GENERAL CERTIFICATE OF EDUCATION BOARD
Technical and Vocational Education Examination

JUNE 2022 **INTERMEDIATE LEVEL**

Specialty Name and Acronym	**Mechanical Specialties : ARM and MAME**
Centre No. & Name	
Candidate Identification No.	
Candidate Name	

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

5145 MECHANICAL DRAWING 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 – 5145 MECHANICAL DRAWING 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 Identification 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.**
12. **At the end of the examination the invigilator shall collect the answer sheet first and then the question booklet. DO NOT ATTEMPT TO LEAVE THE EXAMINATION HALL WITH IT.**

1. A person who has skills in Technical Drawing is called :
   A Drawer
   B Artist
   C Draughtsman
   D Craftsman

2. Identify the type of key represented by the drawing in figure 1 below

Figure 1

   A Round head key
   B Woodruff key
   C Parallel key
   D Jib head key

3. The mechanism in figure 2 shows the meshing of

Figure 2

   A helical gears
   B bevel gears
   C rack and pinion
   D worm and wheel

4. Which drawing instrument is shown in figure 3 below ?

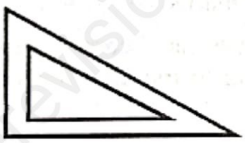


Figure 3

   A Set square
   B T square
   C Compass
   D Protractor

5. The drawing instrument in figure 3 above is used to draw
   A diameters of circles
   B horizontal lines
   C construction lines
   D vertical and inclined lines

Questions 6 and 7 refer to figure 4 below

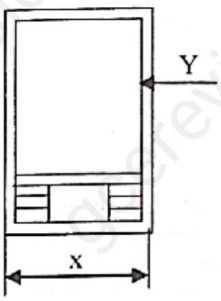


Figure 4

6. The dimension indicated as x on the A4 paper shown in figure 4 above has a value of
   A 210 mm
   B 297 mm
   C 420 mm
   D 597 mm

7. Indicate what Y signifies in the drawing paper in figure 4 above.
   A Internal line
   B Title block
   C Border line
   D Orientation line

8. How many of the lower case letters in figure 5 below have the same height as their upper case letters ?

Figure 5

   A 1
   B 2
   C 3
   D 4

9. Consider the line labelled L in figure 6. What is the name of the line?

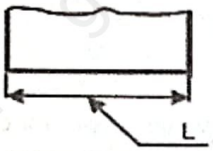


Figure 6

   A Dimension line
   B Projection line
   C Extension line
   D Leader line

10. Identify the line in figure 7 below that is used as an object outline.

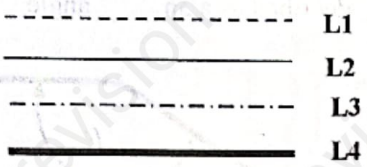


Figure 7

A L4
B L3
C L2
D L1

11. Determine the scale of a piece of actual size 20 mm and measures 40 mm on a drawing.

A 3:1
B 1:2
C 1:1
D 2:1

12. The scale 5 : 1 on a drawing implies that the object has been

A enlarged to its maximum size
B reduced to its minimum size
C enlarged five times its size
D reduced five times its size

13. Identify the type of dimensions on the piece shown in figure 8 below.

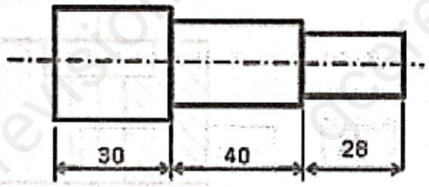


Figure 8

A Chain dimensions
B Running dimensions
C Parallel dimensions
D Staggered dimensions

14. The dimensioning represented in figure 9 below is for the

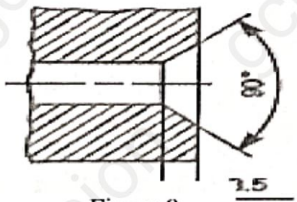


Figure 9

A chamfer
B countersunk
C counter bore
D fillet

15. Figure 10 below is the symbol for

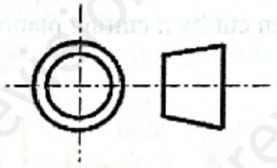


Figure 10

A isometric projection
B oblique projection
C first angle projection
D third angle projection

