City & Guilds Level 3 End-point Assessment for Engineering Maintenance Technician (Dual Discipline) (9331-12)

304 Electrical and Mechanical Engineering Maintenance Technician

Standard: ST1443, EPA Plan: Version 1.0

QN: 610/6878/0

Version 1.0

Last modified: June 2026

Sample Knowledge Test
Sample paper, multiple-choice answer sheet and mark scheme

Version	Summary of changes	Section
1.0 June 2026	Document created	N/A

1 Introduction

Area	Description
What is in this document	This document contains the sample test, answer sheet and mark scheme for the 9331-12 Engineering Maintenance Technician (Dual Discipline) Multiple-choice Test (304 Electrical and mechanical).
Documents included:	• Sample questions • Answer sheet • Mark scheme Apprentices should be provided with the sample questions and the answer sheets. The mark scheme is to be used by employers/training providers/tutors to mark the completed test.

Note to employers/training providers/tutors: this sample paper-based version of the multiple-choice test is to support formative assessment activities.

Live versions of the multiple-choice test will be accessed using City & Guilds e-volve online system. Please refer to the EPA handbook for details on how to book and administer live tests.

2 9331-304 End-point Assessment – multiple-choice knowledge test (sample questions)

Test duration: 75 minutes

You should have the following for this test:

- a pen with black or blue ink
- multiple-choice questions answer sheet.

Read the following notes before you answer any questions.

- Attempt all questions.
- If you find a question difficult, leave it and return to it later.

This paper contains 50 multiple-choice questions worth 1 mark each.

This test paper is the property of City & Guilds.

How to complete the multiple-choice answer sheet

Each multiple-choice question shows four possible answers (lettered ‘a’, ‘b’, ‘c’, ‘d’); only one is correct.

Decide which one is correct and mark your answer on the answer sheet with your pen.

For example, if you decide ‘b’ is correct, mark your answer with a cross like this:

1 a ☐ b ☒ c ☐ d ☐

If you change your answer, cancel your first choice by filling in the box then put a cross in the answer which you have now decided is correct, like this:

1 a ☐ b ■ c ☒ d ☐

Q1	Which stage of the equipment life cycle involves site preparation, alignment and initial testing? (1 mark)
	a) Concept and planning. b) Design and procurement. c) Installation and commissioning. d) Operation and utilisation.
Spec reference	6.1.1 (c)

Q2	Which statement **best** describes Condition-Based Maintenance (CBM)? (1 mark)
	a) Maintenance that is a holistic approach aiming for zero defects and breakdowns. b) Maintenance that is reactive and only performed after equipment failure. c) Maintenance that takes place at fixed intervals to prevent failure. d) Maintenance triggered by monitored data indicating degradation.
Spec reference	7.1.1 (b)

Q3	A safety risk has a likelihood rating of 3 and an impact rating of 2. What is the risk score? (1 mark)
	a) 0.66 b) 1.5 c) 5 d) 6
Spec reference	7.2.1 (a)

Q4	What is the **primary** legislation that sets the overarching duties for health, safety and welfare at work? (1 mark)
	a) DSEAR. b) HSWA. c) LOLER. d) PUWER.
Spec reference	8.1.2 (a)

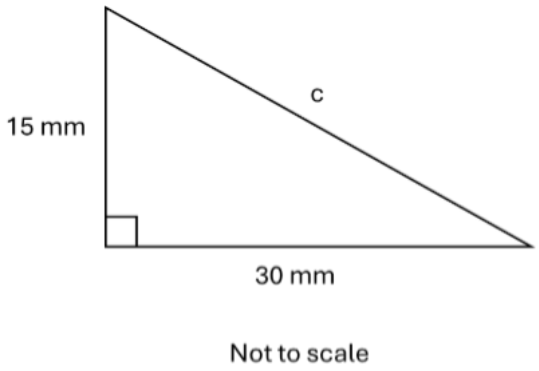
Q5	Which health and safety regulation covers the safe use of computer screens? (1 mark)
	a) DSE. b) PPE. c) COSHH. d) COMAH.
Spec reference	8.1.4 (b)

Q6	According to RIDDOR, how many consecutive days must an injury stop a worker from doing their usual job for before it must be reported to the HSE? (1 mark)
	a) More than 2 days. b) More than 3 days. c) More than 5 days. d) More than 7 days.
Spec reference	8.2.5 (a)

Q7	An engineer is employed by a maintenance engineering company. According to the PPE Regulations, what is a responsibility of the engineer prior to completing a maintenance activity? (1 mark)
	a) To alter the condition of PPE for the activity. b) To complete a risk assessment to determine the PPE for the activity. c) To inspect PPE for any damage before using it in the activity. d) To provide PPE to other employees who are completing the activity.
Spec reference	8.2.7 (a) (ii)

