

FEDERAL UNIVERSITY OF TECHNOLOGY, OWERRI  
SCHOOL OF ENGINEERING AND ENGINEERING TECHNOLOGY  
DEPARTMENT OF MATERIALS AND METALLURGICAL ENGINEERING  
RAIN SEMESTER 2014/2015 EXAMINATIONS

COURSE: ENG 102 – WORKSHOP PRACTICE II

DATE: 18/08/2015

INSTRUCTIONS: (i) Using HB pencil, complete the OMR Sheet as required (ii) Answer all questions

TIME ALLOWED: 1 HOUR

(A) Use the lathe nomenclature listed below and Fig. 1 to answer questions 1 to 3.

[i] = Tool post; [ii] = Compound rest; [iii] = Faceplate; [iv] = Headstock; [v] = Tailstock; [vi] = Dead centre; [vii] = Chuck; [viii] = Live centre; [ix] = Tool post slide; [x] = Lead screw rod; [xi] = Bed; [xii] = Carriage; [xiii] = Tray.

(B) Use the lathe operations listed below and Fig. 2 answer questions 4 to 6

(i) = Knurling; (ii) Facing; (iii) = Reaming; (iv) = Boring (v) = threading; (vi) = Drilling; (vii) = Taper turning; (viii) = Radius turning; (ix) = Shoulder turning; (x) Straight turning; (xi) Parting off.

