

EXAMINATION AND EVALUATION DIVISION
DEPARTMENT OF POLYTECHNIC EDUCATION
(MINISTRY OF HIGHER EDUCATION)

MECHANICAL ENGINEERING DEPARTMENT

FINAL EXAMINATION
DECEMBER 2011 SESSION

JJ104 : WORKSHOP TECHNOLOGY

DATE : 03 MAY 2012 (THURSDAY)
DURATION : 2 HOURS (11.15 AM - 1.15 PM)

This paper consists of **ELEVEN (11)** pages including the front page.
Section A: Objective (25 questions – answer all)
Section B: Structured (4 questions – answer 3 questions)

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DO NOT OPEN THIS QUESTION PAPER UNTIL INSTRUCTED BY
THE CHIEF INVIGILATOR

(CLO stated at the end of each question is referring to the learning outcome of the topic assessed. The CLO stated is only for lectures' references.)

SECTION A

OBJECTIVE (25 marks)

INSTRUCTION:

This section consists of **TWENTY FIVE (25)** objective questions.

Answer **ALL** questions in the answer booklet.

1. The purposes of wearing goggles in workshop practices are _____. [CLO1]
 - i. to avoid eye from chips produced by machining process
 - ii. to prevent eye and face from sparks during welding
 - iii. to protect eye from light of welding flames
 - iv. to improve the sharpness of eye during working in workshop

A. i, ii & iii
B. ii, iii & iv
C. i, iii & iv
D. i, ii & iv
2. What is the first action you should take if there is a spillage of water in workshop?[CLO1]
 - A. Clean it up at once
 - B. Display warning signs
 - C. Walk past it carefully
 - D. Write an accident report
3. Below are parts of a hacksaw, **EXCEPT** [CLO1]
 - A. Frame
 - B. Handle
 - C. Foot
 - D. Blade

4. Which statement is **NOT TRUE** about through filing?[CLO1]
- The file is held in both hands by the blade and pushed forwards and backwards along the material
 - The file is held flat against the surface it is to cut / smooth
 - Hand files are normally held in both hands
 - The file is pushed forward and it cuts on the forward stroke
5. Why does a Vee-Block need to be used during a layout operation?[CLO1]
- To hold a round-shape work for layout and for inspection
 - To support the work in a vertical plane
 - To raise the work piece to a desire height
 - To maintain the work surface parallel to the top
6. What is the function of the tool in Figure 1? [CLO1]

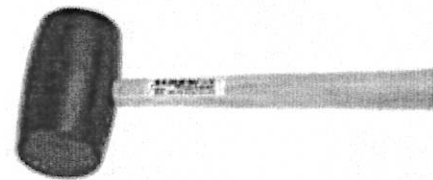


Figure 1

- To operate riveting
 - To draw nails from timber
 - To pound a surface of material that is easily damaged
 - To pound chisels and hand held masonry tools
7. Hammer size is determined by _____.[CLO1]
- the length of hammer
 - head weight of hammer
 - shape of hammer
 - type of hammer

8. What is the actual reading for the vernier caliper shown in figure 2 below. [CLO1]

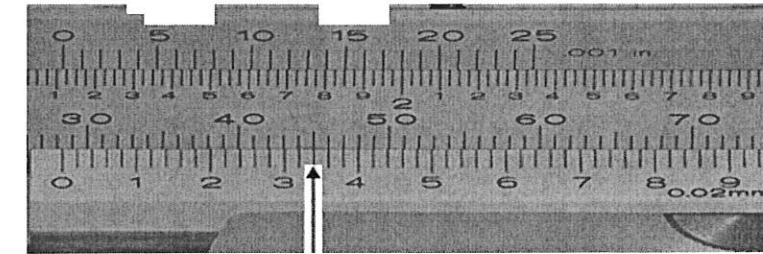


Figure 2

- 30.00 mm
 - 29.34 mm
 - 27.34 mm
 - 28.34 mm
9. Which of the following is **NOT TRUE** about the function of flute? [CLO2]
- Provide space for chips
 - Admit cutting fluid to lubricate the tap
 - To form cutting edge
 - To shape work accurately
10. Determine the speed of spindle in revolution per minute (rpm) for drilling a 45 mm diameter hole on a steel plate with the cutting speed of 35 meters/minute. [CLO2]
- 569.23
 - 227.65
 - 247.57
 - 458.45
11. Which of the following material is used in abrasive grinder wheel?[CLO2]
- Emery
 - Aluminum oxide
 - Silicon carbide
 - All of above

12. Below are tools commonly used to make a taper turning **EXCEPT** [CLO2]

- A. Form tool
- B. Compound slide
- C. Taper turning attachment
- D. Boring

13. Define the process of knurling. [CLO2]

- A. Process to remove as much metal as possible in the shortest length of time.
- B. Process of impressing a diamond-shaped or straight line pattern into the surface of a work piece to improve its appearance.
- C. Process as a uniform change in the diameter of a work piece measured along its axis.
- D. Process is enlarging the top end of a hole to the shape of a cone to accommodate the head of a flat or oval-head machine screw.

