

GENERAL CERTIFICATE OF EDUCATION BOARD
Technical and Vocational Education Examination

JUNE 2025

INTERMEDIATE LEVEL

Specialty Name and Acronym	AUTOMOBILE REPAIR MECHANICS - ARM
Centre No. & Name	
Candidate No.	
Candidate Name	

Mobile phones are **NOT** allowed in the examination room.

5130 MATERIAL TECHNOLOGY AND WORKSHOP PROCESSES 1: MULTIPLE CHOICE QUESTION PAPER

Duration: One and a half hours

INSTRUCTIONS TO CANDIDATES

Read the following instructions carefully before you start answering the questions in this paper. Make sure you have a soft HB pencil and an eraser for this examination.

- 1. USE A SOFT HB PENCIL THROUGHOUT THE EXAMINATION.**
- 2. DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO.**

Before the examination begins:

3. Check that this question booklet is headed "Intermediate Level – 5130 MATERIAL TECHNOLOGY AND WORKSHOP PROCESSES 1."
4. Insert the information required in the spaces above.
5. Insert the information required in the spaces provided on the answer sheet using your HB pencil:

Candidate Name, Exam Session, Subject Code, Centre Number and Candidate Number.

Take care that you do not erase or fold the answer sheet or make any marks on it other than those asked for in these instructions.

How to answer the questions in this examination:

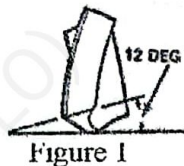
6. Answer **ALL** the **50** questions in this Examination. All questions carry equal marks.
7. Each question has **FOUR** suggested answers: **A, B, C** and **D**. Decide which answer is correct. Find the number of the question on the Answer Sheet and draw a horizontal line across the letter to join the square brackets for the answer you have chosen.
For example, if **C** is your correct answer, mark **C** as shown below:
[A] [B] [C] [D]
8. Mark only one answer for each question. If you mark more than one answer, you will score a zero for that question. If you change your mind about an answer, erase the first mark carefully, then mark your new answer.
9. Avoid spending too much time on any one question. If you find a question difficult, move on to the next question. You can come back to this question later.
10. Do all rough work in this booklet, using, where necessary, the blank spaces in the question booklet.
11. **You must not take this booklet and the answer sheet out of the examination room. All question booklets and answer sheets will be collected at the end of the examination.**

Turn Over

1. The furnace that is used for the transformation of iron ore, coke and limestone into finished iron is called the
- copula furnace.
 - basic oxygen furnace.
 - Open hearth furnace.
 - blast furnace.

2. A grade of iron that is used for the manufacturing of brake drums, brake discs, cylinder blocks, flywheels and exhaust manifolds is
- pig iron.
 - cast iron.
 - steel iron.
 - cast steel.

3. The angle shown in figure 1 below between the drill bit's lip and the horizontal is called the



- rake angle.
- clearance angle.
- drill bit's cone point angle.
- lip angle.

4. The hand forging operation shown in figure 2 below is called

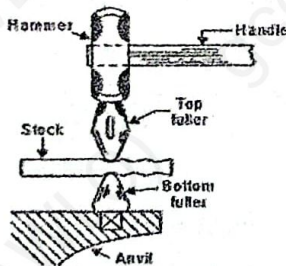


Figure 2

- drawing out.
- fullering.
- upsetting.
- flattening.

5. The crystalline structure of a metal refers to how the
- metal lattice structure is in its liquid state.
 - atoms migrate within it.
 - crystals look like when heated.
 - atoms are located as the metal solidifies its molten or liquid state to the solid state.

6. The carbon content in low carbon or mild steel is from
- 0.8 to 1.5%.
 - 0.15 to 0.45%.
 - 0.45 to 0.8%.
 - 0.15 to 0.20%.

7. The type of cutting tool shown in figure 3 below is a

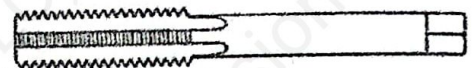


Figure 3

- file.
 - screw.
 - reamer.
 - tap.
8. An ideal polymer that is used for the production of vehicle tyres is a/an
- thermoplastic.
 - thermosetting.
 - elastomer.
 - polyamides.