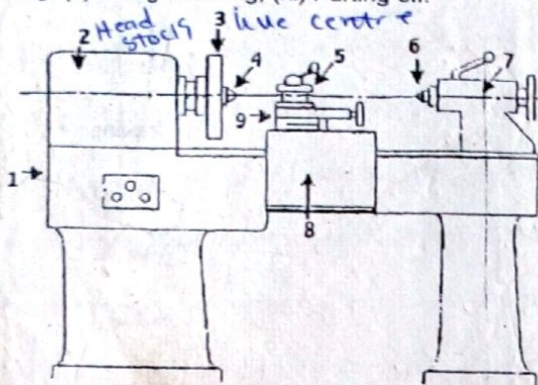


Fig. 1

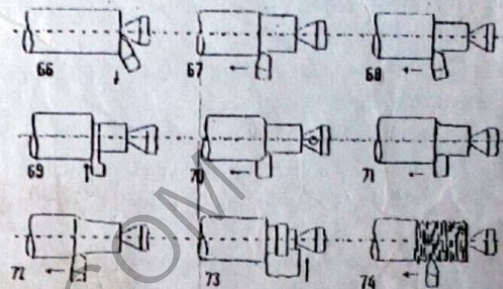


Fig. 2

- The parts labeled 2 and 3 are called (A) iv & viii (B) xi & iii (C) x & viii (D) ix & ii (E) iv & iii
- The numbers 4 and 6 as denoted are (A) iv & ii (B) iv & viii (C) viii & vi (D) iv & vi (E) vi & viii
- The numbers describing compound rest, and tool post are (A) 5 & 9 (B) 9 & 6 (C) 9 & 5 (D) 3 & 6 (E) 5 & 7
- The lathe operations 66 and 67 are (A) xi & x (B) ii & x (C) ii & ix (D) x & ix (E) viii & xi
- The operations depicted by 68 and 69 are (A) ix & xi (B) xi & vi (C) xi & vii (D) vi & v (E) vi, & iv
- The operations described by the numbers 70 and 74 are (A) ii & ix (B) viii & ix (C) vii & x (D) viii & v (E) x & xi
- Cutting tool should have all the following characteristics except (A) High hardness (B) High ductility (C) High toughness (D) High elastic modulus (E) High hardness temperature.
- Cutting tool can be made from these materials except (A) High Speed Steel (B) ceramics (C) diamond (D) mild steel (E) carbides
- A cylindrical job 100 mm diameter is to be turned at a cutting speed of 25 m/min, the feed being 1.5 mm/rev. If the length of the job is 150 mm, what is the required r.p.m. for the job? (A) 120 rev/min (B) 90 rev/min (C) 80 rev/min (D) 70 rev/min (E) 85 rev/min
- What is the time required for the job? (A) 1.25 min (B) 1.5 min (C) 1.72 min (D) 0.25 min (E) 1.76 min
- Probability x Severity equals (a) Hazard (b) Accident (c) Consequence (d) Incident (e) None of the above
- Pick the odd one out: Noise, Dust, Fumes, Effective ventilation (a) Effective Ventilation (b) Noise (c) Dust (d) Fumes (e) A or D
- When an event occurs without consequence, it is called..... (a) Hazard (b) Firearm (c) Incident (d) Unsafe Act (e) Accident
- Which of the following is not a workshop hazard? (a) Fumes (b) Chemicals (c) Toxic Substances (d) Cyanide salts (e) None of the above
- According to the consequence - Probability chart, a 2B operation is a ..... (a) high risk operation with the need for risk control (b) low risk operation with need for risk control (c) low risk operation without need for risk control (d) high-consequence risk operation (e) Extreme risk operation.
- Acoustic Panels are used to shield the operator from (a) Dust (b) Toxic Substance (c) Chemicals (d) Fire (e) None of the above.
- An operator needs SHOC document when handling ..... (a) First Aid cases (b) Project Design (c) Non-routine jobs (d) Chemicals (e) Ergonomics
- Breaking a job down to stages to know the hazard associated with each stage is captured by ..... (a) PTW (b) HFE (c) RAP (d) JHA (e) MOPO
- For high risk operations, the operator needs (a) PTW (b) JHA (c) ALARP (d) PPE (e) PTD
- Reduction of downtimes is ..... (a) the duty of the employer (b) duty of the employee (c) an objective of safety (d) a hazard control method (e) a safety practice
- The metal cutting operation that produces cylindrical holes is called (a) shaping (b) milling (c) drilling (d) grinding.
- The small scraps and particles of metals that is produced during machining operation is known as (a) chaff (b) chips (c) gangue (d) all of the above.
- Which of the following is not an essential part of shaping machine? (a) base (b) ram (c) tool blade (d) drill.
- The following are drilling operations except (a) grinding (b) tapping (c) boring (d) reaming.
- Mathematically, cutting speed in drilling operation is  $\pi DN$  100 (b)  $100\pi/DN$  (c)  $\pi DN/1000$  (d)  $\pi D/100$ .



26. In milling operation, the cutting edges are called (a) bone (b) teeth (c) drill (d) none of the above.
27. The metal cutting operation that enlarges the existing holes with an end cutting tool is called (a) drilling (b) reaming (c) tapping (d) boring.
28. During drilling operation, the linear motion towards the fixed work piece is called (a) feedback (b) chips (c) feed (d) speed.
29. Which of the following is not a classification of milling cutter? (a) blade milling cutter (b) angle milling cutter (c) plain milling cutter (d) end milling cutter
30. The machining operation that produces extremely smooth finish due to the small cutting edges on the wheel is called (a) drilling (b) milling (c) grinding (d) shaping
31. In a fully automated facility, there are no ----- on the floor of production (a) machine (b) humans (c) equipment (d) all of the above
32. Automation is a step beyond (a) industrialization (b) ATM (c) mechanization (d) all of the above
