




**ELIZADE UNIVERSITY, ILARA-MOKIN,  
ONDO STATE, NIGERIA**

**DEPARTMENT OF  
MECHANICAL, AUTOMOTIVE AND PRODUCTION ENGINEERING**

**FIRST SEMESTER EXAMINATIONS  
2017/2018 ACADEMIC SESSION**

**COURSE:** MEE 523 – Machines Tools Engineering (3 Units)  
**CLASS:** 500 Level Mech. & Automotive Engineering  
**TIME ALLOWED:** 2 Hours: 30 Min.  
**INSTRUCTIONS:** Answer any **FOUR** questions

**Date:** March, 2018

  
**HOD'S SIGNATURE**

**Question 1**

- (a) Explain 5 cost that can be associated with economic of machining processes
- (b) With the aid of sketch (es) explain the cutting speed and tool life relationship.
- (c) With the aid of sketch (es), write short notes on the following tool wear and problems encountered in tool design and in age
- Wear on the flank of the tool
  - Wear at the tool chip interface
  - A combination of flank wear and cratering
  - The spalling or crumbling of the cutting edge
  - The loss of hardness
  - Fracture by process of mechanical breakage
- (d) Calculate the job handling cost for machining a mild steel material when the time for loading 1hr 30mins and the time for unloading the job is 20mins.

**Question 2**

- (a) Write short note on the following
- Installation of machine tools
  - Testing of machine tools
- (b) Explain the three types of foundation for machine tools.
- (c) State four factors affecting the choice/design of special foundation for machine tools
- (d) Explain the following foundation specification/thickness
- Foundation block
  - Concrete foundation thickness
  - Concrete reinforced with a steel net.
  - The installation directly on a concrete shop floor.
- (e) Summaries in Four steps, actions to be taking during the Design Production and Installation of Lathe, Milling and Drilling machines
- (f) Write short note on rigidity kinematics

### **Question 3**

- (a) Explain four criteria for good layout and machine installation
- (b) With the aid of sketch explain in relation to generating of surfaces in machine shop;
- Cylindrical surfaces
  - Conical surfaces
  - Helical forms screw threads
  - Plane surface
- (c) With the aid of sketch, explain the following geometry of cutting tools
- Top or front rake
  - Side rake,
  - Front clearance
  - Side clearance
  - Wedge Angle.
- (e) State three safety precautions to be observed in the use of machines in the standard workshop

### **Question 4**

- (a) Explain hydraulic Systems.
- (b) State three reasons for the use of hydraulic system
- (c) State 2 advantages of hydraulic controlled machine tool.
- (d) Write short note on the following
- Pumps
  - Pressure – and Flow- Control devices
  - Directional control devices
  - Hydraulic Power Cylinder and Motors
  - Hydraulic Drive Scheme
- (e) Explain the following
- Direct current motors
  - Selection of power rating of machine tool motor
  - Estimating of power for motors operating under constant long term load.
  - Estimation of power for motors operating under short form load

### **Question 5**

- (a) What is ergonomics?
- (b) With the aid of line sketch explain the ergonomics linking the engineering and human sciences.
- (c) With the aid of sketch, explain the following
- Critical dimension for seated male operator
  - Bench and Seat heights
  - Workplace layout
- (d) Discuss the measurement of noise in relation to ergonomics
- (e) Write short note on the following in relation to ergonomics
- Air conditioning
  - Radiator or convectors
  - Floor and ceiling heaters

- Measurement and amount of light
- Types of electric lamps

**Question 6**

- (a) With the aid of sketch, explain the three-dimensional measuring basis for NC coordinate system
- (b) State six advantages and three disadvantages of NC
- (c) With the aid of sketch describe the general configuration of a DNC system
- (d) Write short note on the following types of automation
- Fixed automation
  - Programmable automation
  - Flexible automation
- (e) Explain the following robot anatomy
- Joints and Links
  - Common robot configuration
- (g) Compare Virtual Reality and artificial or virtual environments
- (h) Explain how the Expert system programme differs from the normal programme.