16. The plane ABCD obtained by projecting EFGH viewed from P in figure 11 is a/an _____ of EFGH.

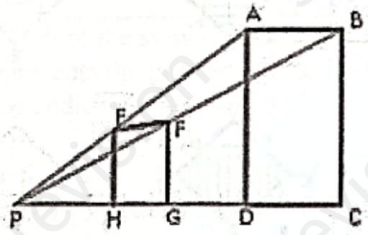


Figure 11

A enlargement
B stretch
C translation
D reduction

17. Give the name of the projection to which the block in figure 12 below is drawn.

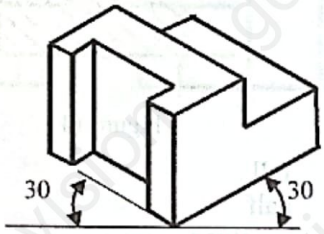


Figure 12

A oblique projection
B Isometric projection
C orthogonal projection
D cavalier projection

18. Figure 13 below shows a square prism which has been cut by a cutting plane A-A.

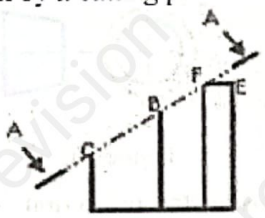
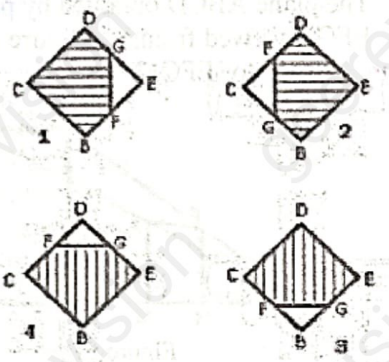


Figure 13

Select the correct sectional view of the cut prism viewed from the direction A-A in figure 13.



A 1
B 2
C 3
D 4

19. The type of section shown in figure 14 below is known as a ___ section

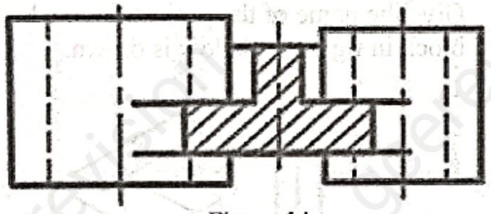


Figure 14

A full
B half
C revolved
D removed

20. Three planes meet together along the axes x, y and z as shown in figure 15 below

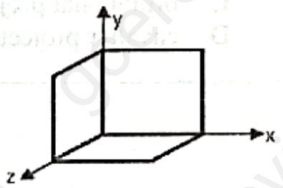


Figure 15

The geometrical shape formed at the intersection of any two of the planes gives rise to a/an:

A line
B point
C plane
D arc

21. The angle β indicated in figure 16 below is decribed as a/an ____ angle

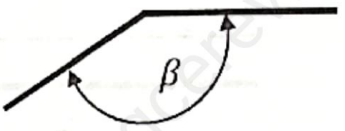


Figure 16

A obtuse
B acute
C reflex
D right

22. In the drawing shown in figure 17 below, the reference 1 indicates a

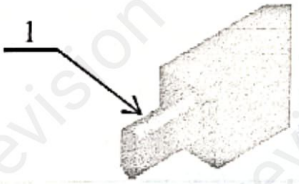


Figure 17

A slot
B cone
C flat
D tenon

23. The name of the hole shown in figure 18 below is a

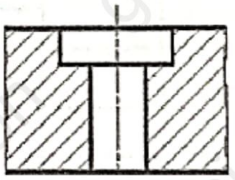


Figure 18

A countersunk hole
B counter bore hole
C threaded hole
D tapered hole

Questions 24 to 26 refer to figure 19 below.