33. The following are main advantages of the automated manufacturing except (a) higher consistency and quality (b) reduced lead times (c) Simplification of production (d) none of the above
34. In automation manufacturing, CAD stands for (a) Computer Applied Design (b) Computer Assisted Design (c) Computer Aided Design (d) Computer Associated Design
35. Automation is the use of ----- and ----- reducing the need for human intervention (a) control systems and mechanization (b) control systems and industrialization (c) automation and world economy (d) none of the above
36. ----- is responsible for the shift in the world economy from agrarian to industrial (a) mechanization (b) automation (c) industrialization (d) all of the above
37. CAM is the next computer-aided process after. ----- (a) computer aided manufacturing (b) computer aided drawing (c) computer aided machines (d) computer aided design
38. ----- stands for (a) computer aided manufacturing (b) computer attributed manufacturing (c) computer assembled manufacturing (d) computer assisted manufacturing
39. CAD is the use of computer in converting initial idea for a product into (a) exceptional engineering design (b) detailed engineering design (c) engineering drawing (d) engineering sketches
40. CAM refers to the use of computers in converting engineering design into ----- (a) design products (b) expected products (c) finished products (d) required product
41. The equipment one wears or holds to protect himself from risk is called ----- (a) personal preparatory equipment (b) personal risk protector (c) personal protective device (d) personal protective equipment (e) none of the above.
42. In protecting against risk to health, buoyancy aids serve as (a) head protector (b) protective clothing (c) hand protector (d) foot protector (e) all of the above.
43. Welding filters are worn to protect against (a) falling objects (b) hazards of impact (c) splashes from chemicals (d) b&c (e) a, b&c
44. Which is the odd one out? (a) provision of safety devices (b) protection of property (c) reduction of costs (d) protection of people (e) continuity of operations
45. Pieces of facilities put in place to ensure safety of operators and machines are called (a) burglary proofs (b) safety gadgets (c) safety facilities (d) safety devices (e) protectors
46. The type of accident that occurred with damages done only to the property/machinery is known as (a) major accident (b) minor accident (c) dangerous occurrence (d) a, b&c (e) none of the above.
47. This is not a remedial action for an electric shock victim (a) switch off plug (b) apply artificial respiration (c) hold the victim (d) obtain medical aid (e) none of the above.
48. The aim of an isolator switch is to (a) isolate the machine (b) decorate the machine (c) protect the operator (d) stop the machine in an emergency (e) all of the above.
49. The colour yellow in safety means (a) mandatory action (b) safe condition (c) caution (d) stop (e) prohibition.
50. ----- is a class of fire except (a) A (b) C (c) B (d) F (e) E.
51. ----- is an example of jig (a) metal duplication (b) hammer duplication (c) key duplication (d) fixture replica (e) none of the above
52. The main purpose of a fixture is to ----- and hold a workpiece (a) fixed (b) round (c) hurdle (d) allow (e) locate
53. Jigs are ----- device (a) work holding (b) work handling (c) work handle (d) holding (e) work rotating
54. Designing of jigs and fixtures depend on the study of workpiece and finished component ----- and ----- (a) size and cost (b) size and geometry (c) geometry and circle (d) joint and fixture (e) all of the above
55. Variability of dimensions in mass production is very low so manufacturing processes supported by use of jigs and fixtures maintain a ----- (a) product quality (b) consistent quality (c) dimensionality (d) a&b only (e) c only
56. ----- operators can be assigned the work so it saves the cost of manpower (a) skilled (b) experienced (c) semi-skilled (d) good (e) none of the above
57. The acronym DOF as applied to locations means (a) date of fabrication (b) date on future (c) date of fixture (d) degree of freedom (e) degree of firm
58. The jigs and fixture are design so that undesirable movements of the workpiece can be ----- (a) restricted (b) rotated (c) minimized (d) none of the above (e) all of the above
59. Six point location of rectangular block is achieved at (a) 2-4 locations (b) 3-2-1 locations (c) 2-2-3 locations (d) 0-1-5 locations (e) 3-3-0 locations
60. The total DOF of a rectangle is (a) 5 (b) 4 (c) 6 (d) 1 (e) 12



