



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

WINTER-2025	
Exam Seat No.:	
Academic Year: 2025-2026	Semester: I/II
Class: FY	Program: B.Tech
Branch Code: FYE (MEC / CIV / CHEM)	Pattern: 2022
Name of Course: Fundamentals of Mechanical Engineering	Course Code: FYE221008
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 two pages.
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 gearbox input shaft rotates at 1000 rpm and input power delivered is 5 KW. The gearbox reduces speed by ratio 5:1. The overall efficiency is 85% find (6) CO5  
a) input torque b) output speed c) Output power d) Output torque

**Question No. 2**

- 2a) Estimate the loss of heat through a wall of cold chamber of length 5m, height 4m and thickness 0.25m. If the temperature of the wall surface are maintained at  $-10^{\circ}\text{C}$  and  $30^{\circ}\text{C}$  respectively. Thermal conductivity of wall is  $0.4 \text{ W/m-k}$ . Also find heat flux. (6) CO3

**Question No. 3**

- 3a) Compare 4 stroke petrol (S.I) and 4 stroke diesel (C.I) engine (8) CO1

**OR**

- 3b) Draw and explain following IC engine terminologies. (8) CO1  
i) Bore ii) Stroke iii) Swept Volume iv) Compression Ratio

- 3c) Explain power transmission layout of IC engine vehicle , electric vehicle and hybrid vehicle (8) CO2

**OR**

- 3d) State advantages and disadvantages of electric vehicle. (8) CO2

**Question No. 4**

- 4a) Explain following terms associated to sand casting process (8) CO1  
i) Mould ii) Core iii) Sprue and riser iv) Pattern

**OR**

- 4b) Define forging and explain different types of forging method based on types of dies used. (8) CO1  
4c) Explain different methods of milling with the help of neat diagram. (8) CO1

**OR**

- 4d) Compare soldering and Welding. (8) CO1

**Question No. 5**

- 5a) Decode the following CNC Code (8) CO1

N001 G90 M04 S1500 F0.2

N002 M06 T03

N003 M08

N004 G01 Z50 X-80

**OR**

- 5b) Write short note on automatic retrieval system. (8) CO1

- 5c) Define Flexible Manufacturing System (FMS). Illustrate the following FMS layouts with neat diagrams: (8) CO1

i) In-line FMS

ii) U-type FMS

iii) Rotary FMS

**OR**

- 5d) Write short note on CIM. (8) CO1

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