



SHRI VISHWAKARMA SKILL UNIVERSITY

(A State Skill University, setup by an Act of Legislature in 2016)

187027

Course : B.Voc. Tool and Die Manufacturing
Subject : Fundamentals of CNC Machines
Subject Code : CBME-103
Semester : First
Duration : 3 Hours
Maximum Marks : 70

Instructions to the Students

1. This Question paper consists of two Sections. All sections are compulsory.
2. **Section A** comprises ten questions of objective type in nature. All questions are compulsory. Each question carries 2 marks.
3. **Section B** comprises eight essay type questions out of which students need to do any five. Each question carries 10 marks.
4. Read the questions carefully and write the answers in the answer sheets provided.
5. Do not write anything on the question paper.
6. Wherever necessary, the diagram drawn should be neat and properly labelled.

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SECTION –A (OBJECTIVE TYPE QUESTIONS)**(10x2=20 Marks)**

For the following objective type questions, write your response (a), (b), (c) or (d). All questions carry equal marks.

1. A CNC machine is always programmed as if:
 - (a) The workpiece moves and the tool remains stationary
 - (b) The tool moves around the workpiece
 - (c) Either the tool or the workpiece moves
 - (d) Both the tool and the workpiece move
2. An ATC plays significant role in reducing:
 - (a) idle time
 - (b) machining time
 - (c) control time
 - (d) tool change time
3. A Vertical Machine Centre (VMC) have:
 - (a) 4.0 axes
 - (b) 3.0 axes
 - (c) 2.0 axes
 - (d) 5.0 axes
4. The most preferable transmission system in CNC machining center is:
 - (a) Recirculation ball-screw
 - (b) V-belt
 - (c) Gear train
 - (d) Rack and pinion
5. Which one of the following is the fast operating tool turret?
 - (a) Pneumatic
 - (b) Hydraulic
 - (c) Stepper motor
 - (d) Electromechanical
6. A good slideway system must have:
 - (a) high stiffness
 - (b) low rate of wear
 - (c) sufficient damping
 - (d) All of these
7. CNC machining centers do not include operation like:
 - (a) milling
 - (b) boring
 - (c) welding
 - (d) tapping
8. Several CNC machine tools can be controlled by a central computer in:
 - (a) NC (Numerical Control) machine tool
 - (b) CNC (Computer Numerical Control) machine tool
 - (c) DNC (Direct Numerical Control) machine tool
 - (d) CCNC (Central Computer Numerical Control) machine tool
9. Feeler gauge is a tool used to measure:
 - (a) depth of hole
 - (b) gap width
 - (c) external diameter
 - (d) internal diameter
10. Which of the following tool can be adjusted on machine itself:
 - (a) qualified tools
 - (b) semi-qualified tools
 - (c) pre-set tools
 - (d) solid tools

SECTION -B (ESSAY TYPE QUESTIONS)

(5x10=50 Marks)

1. (a) What is a CNC machine tool? Where CNC is most appropriate? List out various types of CNC machine tools.
(b) Distinguish the conventional machine tool and CNC machine tool. Also write merits and demerits of CNC machines. Sketch a label diagram of 3 axes vertical CNC milling machine.
2. (a) Classify the cutting tools applicable in CNC. Discuss the methods that can reduce the idle machining time on CNC machines.
(b) Write (i) various design features and (ii) affecting factors that needs to be considered while designing the CNC cutting tools.
3. (a) Explain basic principles of working holding and location. What are distinct features of work holding devices for CNC machine tools.
(b) Give a brief description of Automatic Tool Changer (ATC). Explain basic working principle of ATC and list out its type also.
4. (a) Briefly explain basic construction and working of CNC machine tool with suitable diagram.
(b) Why feedback system is necessary in CNC machine tools. With suitable diagram, discuss the types of feedback systems used in CNC machine tools for positioning tool.
5. (a) Explain following:
(i) Resolution, (ii) Range (iii) Accuracy (iv) least count
(b) Explain construction and working of (i) External micrometer (ii) V-block
6. Briefly explain the construction and working of following (any two):
(a) Pre-set CNC tools
(b) Qualified CNC tools
(c) Solid tools
(d) Environmental control for CNC machines
7. Briefly explain following (any two):
(a) Swarf removal methods in CNC machines
(b) Special devices used in CNC machines
(c) Work holding devices used in CNC machines
(d) Slide ways and guide ways of CNC machines
8. Write short note on following (any four):
(a) Direct Numerical Control (DNC) machine tool
(b) Cutting tools classification
(c) Flexible type CNC tooling
(d) Programmable logic controllers (PLC)
(e) Vernier Caliper and Vernier height gauge
(f) Safety measures and devices in CNC machine tool

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