

Write your name here

Surname					Other names				
Centre Number					Learner Registration Number				
Pearson BTEC Level 1/Level 2 First Certificate									

Engineering

Unit 9: Interpreting and Using Engineering Information

Tuesday 13 January 2015 – Morning Time: 1 hour	Paper Reference 21174E
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You must have: Insert (enclosed)	Total Marks
--------------------------------------------	-------------

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and learner registration number.
- Answer **all** questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*

Information

- The total mark for this paper is 50.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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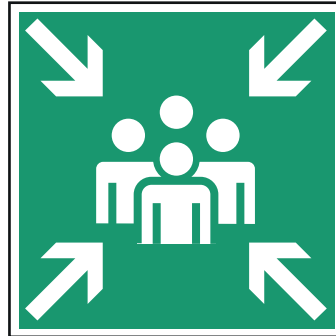
PEARSON

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Answer ALL questions.

1 Engineers working on-site need to be aware of what health and safety signs mean.

(a) What does this safety sign mean?



The background is green.

(1)

- A Assembly point
- B Trip hazard
- C Emergency exit
- D Conference centre

(b) Health and safety signs use colours to identify different categories.

(i) Identify the correct colours used to display **mandatory** signs.

(1)

- A Orange and black
- B Red and white
- C Yellow and black
- D Blue and white

(ii) Name **two** signs from the **warning** category.

(2)

- 1
- 2

(Total for Question 1 = 4 marks)



2 Drawings and other types of information are used by engineering technicians when making engineered products.

(a) (i) The images below represent different drawing types.

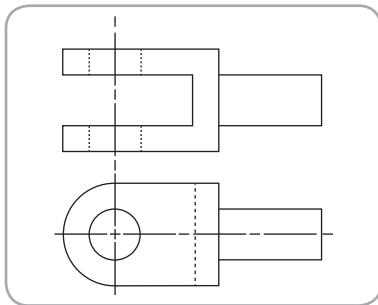
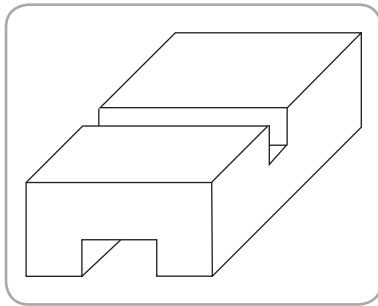
Match the most appropriate drawing name for both of these drawing types.

Draw a straight line to match each drawing type to its associated drawing name.

Each drawing type has only **one** drawing name.

(2)

Drawing type



Drawing name

Isometric

Orthographic

Schematic

Assembly

Oblique



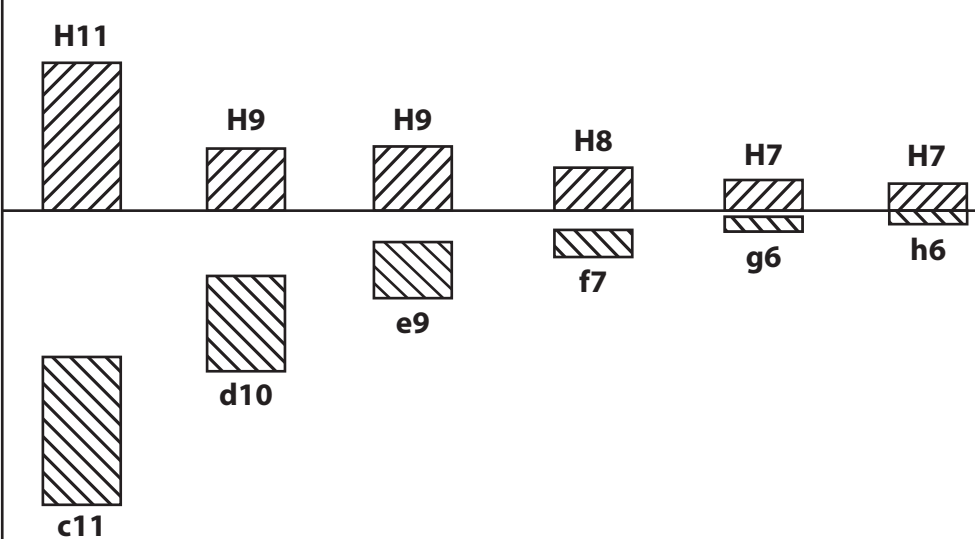
(ii) Give **two** reasons why engineering technicians use exploded diagrams.

(2)

- 1
- 2



(b) The image below shows an extract from a limits and fits chart for a range of different holes and shafts.