9. Gas cutting of iron and steel using the oxy-acetylene welding equipment as shown in figure 4 below requires the use of a

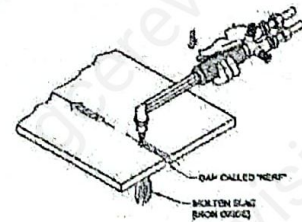


Figure 4

- natural flame.
- carburizing flame.
- natural and a carburizing flame.
- pure oxygen rich flame.

10. Galvanizing is a process of applying a protective
- A copper coating to iron or steel, to prevent rusting.
 - B zinc coating to iron or steel, to prevent rusting.
 - C aluminium coating to iron or steel, to prevent rusting.
 - D lead coating to iron or steel, to prevent rusting.

11. The sequence or stages of quenching after heating is
- A vapor formation-Vapor coverage-Vapor discharge-Slow cooling.
 - B vapor formation-Vapor coverage-Slow cooling-Vapor discharge.
 - C vapor coverage-Vapor formation-Vapor discharge-Slow cooling.
 - D vapor coverage-Vapor formation -Slow cooling-Vapor discharge.

12. The magnetite ore has as chemical symbol
- A Fe_2O_3 .
 - B Fe_3O_4 .
 - C H_3O .
 - D Fe_3O_3 .

13. The coke in the charge of blast furnace
- A controls the grade of pig iron.
 - B acts as iron bearing mineral.
 - C supplies heat to reduce ore and melt the iron.
 - D forms a slag by combining with impurities.

14. From the stress-strain curve diagram in figure 5 below, the region OB represents

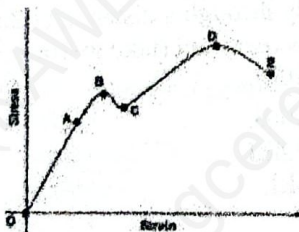


Figure 5

- A plastic behavior.
- B elastic Behavior.
- C fracture point.
- D necking.

15. Which of the following is a sheet metal operation?
- A Casting.
 - B Forming.
 - C Reaming.
 - D Forging.

16. Materials which consist of carbon chemically combined with hydrogen are known as
- A ceramics.
 - B polymers.
 - C composites.
 - D plastic.

17. The law which states that the normal stress is proportional to the relative elongation is known as
- A Hooke's law.
 - B Newton's law.
 - C Coulomb's law.
 - D Faraday's law.

18. The significance of 18 in the cast iron designation ENGL400-18 is
- A Prefix.
 - B Resistance to rupture.
 - C Percentage of elongation.
 - D Carbon content.

19. Which of the following is added to steel in order to increase corrosion resistance?
- A Tungsten and vanadium.
 - B Zinc and lead.
 - C Chromium and nickel.
 - D Sulphur and phosphorus.

20. The following are types of annealing EXCEPT
- A Full annealing.
 - B Isothermal annealing.
 - C Semi annealing.
 - D Subcritical annealing.

21. Dislocation in materials refers to
- A point defects.
 - B line defects.
 - C plane defects.
 - D volumetric defects.

Turn Over

22. When two forces act directly opposite to a beam to increase its length, the beam is said to be subjected to
- compression.
 - extension.
 - shearing.
 - bending.

23. The metal forming processes shown in figure 6 below are referred to as

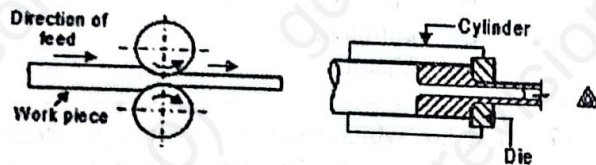


Figure 6

- hot rolling and extrusion.
 - forging and extrusion.
 - casting and forging.
 - hot rolling and casting.
24. The following are surface finishing processes EXCEPT
- galvanizing.
 - plastic coating.
 - horning.
 - shrinking.
25. The basic principal raw material for all ferrous metals is
- pig iron.
 - Limestone.
 - iron ore.
 - coke.
26. Steel with the percentage of carbon up to 0.15% is called
- low carbon steel.
 - dead carbon steel.
 - mild carbon steel.
 - medium carbon steel.
27. An alloy of 50% copper and 50% zinc is called
- bronze.
 - bluminium.
 - brass.
 - copper pyrites.

28. Which of the following materials is used for the production of semiconductors?
- Vinyl coating steel.
 - Cobalt.
 - Germanium.
 - Bronze.