Q8	Which standard gives the requirements for an Environmental Management System? (1 mark)
	a) BS 7671 b) BS 8888 c) ISO 9001 d) ISO 14001
Spec reference	K13.1.1 (a)

Q9	A minor spill has occurred that poses no immediate danger. What should be the **first** action according to spill response procedures? (1 mark)
	a) Attempt to contain the spillage. b) Evacuate the area affected. c) Clean the area affected. d) Document the incident.
Spec reference	K13.2.1 (d)

Q10	The support bracket below forms a right angle. What is the length of side c to the nearest whole number?  (1 mark)
	a) 28 mm b) 34 mm c) 40 mm d) 45 mm
Spec reference	17.1.1 (e)

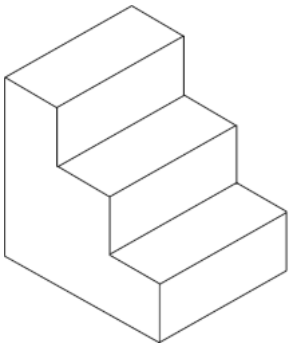
Q11	A series of holes in a material have the diameters shown in the table below. What is the mean diameter of the holes to one decimal place? All dimensions in mm (1 mark)

9.8	9.9	9.7	9.9
10.0	9.8	9.9	9.7

	a) 9.6 mm b) 9.7 mm c) 9.8 mm d) 9.9 mm
Spec reference	17.2.1 (a)

Q12	What property is described as the ability of material to resist scratches and indentations? (1 mark)
	a) Hardness. b) Magnetism. c) Ductility. d) Strength.
Spec reference	18.1.1 (c)

Q13	What does contact between two incompatible metals in the presence of an electrolyte result in? (1 mark)
	a) Corrosion of both metals at the same speed. b) Faster corrosion of the more active metal. c) Faster corrosion of the less active metal. d) No corrosion of either of the two metals.
Spec reference	18.2.1 (d)

Q14	What type of engineering representation format is shown below?  (1 mark)
	a) Detail. b) Assembly. c) Isometric. d) Orthographic.
Spec reference	21.1.1 (d)

Q15	What does this symbol represent on an electrical circuit diagram?  (1 mark)
	a) Lamp. b) Resistor. c) Signal diode. d) Light emitting diode.
Spec reference	21.2.1 (c)

Q16	Which **best** describes the application of the Internet of Things (IoT) in maintenance? (1 mark)
	a) Connected sensors that share data in real time. b) Remote access to data via cloud filesharing services. c) Use of physical equipment integrated with digital control. d) Use of pre-programmed robots to perform system repairs.
Spec reference	32.1.1 (b)

Q17	Which technology can be used to analyse data trends to support predictive maintenance? (1 mark)
	a) IoT. b) AI. c) HMI. d) PLC.
Spec reference	32.2.1 (d)

Q18	What is the role of digital twins in maintenance? (1 mark)
	a) To use virtual models to design brand new products from scratch. b) To use physical models of digital systems to simulate their performance. c) To use virtual models of physical systems to simulate their performance. d) To use virtual models to simulate system components that are not physically possible to make.
Spec reference	32.3.1 (c)

Q19	A maintenance engineer has been asked to replace a faulty power supply for a DC motor. The motor has a resistance of 50 Ω and draws a current of 0.24 A when in use. What voltage power supply should be used for the DC motor? (1 mark)
	a) 0.005 V b) 12 V c) 50.2 V d) 208 V
Spec reference	S13.1.1 (a) (i)

Q20	A maintenance engineer is tightening a bolt as part of re-assembling a machine. They are using a wrench that is 0.2 metres in length. The engineer applies a force of 90 N at a right angle to the end of the wrench handle. What is the amount of torque applied to the bolt? (1 mark)
	a) 450 Nm b) 90.2 Nm c) 18 Nm d) 0.002 Nm
Spec reference	S13.1.1 (a) (iii)

Q21	What is the employee's **primary** responsibility when working on electrical equipment? (1 mark)
	a) Follow the employer's safety procedures and processes. b) Follow your own safety procedures and processes. c) Follow industry safety procedures and processes. d) Follow the manufacturer's safety procedures and processes.
Spec reference	57.1.2 (a)

Q22	Which statement **best** defines the relationship between BS 7671 and Electricity at Work Regulations (EAWR)? (1 mark)
	a) BS 7671 is statutory law and EAWR is a supporting code of practice. b) EAWR and BS 7671 are legal acts of parliament that must be followed by law. c) BS 7671 provides technical standards that support compliance with EAWR. d) BS 7671 sets out employer responsibilities for electrical safety training under EAWR.
Spec reference	57.3.1 (a)

Q23	What is the **main** purpose of a Permit to Work document? (1 mark)
	a) To provide basic safety guidance for employees who have not received any formal training. b) To authorise and control high risk work and ensure safety measures are in place. c) To increase operational efficiency by removing the need for routine safety checks. d) To ensure employees are provided with guidance on what to do when accidents occur.
Spec reference	57.4.2 (b)