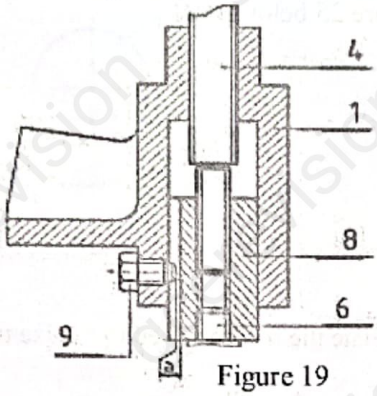


Figure 19

24. Indicate the function of piece 9 with respect to piece 8 in figure 19 above

A Prevents translation of 8
B Ease rotation of 8
C Guides 8 in translation
D Guides 8 in rotation

25. Deduce the type of relative motion possible between piece 8 and piece 9 in figure 19 above

A Translation or rotation
B Translation and rotation
C rotation
D Translation

26. Give the number of degrees of freedom permitted by the type of motion identified between piece 8 and piece 9 in figure 19 above

A 1
B 2
C 3
D 4

Questions 27 and 28 refer to the bearing shown in figure 20 below

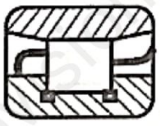


Figure 20

27. The type of bearing in figure 20 is called a ____ bearing

A ball
B roller
C taper roller
D needle

28. The function of the bearing in figure 20 above in a mechanism is to guide in

A translation
B vibration
C rotation
D harmonic

29. In the shaft and hole system represented by Ø20H7/g6, the letter g stands for

A position of hole
B quality of hole
C quality of shaft
D position of shaft

30. A fit in which both the maximum and minimum allowances are negative is called

A clearance fit
B transition fit
C tnterference fit
D line fit

31. Which of the symbols in the table below represents the geometric tolerance for perpendiculaity ?

// 1	⊥ 2	⌭ 3	∠ 4

A 1
B 2
C 3
D 4

32. The geometrical tolerance represented by the symbol in figure 21 below is

Figure 21

A flatness
B symmetry
C angularity
D straightness

Questions 33 and 34 refer to the assembly drawing in figure 22 below

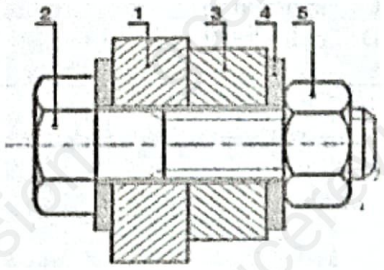


Figure 22

33. Give the name of the assembly

A Screw assembly
B Stud assembly
C Nut assembly
D Bolt assembly

34. Identify piece 4 in the assembly in figure 22 above

A Seal
B Washer
C Circlips
D Nut

35. Identify the threaded fastener shown in figure 23 below

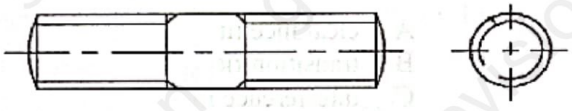


Figure 23

A Screw
B Bolt
C Rivet
D Stud

36. Which of the following is **NOT** a form of thread for an engineering fastener ?

A Metric thread
B Square thread
C ACME
D Pitch

37. The unthreaded fastener labeled **1** in the drawing in figure 24 below is called

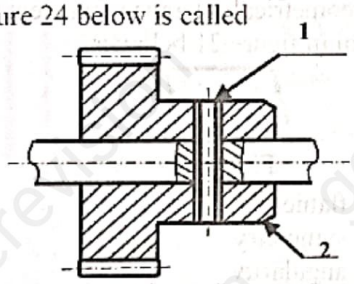
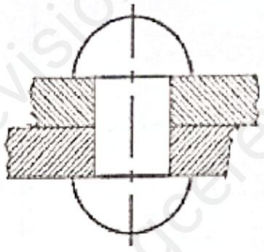


Figure 24

A elastic pin
B tapered pin
C split pin
D cylindrical split pin

Questions 38 to 40 refer to the assembly shown in figure 25 below.