29. The machine in figure 7 below is used to carry out

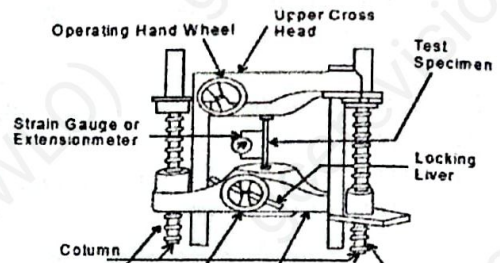


Figure 7

- crack and compact test.
 - tensile and compressive test.
 - rigid test.
 - impact and resistance test.
30. Which of the following molding processes is classified according to the method used
- Pit molding.
 - Sand molding.
 - Plaster molding.
 - Metallic molding.
31. The following are cold working processes EXCEPT
- rolling.
 - extrusion.
 - forging.
 - tube forming.
32. An engine having a mass of 200kg is lifted vertically through a distance of 2m. What work does this represent (take $g=10\text{m/s}^2$) ?
- 40kJ.
 - 400J.
 - 4.4kJ.
 - 4kJ.

33. The type of welding defect in figure 8 below is called

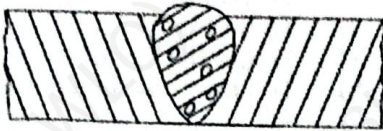


Figure 8

- A lack of penetration.
B porosity.
C lack of fusion.
D slag inclusion.
-
34. The following are precision instruments used in the fitting shop EXCEPT
A vernier caliper.
B micrometer.
C slip gauge.
D telescopic gauge.
-
35. The material for the brake shoe friction face is
A copper.
B tin.
C asbestos.
D zinc.
-
36. Nickel is added to low carbon steel to
A make the steel tougher and harder.
B raise its yield point.
C make the steel ductile and oxidation resistant.
D increase the flexibility.
-
37. Extrusion is the process of
A making cup shape ports from the sheet metal.
B producing a hole by a push.
C pushing the heated billet of metal through an orifice.
D making pattern shapes from the sheet metal.
-
38. The full designation of polyvinyl chloride is
A PVC.
B POVC.
C PLVC.
D PVCD.

39. Chromium is used in steel as an alloying element to improve
A hardness.
B mechanical strength.
C toughness and high elastic limit.
D thermal properties.

40. The tendency of a deformed solid to regain its actual proportions instantly upon unloading is known as
A plasticity.
B elasticity.
C malleability.
D elongation.

41. The operation of cutting a sheet of metal in a straight line along the length, is known as
A plunging.
B notching.
C slitting.
D forming.

42. All of the following are measuring instruments EXCEPT
A Centre punch.
B Feeler gauge.
C Dial indicator.
D Micrometer.

43. In oxy-acetylene welding shown in figure 9 below, acetylene is supplied in steel bottles painted maroon while oxygen is supplied in

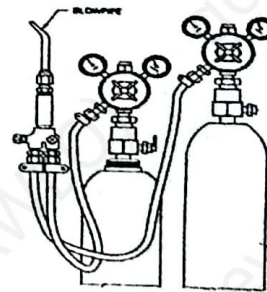


Figure 9

- A white seamless steel cylinders.
B bleu seamless steel cylinders.
C black seamless steel cylinders.
D gray seamless steel cylinders.
-
44. External threads cutting are done using a
A Knife.
B tap.
C disc.
D saw.

45. The electrodes used in spot welding have a tip of
- stainless steel.
 - aluminium.
 - copper.
 - brass.

46. The difference between the upper limit and lower limit of a dimension is called
- tolerance.
 - normal size.
 - basic size.
 - actual size.

47. Identify the type of pattern making in figure 10 below

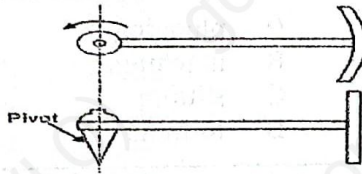


Figure 10

- Segmental.
- Skeleton.
- Gated.
- Single piece.

48. State the purpose of heat treatment.
- To change the properties of the metal.
 - To destroy the metal.
 - To use the metal.
 - To know how much it weighs and to sell it.

49. In TIG arc welding, the welding zone is shielded by an atmosphere of
- helium gas.
 - argon gas.
 - helium or argon gas.
 - Oxygen.

50. Which of the following terms is used to define the temperature at which a substance changes its status from solid to liquid?
- Boiling point.
 - Freezing point.
 - Condensation point.
 - Melting point.

STOP

GO BACK AND CHECK YOUR WORK