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RAIN SEMESTER 2017/2018 EXAMINATIONS

COURSE: ENG 102 – ENGINEERING WORKSHOP PRACTICE II

DATE: Tuesday, 11/09/2018

TIME: 2.00 p.m.

**INSTRUCTIONS:** Clearly write and shade in your particulars as required on the optical mark recognition (OMR) answer sheet given to you. Answer all questions. This paper carries 60 marks and all questions carry equal mark. Time allowed is 80 minutes (1 hr, 20 minutes).

**N.B. FAILURE TO SHADE NAMES & REG. NO. ON THE OMR SHEET WILL LEAD TO FORFEITURE OF EXAM SCORES AS THE COMPUTER WILL RETURN SCORES OF SUCH STUDENTS ANONYMOUSLY. IN THE OGR (RESULT) SHEETS, SUCH SCORES WILL BELONG TO NOBODY.**

**SECTION A: INDUSTRIAL SAFETY (PCA & CEN)**

1. Which of the following is a consequence of accident? (A) Pain (B) Hazard (C) Loss (D) Injury
2. What type of hazard is Manual handling? (A) Physical (B) Chemical (C) Biological (D) None of the above
3. The acronym PTD in safety stands for (A) Partial Total Disability (B) Permanent Total Deformation (C) Partial Total Deformation (D) Permanent Total Disability
4. The cost safety seeks to reduce include all the following EXCEPT: (A) Cost of replacing damaged equipment (B) Cost of repairing damaged equipment (C) Cost of siting an additional new factory (D) Cost of medical treatment to injured operators.
5. To undertake a job labelled 3D in Risk Chart, we need a (A) SHOC card (B) LTI (C) PTW (D) PT(D)
6. Downtimes are occasioned by all the following EXCEPT (A) LTI (B) Damage of pivotal machinery (C) Industrial action (D) Industrial safety.
7. Causes of accidents include the following EXCEPT (A) Pain (B) Carelessness (C) Lack of training (D) All of the above.
8. Given A=Accident, N=Near-miss and I=Incident. Which of the following options is correct? (A)  $\{N\} \cap \{A\} = \{I\}$  (B)  $\{N\} \cup \{I\} = \{A\}$  (C)  $\{A\} \cup \{N\} = \{I\}$  (D)  $\{A\} \cap \{I\} = \{N\}$
9. The equipment one wears or holds to protect himself from risk is called \_\_\_\_ (A) personal safety device (B) personal risk protector (C) personal protective device (D) personal protective equipment
10. In protecting against risk to health, buoyancy aids serve as (A) head protector (B) protective clothing (C) hand protector (D) foot protector
11. To guard against impact from fixed objects, the \_\_\_\_ is protected (A) eye (B) hand (C) foot (D) head
12. \_\_\_\_ is the odd one out. (A) stop button (B) start button (C) fixed guard (D) stop switches
13. The type of accident that occur with damages done only to the property/machinery is known as (A) major accident (B) dangerous occurrence (C) minor accident (D) A, B & C
14. The aim of an isolator switch is to (A) isolate the machine (B) decorate the machine (C) protect the operator (D) stop the machine in an emergency
15. The colour blue in safety means (A) mandatory action (B) safe condition (C) caution (D) stop
16. \_\_\_\_ does not belong to this group (A) escape routes (B) emergency showers (C) rescue stations (D) prohibition signs

**SECTION B: MACHINE SHOP WORK INCLUDING WORK HOLDING & AUTOMATION [USI, JUA, CPE, NAN]**

17. Automation is the use of \_\_\_\_ and \_\_\_\_ reducing the need for human intervention. (A) control systems and industrialization (B) control systems and mechanization (C) automation and world economy (D) none of the above
18. Automation is a step beyond \_\_\_\_ (A) industrialization (B) ATM (C) mechanization (D) all of the above
19. In a fully automated facility, there are no \_\_\_\_ on the floor of production. (A) machines (B) humans (C) equipment (D) all of the above
20. The following are main advantages of the automated manufacturing EXCEPT; (A) higher consistency and quality (B) reduced lead times (C) simplification of production (D) none of the above
21. In automated manufacturing, CAD stands for (A) computer applied design (B) computer assisted design (C) computer associated design (D) computer aided design
22. In CAD \_\_\_\_ replaces the \_\_\_\_ and \_\_\_\_ traditionally used to visualize products and communicate information (A) computer graphics, sketches and engineering drawings (B) computer graphics, computer sketches and drawings (C) computer drawings, computer graphics and sketches (D) computer sketches, computer drawings and graphics
23. CAM stands for; (A) computer attributed manufacturing (B) computer assembly manufacturing (C) computer assisted manufacturing (D) computer aided manufacturing
24. CAD is the use of computers in converting initial idea for a product into (A) detailed engineering design (B) exceptional engineering design (C) engineering drawing (D) engineering sketches
25. Typically CIM relies on \_\_\_\_ based on real-time input from sensors (A) closed-loop control processes (B) open-loop control processes (C) semi closed-loop control processes (D) all of the above
26. The parts labeled R and S are called (A) carriage and tool post (B) lead screw and feed rod (C) apron and tail stock (D) feed box and cross slide
27. The parts labelled G and M are called (A) spindle and tailstock (B) headstock and tailstock (C) compound rest and bed (D) chuck and dead centre
28. The parts labelled H and I are (A) tool rest and compound post (B) cutting die and tool box (C) tool post and compound rest (D) cutting tool and compound post
29. The parts labelled Q and X denote (A) apron and cross slide (B) bed and chip pan (C) spindle and screw head (D) carriage and feed box
30. Which part is used to control the movement of carriage on bed? (A) W (B) X (C) Y (D) Z
31. The operations designated 1, 5 and 7 are (A) facing, tapping and reaming (B) turning, facing and boring (C) threading, turning and grinding (D) Knurling, turning and threading
32. The operations represented in 4, 6 and 8 are called (A) drilling, reaming and boring (B) boring, drilling and reaming (C) reaming, boring and drilling (D) threading, drilling and reaming
- ❖ A cylindrical job 100 mm diameter is to be turned at a cutting speed of 25 m/min, the feed being 1.5 mm/rev. If the length of the job is 150 mm. Use this information for questions 33-35.
33. What is the required spindle speed for the job? (A) 120.00 rev/min (B) 90.50 rev/min (C) 79.55 rev/min (D) 70.43 rev/min
34. What is the time required for the job? (A) 1.26 min (B) 1.50 min (C) 1.72 min (D) 0.25 min
35. Calculate the metal removal rate if the finished diameter is 80mm (A) 1250.5mm<sup>3</sup>/rev (B) 4714.3mm<sup>3</sup>/rev (C) 1725.8 mm<sup>3</sup>/rev (D) 2250.5 mm<sup>3</sup>/rev
36. Which of the following is not an element of jigs and fixtures? (A) The Body (B) Clamping Devices (C) Metering Devices (D) Locating Devices
37. Jigs are used for the following specific machining operations except (A) Drilling (B) Slotting (C) Reaming (D) Boring
38. The most important function of jigs and fixtures for mass production process is (A) Accuracy (B) Precision (C) Cost (D) Interchangeability
39. The primary purpose in the design of a jig is to provide the following except (A) Repeatability (B) Formability (C) Accuracy (D) Precision
40. Which of the following is a typical example of a fixture (A) Vices (B) Drill bits (C) Shapers (D) Lathe Machines