Extracted from BS 4500: 1969		BRITISH STANDARD DATA SHEET No. 4500 A.											
		SELECTED ISO FIT – HOLE BASIS (SHEET No.1)											
Holes  0 Diagram to scale for 25mm Dia Shafts 		Clearance fits											
													
Nom Sizes	Tolerance	Tolerance	Tolerance	Tolerance	Tolerance	Tolerance	Tolerance	Tolerance	Tolerance	Tolerance	Tolerance	Tolerance	Tolerance
Over	To	H11	c11	H9	d10	H9	e9	H8	f7	H7	g6	H7	h6
mm	mm	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
-	3	+60 0	-60 -120	+25 0	-20 -60	+25 0	-14 -39	+14 0	-6 -16	+10 0	-2 -8	+10 0	-6 0
3	6	+75 0	-70 -145	+30 0	-30 -78	+30 0	-20 -50	+18 0	-10 -22	+12 0	-4 -12	+12 0	-8 0
6	10	+90 0	-80 -170	+36 0	-40 -98	+36 0	-25 -61	+22 0	-13 -28	+15 0	-5 -14	+15 0	-9 0
10	18	+110 0	-95 -205	+43 0	-50 -120	+43 0	-32 -75	+27 0	-16 -34	+18 0	-6 -17	+18 0	-11 0
18	30	+130 0	-110 -240	+52 0	-65 -149	+52 0	-40 -92	+33 0	-20 -41	+21 0	-7 -20	+21 0	-13 0
30	40	+160 0	-120 -280	+62 0	-80 -180	+62 0	-50 -112	+39 0	-25 -50	+25 0	-9 -25	+25 0	-16 0
40	50	+160 0	-130 -290	+62 0	-80 -180	+62 0	-50 -112	+39 0	-25 -50	+25 0	-9 -25	+25 0	-16 0
50	65	+190 0	-140 -330	+74 0	-100 -220	+74 0	-60 -134	+46 0	-30 -60	+30 0	-10 -29	+30 0	-19 0
65	80	+190 0	-150 -340	+74 0	-100 -220	+74 0	-60 -134	+46 0	-30 -60	+30 0	-10 -29	+30 0	-19 0
80	100	+220 0	-170 -390	+87 0	-120 -260	+87 0	-72 -159	+54 0	-36 -71	+35 0	-12 -34	+35 0	-22 0
100	120	+220 0	-180 -400	+87 0	-120 -260	+87 0	-72 -159	+54 0	-36 -71	+35 0	-12 -34	+35 0	-22 0



(i) Identify the correct tolerance for a g6 8mm diameter shaft.

(1)

A

-4
-12

B

-5
-14

C

-6
-17

D

-7
-20

(ii) Using the chart, state the maximum size limit for a 28mm diameter hole with a fit designation of H8.

(1)

(iii) A small team of engineering technicians needs to design and make accurate guide pillars and bushes for injection moulding tools. The team uses a limits and fits chart to find out the hole size tolerance for the bushes and the shaft size tolerance for the guide pillars.

Explain **two** other reasons why engineering technicians would use a limits and fits chart when designing and making accurate guide pillars and bushes.

(4)

1

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2

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(Total for Question 2 = 10 marks)



3 Use the insert to answer all parts of Question 3.

(a) Which linetype represents hidden detail?

(1)

A

B

C

D

(b) What do the letters PCD mean?

(1)

(c) Determine the distance labelled E.

(1)

(d) There is no section view on the clamping unit drawing.

Explain **two** other errors on the clamping unit drawing that will cause a problem when interpreting information.

(4)

1

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2

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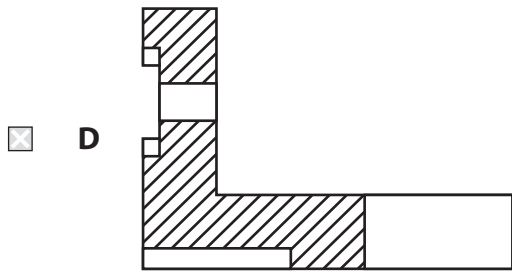
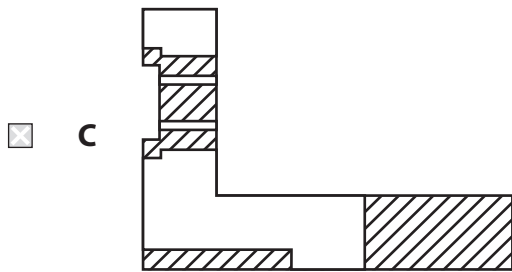
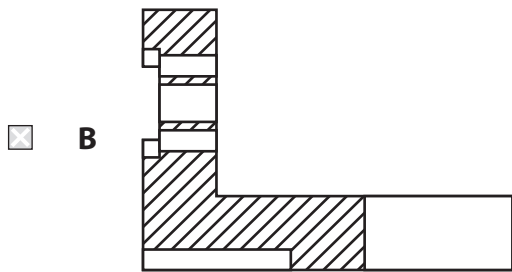
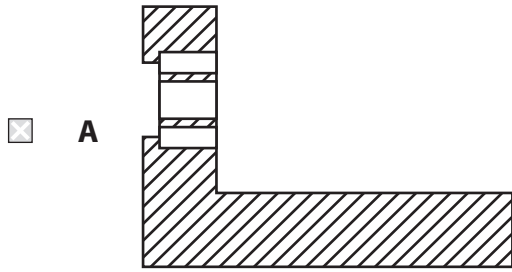
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(e) Identify the correct section view for F-F on the clamping unit drawing.

