

Mechanical Technology

PAPER I : OPERATION AND MAINTENANCE OF MACHINE TOOLS-I (IA)

Instructions to internal and external examiner and Scheme of marking

Time: 3 Hrs.

Max. Marks: 120

A. General Instructions to the internal and external examiner.

1. Evaluation system must be followed strictly as shown below.
2. No extra time should be given for completing the practical.
3. The assessment of the term work and project journal and Industrial visit should be done by both the examiner.

(i)	Term work	: 20 Marks
(ii)	Project work	: 10 Marks
(iii)	Industrial visit	: 10 Marks

	Total	: 40 Marks

B. Scheme of Marking

- For Job no.1, 2, 3 & 4.

I.	Length	: 15 Marks
II.	Diameter / width	: 15 Marks
III.	Tolerance	: 10 Marks
IV.	Operations	: 10 Marks
V.	Finish	: 10 Marks
VI.	Viva	: 20 Marks

	Total	: 80 Marks

- For practical no.5.(Overhauling)

i.	Dismantling as per proper sequence	: 10 Marks
ii.	Fault finding	: 10 Marks
iii.	Cleaning	: 10 Marks
iv.	Rectification of fault	: 10 Marks
v.	Assembling	: 10 Marks
vi.	Checking for proper functioning	: 10 Marks
vii.	Viva	: 20 Marks

Total : 80 Marks

- For practical no.6.(CNC Programming)

- i. Co-ordinate calculation : 15 Marks
- ii. Programme preparation : 15 Marks
- iii. Programme editing : 15 Marks
- iv. Graphic Simulation : 15 Marks
- v. Viva : 20 Marks

Total : 80 Marks

- For practical no.7. (CNC Programming)

- i. Description / procedure / part Function : 15 Marks
- ii. Schematic diagram : 15 Marks
- iii. Application : 15 Marks
- iv. Merit – demerits : 15 Marks
- v. Viva : 20 Marks

Total : 80 Marks

Question Paper

Time: 3 Hrs.

Max. Marks: 80

Instructions:

1. There will be seven sets of practicals. To be prepare by the internal & external examiner as per the available raw material and question set provided.
2. The internal & external examiner must prepare job drawing including operations in the set and showing all dimensions in mm.
3. The drawings provided are not to the scale.
4. Perform practical as per job drawing or study questions.
5. Show the graphic simulation to the internal and external examiner.
6. Job no.1, 2, 3, 4 & 5 are based on machine shop practice & overhauling.
7. Job no.6 is based co-ordinate calculation and programme preparation as per given respective operations.
8. Job no.07 is based on study aspect of CNC programming.

Instructions to the head of the Institution and list of requirement.

1. Any one set of practical should be selected by the head of the institution with an internal examiner well in advance and accordingly raw material should be made available before commencement of examination. There should be not more than four students in each set.
2. The question paper set must be prepared by the internal & external examiner as per set given including job drawing, marking scheme etc. before commencement of practical exam.
3. Job material should be supplied to the candidate as per given size and specifications.
4. Number of candidate in one batch should be arranged as per the machines /equipments available.
5. All the equipments / machines should be supplied to candidate at least fifteen minutes before the schedule time.

Tools and Equipments.

1. Center Lathe, Shaping machine, CNC simulation software with computable computer and related tools and equipments of Errection and testing of machines, measuring and marking tools, holding equipments, cutting tools, tools and equipments required as per job drawing etc.

Set of Question paper/ Practical slip to be prepared by the internal & external examiner. (IA).

- i. Prepare a composite job including operations such as step turning, taper turning, knurling, grooving etc.
- ii. Prepare a composite job including operations such as step turning, chamfering, grooving and external threading.
- iii. Prepare a job including operations such as drilling, boring and internal threading.
- iv. Prepare a composite job on lathe machine & shaper machine including operations such as turning , facing , chamfering & keyway cutting,
- v. Do dismantling & assembling of lathe machine tailstock / carriage / chuck / tool head of shaper machine (Any one).
- vi. Prepare a part programme as per given drawing.
- vii. Study the CNC machine parts as per given in question paper.

Mechanical Technology

PAPER II : OPERATION AND MAINTENANCE OF MACHINE TOOLS - II (IB)

Instructions to internal and external examiner and Scheme of marking

Time: 3 Hrs.

