



K. K. Wagh Institute of Engineering Education & Research, Nashik
(An Autonomous Institute From A.Y. 2022-23)

WINTER-2024	
Exam Seat No.:	
Academic Year:2024-2025	Semester:I
Class:FY	Program:B.Tech
Branch Code:FYE	Pattern:2023
Name of Course:Fundamentals of Mechanical Engineering	Course Code:2300114A
Max. Marks:60	Duration:2.30 Hrs.

Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains 02 page(s).
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last columns indicates the Course Outcome of the Question/sub-question.

Marks CO

Question No. 1

- 1a) A spur pinion is mounted on an electric motor shaft running at 500 r.p.m. and it is in mesh with a spur gear, mounted on the shaft of compressor. The gear ratio is 2.25. The torque required to run the compressor is 90 N-m. If the number of teeth on pinion is 10, determine: (6) CO5
- i) The number of teeth on gear
 - ii) The torque on electric motor shaft
 - iii) The power rating of an electric motor

Question No. 2

- 2a) Draw neat and labelled diagram for heat pump and refrigerator and prove $(COP)_{H.P} - (COP)_R = 1$ (6) CO3

Question No. 3

- 3a) Draw a block diagram of electric vehicle and explain the function of main components involved in it. (8) CO2

OR

- 3b) What are hybrid vehicles? Draw and explain layout of any one type of hybrid vehicle. (8) CO2
- 3c) Draw neat labelled diagram of 4 stroke compression ignition engine and explain its working (8) CO1

OR

- 3d) Draw and explain working of 2 stroke SI engine. (8) CO1

Question No. 4

- 4a) Explain sand casting process with help diagram. (8) CO1

OR

- 4b) Explain any 4 sheet metals working operations with help of diagram. (8) CO1

- 4c) Enlist different metal joining process and explain shielded metal arc welding with the help of neat diagram (8) CO1

OR

- 4d) Write short note on hot forging and cold forging process. (8) CO1

Question No. 5

- 5a) Draw block diagram of CNC machine and explain function of different components involved in CNC machine. (8) CO1

OR

- 5b) Write short note on AGV and RS. (8) CO1

- 5c) Define flexible manufacturing system and draw layout of any 3 types of flexible manufacturing systems (8) CO1

OR

- 5d) Define CIM and explain briefly four island of CIM (8) CO1

..... **End of question paper**.....