



**MATERIAL SCIENCE AND PROCESSES 1  
5385**

**JUNE XXXX**

**INTERMEDIATE LEVEL**

Centre No. & Name	
Candidate No.	
Candidate Name	

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

**5385 - MATERIAL SCIENCE AND PROCESSES 1: MULTIPLE CHOICE QUESTION PAPER**

**1 hour 30 minutes**

**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 – 5385 - MATERIAL SCIENCE AND 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. Which of the following designation is not correct ?

A	En-GJL 400-80
B	Al Si5 Cu3
C	X 6 Cr Ni Ti 10-08
D	20 Ni Cr W 04-18

2. Select the most suitable process of production of pieces with cast iron.

A	Bending
B	Sheet metal
C	Sand casting
D	Hot forging

3. The lowest critical point of all steels is

A	600°C
B	700°C
C	913°C
D	723°C

4. The hardness of a steel increases if it contains

A	Cementite
B	Ferrite
C	Austenite
D	Pearlite

5. Bronze is an alloy made from

A	Copper and tin
B	Copper and nickel
C	Copper and chromium
D	Copper and zinc

6. Steel is obtain from

A	Iron ore
B	Iron
C	Cast iron
D	Blast furnace

7. The ability of a metal to be hammered and shaped without cracking or breaking is

A	Machinability
B	Malleability
C	Hardness
D	Toughness

8. Give the composition of the following steel: C 35

A	Unalloyed steel with 0.35 % carbon
B	Alloyed steel with 0.35 % carbon
C	Alloyed steel with elastic limit of 35N/mm <sup>2</sup>
D	Unalloyed steel with elastic limit of 35N/mm <sup>2</sup>

9. The ability of metal to break without warning is

A	Tensile strength
B	Toughness

C	Brittleness
D	Torsional strength

10. The process of shaping metal using compressive force is

A	Forging
B	Rolling
C	Drawing
D	Extrusion

11. The process of producing metal by passing metal rod through a die which has a slightly smaller diameter is

A	Rolling
B	Extrusion
C	Drawing
D	Pouring

12. Brittleness is opposite to

A	Toughness
B	Plasticity
C	Ductility
D	Malleability

13. The designation of a low alloyed steel with 0.42 % of carbon with 4% of chromium is

A	42 Cr 4
B	42 Co 4
C	42 Cr 40
D	42 Cr 16

14. The ability of a material to resist deformation under stress

A	Plasticity
B	Hardness
C	Stiffness
D	Strength

15. Tempering is a process performed after

A	Annealing
B	Carburizing
C	Normalizing
D	Hardening

16. For a steel containing 0.85 carbon

A	There is no critical point
B	There are two critical points
C	There is only one critical point
D	There can any number of critical points

17. When a steel containing \_\_\_\_\_ 0.85% carbon is cooled slowly below the lower critical point, it consists of ferrite and pearlite.

A	Equal to
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B	Less than
C	More than
D	Less and more than

18. The charge of the blast furnace consists of

A	Scrap, limestone and coke
B	Limestone, iron ore and scrap
C	Iron ore, coke and limestone
D	Coke, scrap and iron ore

19. Which of the following is an alloy of copper?

A	Vitallium
B	Brass
C	Invar
D	Solder

20. Which of the following is not a non-ferrous metal?

A	Aluminium
B	Lead
C	Zinc
D	Iron

21. When a metal is referred to as "hard", this means:

A	The metal can deform plastically
B	The same thing as toughness
C	The metal is more ductile
D	The metal resist indentation Penetration, and scratching

22. Which of the following is and alloy of iron and carbon?

A	Bronze
B	Brass
C	Steel
D	Solder

23. At room temperature which is the most stable form of iron?

A	Pearlite
B	$\alpha$ -iron
C	Martensite
D	Ledeburite

24. Tensile test can be performed on

A	Rockwell tester
B	Impact testing machine
C	Universal testing machine
D	Brinell tester

25. At what temperature does pure iron turn into FCC structure

A	800°C
B	810°C
C	900°C
D	910°C

26. What is the form graphite structure in ductile cast iron?

A	Spheroidal
B	Flakes
C	Nodular
D	Layer

27. Weight percentage of carbon in mild steels

A	< 0.008
B	0.08 to 0.3
C	0.3 to 0.8
D	0.8 to 2.11

28. Which of the following is a process in which a part or shape is the cut out of sheet metal?

A	Welding
B	Cutting
C	Roll forming
D	Blanking

29. Which of the following process is used to reduce brittleness in hardened steel?

A	Annealing
B	Normalizing
C	Tempering
D	Spheroidizing

30. The percentage of carbon in gray cast iron is in the range of

A	3 to 4 %
B	0.25 to 0.75 %
C	1.25 to 1.75 %
D	8 to 10 %

31. The crystal structure of  $\alpha$  iron is

A	Simple cubic
B	Body centered cubic
C	Face centered cubic
D	Closed packed hexagonal

32. Melting point of iron in degree centigrade is equal to

A	768
B	910
C	1410
D	1535

33. Which is the closest to the purest form of the iron?

A	Cast iron
B	Wrought iron
C	Pig iron
D	Steel

34. Which of the following cannot be used as an alloying element in steel?

A	Chromium
B	Lead

C	Nickel
D	Tungsten

B	Alloys
C	Pure metals
D	Coinage metals

35. Which property of the metal cold working increases

A	Conductivity
B	Hardness
C	Toughness
D	Ductility

36. For which of the following purposes, annealing is not done?

A	Homogenization
B	Recrystallization
C	Stress relieving
D	Decreasing brittleness

37. Tempering is achieved by heating a hardened steel to a temperature in the range of

A	100°C – 150°C
B	100°C – 680°C
C	200°C – 375°C
D	300°C – 835°C

38. Which one of the following metals would work-harden more quickly than the others?

A	Copper
B	Lead
C	Brass
D	Zinc

39. Riser is a reservoir of molten metal provided in the casting so that hot metal can flow back into the mould cavity when there is a reduction in the volume of metal due to

A	Compression
B	Solidification
C	Expansion
D	Conservation

40. The hardness of steel depends only on the

A	Carbon content
B	Temperature
C	Yield strength
D	Tensile strength

41. Quenching is generally carried out to

A	Remove brittleness
B	Remove rust
C	Freeze the high temperature structure
D	Oxidise the surface of the component for good reason

42. Which of the following material has rapid rates of recrystallization

A	Ductile metals
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43. During recrystallization, the metal becomes

A	Harder
B	Soft
C	Brittle
D	Malleable

44. The degree of recrystallization increases with

A	Time
B	Softness
C	Temperature
D	Strain energy

45. Brinell hardness number for soft iron is between

A	1000–2000
B	227–857
C	67–500
D	0–10

46. The passage ways in the parting plane through which molten flowing is regulated is known as

A	Core
B	Chaplet
C	Gate
D	Runner

47. Which of the following is a metal shaping process?

A	Press forging
B	Broaching
C	Riveting
D	Lapping

48. The replica of the final object to be made is known as

A	Parting line
B	Flask
C	Pattern
D	Mould

49. Which of the following is not a metal removing process?

A	Grinding
B	Milling
C	Swaging
D	Hobbing

50. What is the function of cores in casting?

A	To remove dissolved gases
B	To form hollow region
C	To avoid defects
D	To reduce shrinkage porosity