Max. Marks: 120

A. General Instructions to the internal and external examiner.

1. Evaluation system must be followed strictly as shown below.
2. No extra time should be given for completing the practical.
3. The assessment of the term work and project journal and Industrial visit should be done by both the examiner.

(i)	Term work	: 20 Marks
(ii)	Project work	: 10 Marks
(iii)	Industrial visit	: 10 Marks

Total : 40 Marks

B. Scheme of Marking

- For Job no.1, 2 & 3.

i.	Length	: 15 Marks
ii.	Diameter / width	: 15 Marks
iii.	Tolerance	: 10 Marks
iv.	Operations	: 10 Marks
v.	Finish	: 10 Marks
vi.	Viva	: 20 Marks

Total : 80 Marks

- For practical no.4.(Overhauling)

i.	Dismantling as per proper sequence	: 10 Marks
ii.	Fault finding	: 10 Marks
iii.	Cleaning	: 10 Marks
iv.	Rectification of fault	: 10 Marks
v.	Assembling	: 10 Marks
vi.	Checking for proper functioning	: 10 Marks
vii.	Viva	: 20 Marks

Total : 80 Marks

• For practical no.5.(Preventive maintenance)

- | | | |
|------|--|------------|
| i. | History sheet | : 15 Marks |
| ii. | General Inspection chart | : 15 Marks |
| iii. | Preventive maintenance chart | : 15 Marks |
| iv. | Recommendation to avoid brake down maintenance | : 15 Marks |
| v. | Viva | : 20 Marks |

Total : 80 Marks

For practical no.6. (Study of modern methods of machining /
super finishing operations)

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|------|---|------------|
| i. | Description / procedure / part Function | : 15 Marks |
| ii. | Schematic diagram | : 15 Marks |
| iii. | Application | : 15 Marks |
| iv. | Merit – demerits | : 15 Marks |
| v. | Viva | : 20 Marks |

Total : 80 Marks

Question Paper

Time: 3 Hrs.

Max. Marks: 80

Instructions:

1. There will be six sets of practicals. To be prepare by the internal & external examiner as per the available raw material and question set provided.
2. The internal & external examiner must prepare job drawing including operations in the set and showing all dimensions in mm.
The drawings provided are not to the scale.
3. Perform practical as per job drawing or study questions.
4. Job no.1, 2, 3 & 4 are based on machine shop practice & overhauling.
5. Job no.5 is based preventive maintenance of different machine tools like lathe machine, milling machine, Shaper machine, grinding machine & drilling machine etc.
6. Job no.06 is based on study aspect of modern machining process and super finishing operations.

Instructions to the head of the Institution and list of requirement.

1. Any one set of practical should be selected by the head of the institution with an internal examiner well in advance and accordingly raw material should be made available before commencement of examination. There should be not more than four students in each set.
2. The question paper set must be prepared by the internal & external examiner as per set given including job drawing, marking scheme etc. before commencement of practical exam.
3. Job material should be supplied to the candidate as per given size and specifications.
4. Number of candidate in one batch should be arranged as per the machines /equipments available.
5. All the equipments / machines should be supplied to candidate at least fifteen minutes before the schedule time.

Tools and Equipments.

1. Lathe machine, milling machine, Grinding machine, drilling machine & Shaping machine, related tools and equipments of preventive maintenance of machines, measuring and marking tools, holding equipments, cutting tools, tools and equipments required as per job drawing etc.

Set of Question paper/ Practical slip to be prepared by the internal & external examiner. (IB).

- i. Turn specified diameter on lathe machine & perform operation for round to square on milling machine.
- ii. Prepare a spur gear of given module (only five teeth) on lathe & milling machine.
- iii. Do surface finishing operation on given plate by using surface grinder.
- iv. Do dismantling & assembly of dividing head / table of milling machine.(Any one).
- v. Prepare history sheet, general inspection chart, preventive maintenance chart of given machine (Lathe, milling, drilling, shaper, power saw & grinding machine etc.) (Any one machine only).
- vi. Study the aspect of modern machining process or study the super finishing operations (Any one).

Mechanical Technology

PAPER III: ENGINEERING SCIENCE AND UTILITIES MACHINERY – (IC)

Instructions to internal and external examiner and Scheme of marking

Time: 3 Hrs.

