

M.E. ELECTRICAL ENGINEERING FIRST YEAR FIRST SEMESTER EXAM 2025

SUBJECT: - CONDITION MONITORING OF ROTATING MACHINES

Full Marks 100

Time: ~~Two hours~~/Three hours/ ~~Four hours~~/Six hours

(50 marks for each part)

Use Separate Answer scripts for each Part

Part I

- (a) What do you understand by the term "Condition Monitoring"? How does it differ from protection?
- Q 1. or 10
- (b) Discuss in brief, the different courses of maintenance actions and their relative advantages and disadvantages?
- (a) Discuss : How machine specification is related to machine failure?
- or
- Q 2. 10
- (b) Discuss in brief what is "environmental aging" of electrical machines and what are its effects?.
- Discuss in brief(any two):
- a) Induction machine faults
- Q 3. 10
- b) Stator end-winding faults
- c) Cooling system failure
- a) Discuss : How machine specification is related to machine failure?
- or
- Q 4. 10
- b) Discuss in brief, what are the common faults of electrical machines and what are the effects?
- Define the following terms (any five):
- Q 5. 5x2
- Availability; time of failure; time of repair; failure rate; time between failure; mean time between failure

[Turn over

Master of Electrical Engineering 1st Year 1st Semester Examination, 2025**SUBJECT: CONDITION MONITORING OF ROTATING MACHINES**

Time: Three Hours

Full Marks: 100 (50 each part)

Use a separate Answer-Script for each part.

Question No.	PART – II	Marks
	Answer any three from the following.	
1.i)	Write down the objectives of condition monitoring of rotating machines.	4+4+4+4
ii)	Draw a schematic for basic steps of condition monitoring.	
iii)	Write a short note on basic approaches of condition monitoring.	
iv)	What are the probable internal faults of a rotating machine?	
2. i)	Instantaneous power cannot represent Instantaneous torque – explain	4+4+4+4
ii)	What kind of information can be obtained from acoustic noise from a rotating machine?	
iii)	Vibration based method is suitable for both mechanical and electrical fault of a rotating machine.	
iv)	What is non-invasive method of condition monitoring? Explain with an example.	
3. i)	Derive the d-q model of a healthy three-phase squirrel cage induction motor (SQIM).	14 +4
ii)	Show the current distribution in a star-connected three phase winding of a 3-phase SQIM considering a stator inter-turn fault in one phase.	
4. i)	Prove that the linear combination of wavelets is another wavelet	4 + 12
ii)	Compute the CWT of the following signal using the Haar wavelet. $f(t) = \begin{cases} 1, & 0 \leq t \leq 1 \\ 0, & \text{otherwise} \end{cases}$	