(1)



(f) Give **two** reasons why an engineer would use an orthographic projection to draw the clamping unit.

(2)

1

.....

2

.....

(Total for Question 3 = 10 marks)



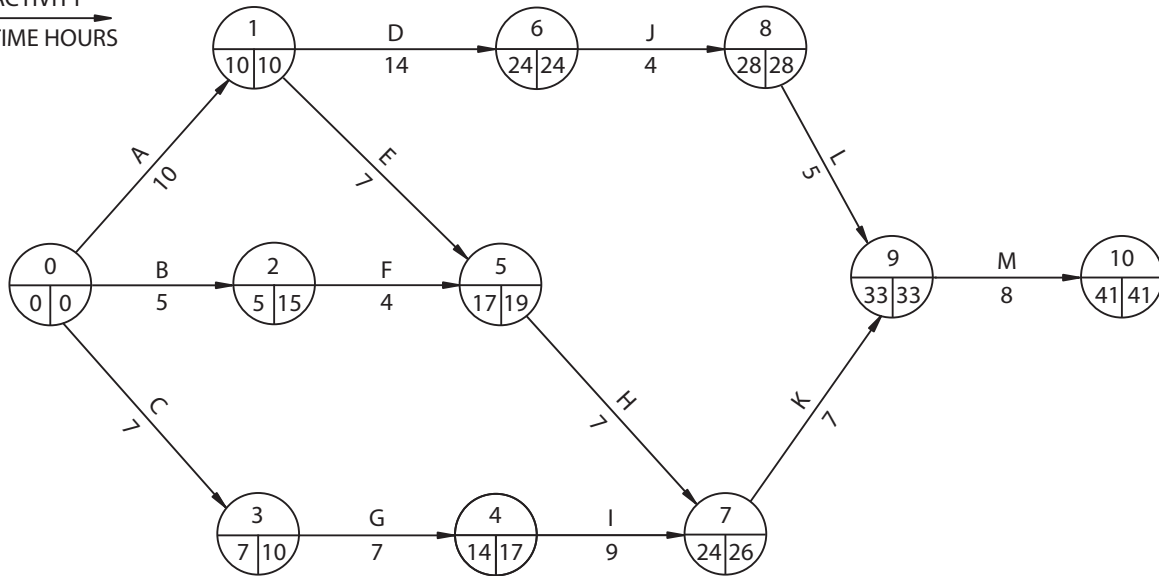
4 PQR Ltd is a specialist car manufacturing company that uses critical path analysis.

The critical path analysis below was generated by the production manager at PQR Ltd and relates to the assembly of a car chassis.

KEY:



ACTIVITY
TIME HOURS



(a) Identify the critical path from **one** of the options below.

(1)

- A AEHKM
- B ADJLM
- C BFHKM
- D CGIKM

(b) State the latest start time for Activity H.

(1)

..... hours



(c) Explain **two** advantages to the production manager of using critical path analysis when assembling the car chassis.

(4)

1

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.....

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2

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.....

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(Total for Question 4 = 6 marks)

5 DW7 Engineering manufactures seals for a range of engineering sectors.

It uses production plans, quality control information and test reports at various intervals when making the seals.

(a) State **two** types of information that could be found in a production plan for the seals.

(2)

1

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2

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(b) Describe **one** type of related documentation that could be used to provide quality control information when making the seals.

(2)

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.....

(c) An engineer at DW7 Engineering needs to make a special seal for a forklift that operates in very cold conditions. The engineer has chosen a new material for the seal and decides to refer to a test report for the new material to determine its suitability.

Explain **one** reason why a test report was used in this situation to determine the suitability of the material.

(2)

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(Total for Question 5 = 6 marks)



6 (a) IG11 Manufacturing produces fabricated components for the marine industry. It uses engineering drawings to support the manufacture of these components. These drawings are handled by the engineers for long periods of time and are subject to damage and graffiti.

State **two** problems that can be caused by graffiti and other damage to engineering drawings.

(2)

1

2

(b) MWK Engineering makes specialist one-off components for the nuclear industry. The design department at MWK Engineering must produce a new engineering drawing for each specialist component. It has an ICT-based system of document control.

Explain **two** disadvantages of MWK Engineering using an ICT-based system of document control.

(4)

1

2