14. The carriage can be advanced automatically for turning operations by the _____. [CLO2]

- A. automatic feed lever
- B. split-nut lever
- C. lead screw
- D. feed-directional lever

15. The over arm of a milling machine is used to support _____. [CLO2]

- A. spindle
- B. arbor
- C. column
- D. table

16. Which of the following **IS NOT** required for direct indexing? [CLO2]

- A. Sector arms
- B. Index crank
- C. Worm wheel
- D. All of these

17. The number 60 in the standard code for a grinding wheel on table 1 represent _____. [CLO2]

20 A 60 L 8 R 50

Table 1

- A. grain size
- B. structure
- C. grade
- D. type of abrasive

18. What is the purpose of dressing in grinding wheel maintenance? [CLO2]

- A. Sharpen the grinding wheel
- B. Process of transferring a design
- C. To smooth the material
- D. Remove the metal

19. What is the device used to control the gas flow in welding torch? [CLO2]

- A. Valves
- B. Handles
- C. Wing-pressure adjusting screws
- D. Regulators

20. Oxy-acetylene torch can weld _____. [CLO2]

- A. stainless steel
- B. aluminum
- C. carbon steels
- D. copper-nickell alloys

21. What is brazing process? [CLO2]

- A. Brazing is a process of joining two pieces of same type material using the brass alloy.
- B. Brazing is a process of joining two pieces of different types material using the brass alloy.
- C. Brazing is a process of joining two pieces of same type or different types material using the brass alloy.
- D. Brazing is a process of joining two pieces of same type or different types of base material by heating until melted and merged into one joining and use brass material.

22. Below are the advantage of braze welding, **EXCEPT**: [CLO2]

- A. Any metals can be joined
- B. Multiple brazing at the same time
- C. Joining stronger then fusion welding
- D. Thin parts can be joined

23. Welding rods or electrodes have numbering systems that have been developed by the American Society for Testing Material (ASTM) and the _____. [CLO2]

- A. National Association of manufacturer
- B. American Welding Society
- C. American Society of Welding
- D. Welding Society of America

24. Distortion is caused by _____ heat in the work, which in turn produces stress in the weld area. [CLO2]

- A. equal
- B. unequal
- C. excess
- D. less

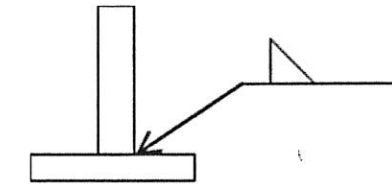


Figure 3

25. The welding symbol shown in figure 3 above represents. [CLO2]

- A. Weld to the direction of the arrow
- B. Weld to the opposite of arrow's direction
- C. Weld to both side of the arrow
- D. Weld around the area

SECTION B**STRUCTURES / ESSAY (75 marks)****INSTRUCTION:**

This section consists of **FOUR (4)** structures questions. Answer **THREE (3)** questions only.

QUESTION 1

- (a) State **FIVE (5)** safety precautions that should be followed while working in workshop. [CLO1]
(5 marks)
- (b) i. Explain briefly **FOUR (4)** uses of L-square. [CLO1]
(4 marks)
- ii. List **TWO (2)** tools that are used as marking tool. [CLO1]
(2 marks)
- (c) State **TWO (2)** differences between ball peen hammer and sledge hammer?
[CLO1]
(4 marks)
- (d) Sketch and label parts of vernier caliper. [CLO1]
(10 marks)

QUESTION 2

- (a) State **FOUR (4)** methods on how to determine drill size. [CLO2]
(4 marks)
- (b) Sketch and explain the functions of drill bit below: [CLO2]
- i. Countersink
 - ii. Counter bore
 - iii. Center drill
- (9 marks)

- (c) Calculate the RPM for drilling a 20 mm thickness of a brass. The cutting speed for brass is given as 50 m/min. [CLO2]
(6 marks)
- (d) Briefly explain the lathe operation below: [CLO2]
- i. Turning
 - ii. Tapering
 - iii. Facing
- (6 marks)

QUESTION 3

- (a) Briefly explain the purpose of the part of universal milling machine below:
[CLO2]
- i. Column
 - ii. Spindle
- (4 Marks)
- (b) Draw and explains the up milling operation. [CLO2]
(10 Marks)
- (c) Calculate the crank rotation index for dividing $24^{\circ} 36'$ by using Brown & Sharpe table below :- [CLO2]

Plate:	1	15, 16, 17, 18, 19, 20
	2	21, 23, 27, 29, 31, 33
	3	37, 39, 41, 43, 47, 49

- (d) State **FOUR (4)** types grinding wheel. [CLO2]
(4 Marks)

QUESTION 4

- (a) i. Briefly state **THREE (3)** of the functions for oxy-acetylene regulator. [CLO2]
(3 Marks)
- ii. Draw and label parts of single stage regulator. [CLO2]
(4 Marks)
- (b) Briefly explain **THREE (3)** advantages and three **(3) disadvantages** of a brazing process. [CLO2]
(6 Marks)
- (c) i. State **TWO (2)** ways on how to identify an electrode code. [CLO2]
(2 Marks)
- ii. Briefly state **FOUR (4)** functions of the electrode coating [CLO2]
(4 Marks)
- (d) Describe **THREE (3)** characteristics of arc welding machine polarity below.
[CLO2]
- i. Direct Current Reverse Polarity
- ii. Direct Current Straight Polarity
(6 Marks)