any one part of the following.

(7 × 1 = 7)

a	Describe the architecture and significance of energy harvesting-based sensor networks.	CO1	K2
b	Discuss different photovoltaic cell technologies and their role in harvesting ambient energy.		K2



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Q4. Attempt any one part of the following.

(7 × 1 = 7)

a	Explain the electromechanical modeling of harvesters using the Lumped parameter model.	CO2	K2
b	Discuss the design and functionality of piezoelectric microgenerators in modern IoT devices.	CO2	K2

Q5. Attempt any one part of the following.

(7 × 1 = 7)

a	Compare micro-scale and macro-scale implementations of electromagnetic energy harvesting.	CO2	K2
b	Explain the application of non-linear techniques in vibration control and steady-state cases.	CO2	K2

Q6. Attempt any one part of the following.

(7 × 1 = 7)

a	Discuss the various losses encountered in harvesting microelectronic circuits and how to manage them.	CO3	K2
b	Provide detailed case studies regarding power generation for wireless sensors using harvesting techniques.	CO3	K2

Q7. Attempt any one part of the following.

(7 × 1 = 7)

a	Describe the methods and challenges of powering wireless Structural Health Monitoring (SHM) sensor nodes.	CO4	K2
b	Explain the utility of energy harvesting for ID tags and RF sensors with suitable examples.	CO4	K2