38. State the method used to realise the assembly

A Clamping
B Welding
C Riveting
D soldering

39. Identify the nature of the link established by this mode of assembly.

A Pivot link
B Embedded link
C Sliding link
D Helical link

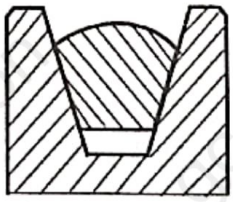
40. Give the characteristics of the link identified in figure 25 above

A Complete, rigid, dismountable
B Complete, elastic, undismountable
C Complete, elastic,undismountable
D Complete, rigid, undismountable

41. A low carbon steel with 0.42 % of carbon with 4% of chromium is designated as

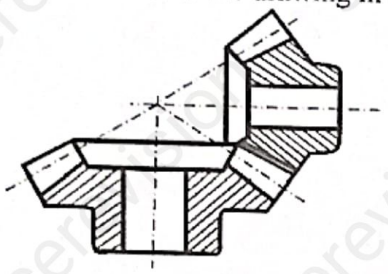
A 42 Cr 4
B 42 Co 4
C 42 Cr 40
D 42 Cr 16

42. Identify the type of belt used in the belt and pulley system shown in section in figure 26 below



A Tooth belt
B Flat belt
C Round belt
D Trapezoidal belt

Questions 43 and 44 refer to the drawing in figure 27 below



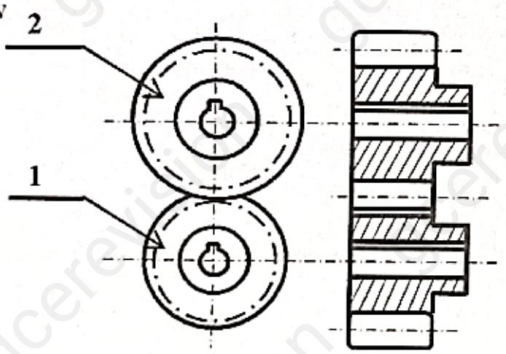
43. What type of transmission mechanism is represented by the drawing?

A Bevel gears
B Helical gears
C Spur gears
D Worm and worm wheel

44. The assembly in figure 27 above transmits motion to _____ shafts.

A parallel
B inclined
C Straight
D perpendicular

Questions 45 and 46 refer to the gear train in figure 28 below



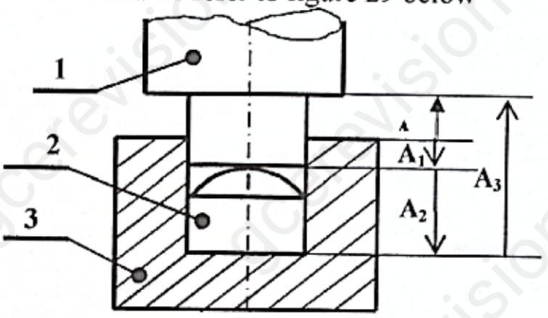
45. Determine the nominal diameter of gear 1 if it has 10 teeth and a module of 2

A 5 mm
B 20 mm
C 12mm
D 8mm

46. Calculate the number of teeth of gear **2** if it has a nominal diameter of 32 mm and a module of 2.

A 30
B 34
C 16
D 64

Questions 47 and 48 refer to figure 29 below



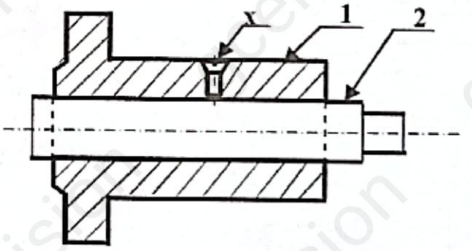
47. The equation of the chain of dimensions for the clearance **A** in figure 29 above is:

A $A = A_3 - A_1 - A_2$
B $A = A_3 - A_1 + A_2$
C $A = A_3 + A_1 - A_2$
D $A = A_3 + A_1 + A_2$

48. What is the condition for the clearance A to be minimum ?

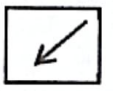
A $A_{min} = A_{3min} - A_{1min} - A_{2max}$
B $A_{min} = A_{3min} - A_{1max} - A_{2min}$
C $A_{min} = A_{3min} - A_{1min} - A_{2min}$
D $A_{min} = A_{3min} - A_{1max} - A_{2max}$

49. The assembly in figure 30 below shows guidance in rotation between piece 1 and 2. What is the function of the hole labeled x?



A To tighten pieces 1 and 2
B To lubricate piece 2
C To immobilize piece 2
D To immobilize piece 1

50. Identify the type of seal represented by the symbol shown in figure 31 below



A Double lip seal
B Single lip seal
C Toric seal
D Flat seal

STOP

NOW GO BACK AND CHECK YOUR WORK