Max. Marks: 120

A. General Instructions to the internal and external examiner.

1. Evaluation system must be followed strictly as shown below.
2. No extra time should be given for completing the practical.
3. The assessment of the term work and project journal and Industrial visit should be done by both the examiner.

(i)	Term work	: 20 Marks
(ii)	Project work	: 10 Marks
(iii)	Industrial visit	: 10 Marks

Total : 40 Marks

B. Scheme of Marking

- For practical no.1, 2 & 3.

i.	Performance of practical	: 20 Marks
ii.	Observations / calculation	: 20 Marks
iii.	Results	: 20 Marks
iv.	Viva	: 20 Marks

Total : 80 Marks

- For practical no.4.(Jigs & Fixture)

i.	Performance of practical	: 20 Marks
ii.	Accuracy in work	: 20 Marks
iii.	Proper functioning	: 20 Marks
iv.	Viva	: 20 Marks

Total : 80 Marks

- For practical no.5.(Study of IC engine, pump, Hydraulic & Pneumatic system & star delta connection etc.)
 - i. Schematic diagram : 15 Marks
 - ii. Principal & functioning : 15 Marks
 - iii. Application : 15 Marks
 - iv. Merits- demerits : 15 Marks
 - v. Viva : 20 Marks

Total : 80 Marks

- For practical no.6. (Overhauling)
 - i. Dismantling as per proper sequence : 10 Marks
 - ii. Fault finding : 10 Marks
 - iii. Cleaning : 10 Marks
 - iv. Rectification of fault : 10 Marks
 - v. Assembling :10 Marks
 - vi. Checking for proper functioning :10 Marks
 - vii. Viva : 20 Marks

Total : 80 Marks

- For practical no.7.(Layout preparations)
 - i. Layout diagrams : 20 Marks
 - ii. Point considered to draw layout : 20 Marks
 - iii. Safety rule in work : 20 Marks
 - iv. Viva : 20 Marks

Total : 80 Marks

Question Paper

Time: 3 Hrs.

Max. Marks:80

Instructions:

1. There will be seven sets of practicals. To be prepare by the internal & external examiner as per the available raw material and question set provided.
2. The internal & external examiner must prepare Practical slip as provided.
3. The drawings provided are not to the scale.
4. Perform practical as per Practical slip or study questions.
5. Practical no.1, 2,&3 are based on force, friction & simple machines.
6. Practical no.4 is based on Jigs & fixtures.
7. Practical no.5 is based on Study of IC engine, pump, Hydraulic & Pneumatic system & star delta connection etc.
8. Practical no.6 is based on overhauling of pump.
Practical no.7 is based on preparation of layout of electrical wiring.

Instructions to the head of the Institution and list of requirement.

1. Any one set of practical should be selected by the head of the institution with an internal examiner well in advance. There should be not more than four students in each set.
2. The question paper set must be prepared by the internal & external examiner as per set given task performance, marking scheme etc. before commencement of practical exam.
3. Number of candidate in one batch should be arranged as per the sets /equipments available.
4. All the sets /equipments should be supplied to candidate at least fifteen minutes before the schedule time.

Tools and Equipments.

1. Weights, ropes, glass , spanner sets, pliers, Allen keys, oil can, kerosene, cotton waste, simple machines models like simple wheel and axel, screw jack, pulley block etc. co efficient of friction set.Study material for IC engine , Pump, Hydraulic& Pneumatic system , star delta connection etc. & all necessary equipments & tools required to perform the practical as per question paper set / slip.

Set of Question paper/ Practical slip to be prepared by the internal & external examiner. (IC).

- i. Find out resultant force by parallelogram law or triangle law of force.
- ii. Find out co efficient of friction between two surfaces (glass & wood or wood & wood) .
- iii. Find out M.A., V.R. and efficiency of following machines (Any one).
 - a. Simple wheel and axle.
 - b. . Simple screw jack.
- iv. Prepare a simple model of Jig & Fixture.(Template jig, diameter jig, Channel jig etc.)
- v. Study of petrol or diesel engine / study of reciprocating pump, / study of hydraulic or Pneumatics system / Study of star delta connections / study of single stage air compressor.
- vi. Do dismantling and assembling of centrifugal pump or hand bore well pump.
- vii. Prepare a electric wiring layout of workshop.(Single phase or three phase)
