Scheme – I
Sample Question Paper

Program Name: Diploma in Mechanical Engineering
Program Code: ME
Semester: Fifth
Course Title: Advanced Manufacturing Processes
Marks: 70

Time: 3Hrs.

Instructions:
(1) All questions are compulsory.
(2) Illustrate your answers with neat sketches wherever necessary.
(3) Figures to the right indicate full marks.
(4) Assume suitable data if necessary.
(5) Preferably, write the answers in sequential order.

Q.1) Attempt any FIVE of the following. 10 Marks

a) Enlist the different type non conventional machining processes.
b) Name the various types milling machines.
c) List various gear finishing methods.
d) State advantages and limitations of CNC machine.
f) Write meaning of following M-codes.
   i) M03 and ii) M05
g) Give one example of fixed automation and one example of flexible automation.

Q.2) Attempt any THREE of the following. 12 Marks

a) Explain the functions of the dielectric fluid used in EDM.
b) Compare between up milling and down milling process.
c) Describe the concept of ‘Tool Offset’ for CNC machine with suitable example.
d) Justify need of cutter radius compensation given for CNC milling programming.

Q.3) Attempt any THREE of the following. 12 Marks

a) Distinguish between gear shaping by pinion cutter and gear shaping by rack cutter.
b) Compare lead screw of conventional machine and re-circulating ball screw of CNC machine.
c) Differentiate between canned cycle and subroutine function for CNC machine.
d) Draw the diagram of simple robot and show different components of it.
Q.4) Attempt any THREE of the following. 12 Marks
a) Classify the different methods of gear manufacturing.
b) Differentiate between automatic tool changer (ATC) and automatic pallet changer (APC) of CNC machine.
c) Prepare process sheet and calculate cutting parameter for the following component with neat diagram. All dimensions are in mm. Given: Raw material stock size-Ø25 X 96 length. Stock Material- Aluminum. Feed (f) =0.2 mm/rev. Cutting velocity (V) =90 m/min. Work Zero(W)

![Component Diagram]

d) Develop full G and M code manual part program of CNC lathe for above component in word address format (WAF).
e) Justify the use of FMS in today’s manufacturing situation.

Q.5) Attempt any TWO of the following. 12 Marks
a) Draw set up diagram of wire cut EDM processes showing all the elements. State the functions of each element.
b) Calculate cutter RPM to cut 'T' slot when cutting speed (V) = 90 m/min. Diameter of cutter Ø =10 mm. and show work and cutter arrangement diagram for above operation.
c) Apply right hand rule of axes identification for CNC lathe and CNC milling machine.

Q.6) Attempt any TWO of the following. 12 Marks
a) Draw set up diagram and demonstrates the range of following process control parameters of abrasive jet machining process.
   i) Grain types and size. ii) Gas type and pressure. iii) Nozzle material and hardness.
b) Apply compound indexing method for indexing 69 divisions.
c) Draw experimental set up of gear manufacturing by horizontal milling machine and show various elements on it with its function.
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(5) Preferably, write the answers in sequential order.

Q.1 Attempt any FOUR. 08 Marks
a) State any four characteristics of dielectric fluid used in EDM process.
b) Write any two functions of electrolyte used in Electro Chemical Machining (ECM)
c) List various type of cutters used in milling machining process.
d) Name the various methods of indexing.
e) Enlist the different type of gears.
f) State the principle of gear honing process.

Q.2 Attempt any THREE. 12 Marks
a) Differentiate between abrasive jet machining (AJM) and Ultrasonic machining (USM)
b) Draw diagram of Wire Cut Electric Discharge Machining (WEDM) and show all elements on it.
c) Explain the straddle milling operation with neat sketch.
d) Apply compound indexing method to index 51 divisions on blank.
e) Describe gear shaping by pinion method with suitable diagram.
f) Justify, selection of gear material depends on amount of power transmitted.
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(4) Assume suitable data if necessary.
(5) Preferably, write the answers in sequential order.

Q.1 Attempt any FOUR. 08 Marks
   a) Write any two feedback devices used in closed loop control CNC machine.
   b) State the thumb rule for axis identification for CNC machine.
   c) Write the meaning G00 and G01 code used in CNC programming.
   d) List various compensations required during CNC programming.
   e) Name the various types of automations in industry.
   f) Define- Automation

Q.2 Attempt any THREE. 12 Marks
   a) Explain, closed loop control system CNC machine with neat sketch.
   b) Apply right hand rule to identify axes of wire cut EDM CNC machine.
   c) Prepare process sheet and calculate cutting parameter for the following component with neat diagram. Use HSS end milling cutter of Ø20mm. Raw material – Aluminium Raw material size= 60 X 60 Feed rate=0.2 mm/rev. Cutting speed= 90 m/min.
d) Develop full G & M code CNC manual part programme of CNC milling for above component. Use cutter radius compensation off.

e) Explain various elements of Flexible Manufacturing System.

f) Draw sketch of robot and shoe various parts on it.