41. Find the cutting speed of a 50 mm diameter bar being turned with a spindle speed of 178 rpm. (A) 28m/min (B) 27m/min (C) 0.28m (D) 28m/min
42. The Taylor tool-life equation of a certain material was found to be  $VT^n = 1190$ . Find the value of the exponent  $n$  for a cutting speed of 300m/min, if the tool life is 192mins. (A) 0.26 (B) 0.16 (C) 0.42 (D) 0.12
43. Which of the options below is best described as a manufacturing process whereby useful products are made by material removal operations? (A) Cutting tools (B) Cutting speed (C) Machining (D) Workshop Practice
44. Some of the named options are examples of cutting tools EXCEPT; (A) Fillings discs (B) Driller (C) Drilling pins (D) Cutting discs
45. Which of the types of wear is associated with machining by the fracture of welded local asperities? (A) Abrasive wear (B) Solid-state diffusion (C) Corrosion (D) Adhesive wear
46. The use of cutting fluids during machining helps to; (A) improve the physical and chemical properties of the machine tool. (B) Reduce thermal conductivity and lubricate the surface in action (C) Corrode the work piece and machine tool (D) Improve the electrical properties of the machine tool.
47. The qualities of a good tool includes the following EXCEPT; (A) High hardness (B) High resistance to high temperature (C) High resistance to wear (D) High cutting speed
48. What spindle speed would be required to turn a 150mm diameter cast iron component using cemented-tungsten-carbide tooling at a cutting speed of 160m/min? (A) 340rev/min (B) 350rev/min (C) 335rev/min (D) 240rev/min
49. Some of these materials are used in making cutting tools except; (A) Tungsten (B) Silicon Carbide (C) Polyethylene (D) Aluminum Oxide

**SECTION C: AUTOMOBILE WORK [UM]**

50. Apart from the power stroke, the other three strokes are referred to as \_\_\_\_ strokes. (A) passive (B) active (C) idle (D) dormant
51. Diesel engines operate by \_\_\_\_ ignition. (A) pressure (B) compression (C) stress (D) spark
52. The engine consists of a fixed \_\_\_\_ and a moving \_\_\_\_\_. (A) drum, barrel (B) piston, cylinder (C) cylinder, barrel (D) cylinder, piston.
53. Gasoline or petrol engines operate by \_\_\_\_ ignition. (A) pressure (B) compression (C) stress (D) spark
54. Running the engine beyond the safe limit on the tachometer is called: (A) red crossing (B) yellow crossing (C) red lining (D) red zoning
55. The engine and drivetrain constitute the \_\_\_\_\_. (A) power stroke (B) power trust (C) power train (D) power drive
56. The first and last processes in a four-stroke cycle engine are \_\_\_\_ and \_\_\_\_\_. (A) intake, exhaust (B) intake, compression (C) combustion, compression (D) combustion, exhaust
57. The internal diameter of the cylinder of an eight-cylinder engine is 9 cm while the distance moved by the piston between the BDC and TDC is 7.3 cm. What is the engine capacity? (A) 3751 cm<sup>3</sup> (B) 3571 cm<sup>3</sup> (C) 7531 cm<sup>3</sup> (D) 3715 cm<sup>3</sup>
58. The rotary motion of the \_\_\_\_ results from the reciprocating motion of the \_\_\_\_: (A) crankshaft, piston (B) crankshaft, barrel (C) shaft, piston (D) wheels, wipers.
59. The second and third processes in a four-stroke cycle engine are \_\_\_\_ and \_\_\_\_\_. (A) intake, exhaust (B) intake, compression (C) combustion, exhaust (D) compression, expansion

**SECTION D: ELECTRICAL WORK [CO & CO]**

60. A system of electric conductors, components and operators for conveying electric power from one source to the point of use is called \_\_\_\_\_. (A) Cable (B) Resistor (C) Electric circuit (D) Electric wiring.
61. The whole path along which an electric current may flow is called \_\_\_\_\_. (A) Cable (B) Voltage (C) Electric circuit (D) Electric wiring.
62. A length of a conductor which is usually insulated is called \_\_\_\_\_. (A) Wire (B) Insulator (C) Cable (D) Conductor
63. \_\_\_\_ is NOT a component of an electric circuit. (A) Cable (B) generator (C) switch (D) Current
64. \_\_\_\_ is NOT a component of a cable. (A) Conductor (B) Insulation (C) Outer sheath (D) Inner Sheath
65. An overcurrent resulting from a fault is called \_\_\_\_\_. (A) Overcurrent (B) Isolation (C) Short circuit (D) High Voltage
66. Wires and cables are generally called \_\_\_\_\_. (A) Capacitors (B) Cables (C) Conductors (D) Insulators
67. The neutral of a single phase system is coloured \_\_\_\_\_. (A) Blue (B) Red (C) Black (D) Green and yellow
68. \_\_\_\_ protects some cables against mechanical damage. (A) Conductor (B) Outer sheath (C) Insulation (D) Cloth.
69. Which of the following is a variable resistor (A) Capacitor (B) Resistance box (C) Potentiometer (D) Voltmeter
70. A resistor is color-coded "grey-blue-red-gold". What is the value of the resistor? (A) 5K6M (B) 8K6J (C) 8R5K (D) 700Ω
71. When the tolerance band is not present on a resistor, what percentage of tolerance is to be assumed? (A) ±20% (B) ±10% (C) ±5% (D) ±2%.
72. In a four-band type colour code, the fourth band is known as the (A) first digit (B) multiplier (C) second digit (D) tolerance
73. A 2000Ω resistor has a tolerance of ±5%; this means that the actual value is in the range of (A) 1800Ω to 2200Ω (B) 1900Ω to 2100Ω (C) 1900Ω to 2200Ω (D) 1700Ω to 2300Ω
74. The letters F, G and M used as abbreviations for tolerance of a resistor represents (A) ±1%, ±2% and ±20% respectively (B) ±2%, ±5% and ±10% respectively (C) ±10%, ±2% and ±1% respectively (D) ±2%, ±10% and ±20% respectively.
75. A resistor of resistance value 3500Ω with a tolerance of ±2%; how will this be printed on the component using standard practice? (A) 3M5F (B) 3K5G (C) 5F3M (D) 3500RG

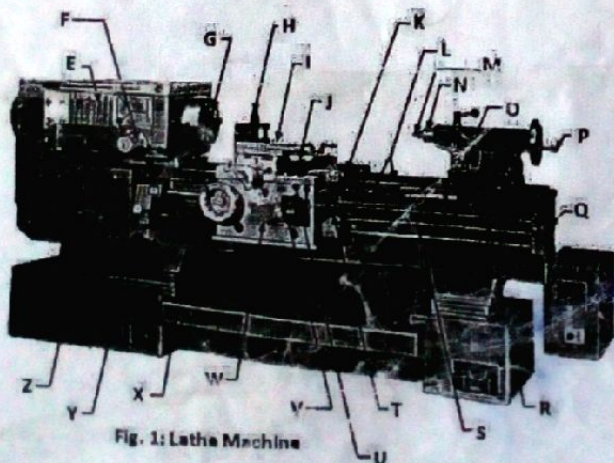


Fig. 1: Latha Machine

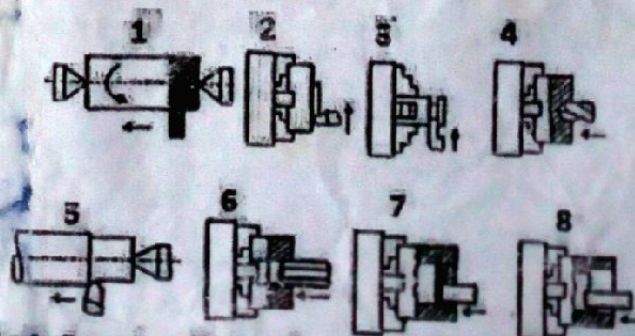


Fig. 2: Operations that can be performed on a lathe machine

END OF PAPER

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