Q24	Which is the correct industrial application of a single-phase circuit?
	a) Powering heavy industrial welding equipment. b) Powering manufacturing production lines. c) Powering large CNC machines. d) Powering portable power tools.
Spec reference	59.1.1 (b)

Q25	What is the basic operating principle of a three-phase motor? (1 mark)
	a) It uses Alternating Current (AC) which produces a rotating magnetic field that causes the rotor to turn. b) It uses Direct Current (DC) which produces a rotating magnetic field that causes the rotor to turn. c) It allows current to transfer from a primary coil to a secondary coil without electrical connections which causes the rotor to turn. d) It converts Alternating Current (AC) to Direct Current (DC) which causes the rotor to turn.
Spec reference	59.3.2 (a)

Q26	Which method is the **most** effective for protecting electrical components against electrostatic discharge (ESD) during assembly? (1 mark)
	a) Ensure all electrical components are non-conductive. b) Storing components within plastic bags. c) Wearing an earthed antistatic discharge wrist strap. d) Ensuring the main power supply is switched off.
Spec reference	59.4.2 (b) (i)

Q27	What is the correct SI unit of measurement for electrical resistance? (1 mark)
	a) Volt (V) b) Current (I) c) Amp (A) d) Ohm (Ω)
Spec reference	60.1.1 (d)

Q28	What type of circuit allows industrial machinery to be switched off independently without affecting the operation of the other machines? (1 mark)
	a) A series circuit b) A parallel circuit c) A closed circuit d) A dead circuit
Spec reference	60.2.1 (b)

Q29	An electrical transformer works on which basic principle? (1 mark)
	a) Electrostatic attraction between conductors. b) Electromagnetic induction between two windings. c) Mechanical rotation of coils. d) Direct current conduction.
Spec reference	60.3.1 (a)

Q30	Which describes a **key** difference between series and parallel circuits? (1 mark)
	a) In a series circuit, a break in one component stops the flow of current in the circuit. b) In a series circuit, the voltage is the same across all components. c) In a parallel circuit, the current is the same through all components. d) In a parallel circuit, the total resistance remains the same through all components.
Spec reference	61.1.1 (a)

Q31	What is the function of a transistor in an electrical circuit? (1 mark)
	a) To store electrical energy. b) To amplify current or act as a switching device. c) To provide resistive force across an electrical circuit. d) To convert DC voltage to AC voltage.
Spec reference	61.3.1 (a) (ii)

Q32	What is a function of a distribution board in an industrial facility?
	a) To provide backup power supply to industrial plant in the event of main power failure. b) It divides main power feed into subsidiary circuits and provides protective disconnection. c) To monitor the consumption of supplied electricity within an industrial circuit. d) It acts as an isolation device to protect equipment during testing only.
Spec reference	61.2.1 (a)

Q33	Which electrical component does this circuit symbol represent?  (1 mark)
	a) Battery. b) Lamp. c) Resistor. d) Transformer.
Spec reference	62.2.2 (a) (iii)

Q34	When following Standard Operating Procedures (SOPs) in electrical work, why should a wiring diagram be used? (1 mark)
	a) They are mainly referenced during troubleshooting tasks. b) They give the installation and connection details needed for safe work. c) They show component layout and connections to support accurate work. d) They provide information related to isolation procedures.
Spec reference	62.3.3 (a)

Q35	What is the **primary** application of Steel Wire Armoured (SWA) cables in electrical installations? (1 mark)

	a) To provide mechanical protection for power and auxiliary circuits. b) To supply low voltage applications for illumination including light emitting diodes (LEDs). c) To increase electrical earthing or bonding capacity within electrical installations. d) To provide a temporary means of connecting electrical components prior to testing.
Spec reference	63.1.1 (d)

Q36	According to IET Wiring Regulations, why is it important to follow the guidelines when selecting and installing cables? (1 mark)
	a) To allow unqualified personnel to install electrical systems safely. b) To reduce the length of cable required and help reduce material costs. c) To ensure the cables look neat and match the building décor. d) To prevent overheating, electrical faults, and ensure safety and compliance.
Spec reference	63.2.4 (a)

Q37	A hydraulic press has an input piston with an area of 0.02 m². A force of 50 N is applied to this piston. Using Pascal's Law, what pressure is transmitted through the hydraulic fluid? (1 mark)
	a) 125 Pa b) 2.5 Pa c) 2500 Pa d) 0.4 Pa
Spec reference	71.1.1 (a) (i)

Q38	An air compressor is said to operate between 0 bar g and 10 bar g. What is this referring to? (1 mark)
	a) Flow cycle. b) Duty cycle. c) Pressure range. d) Temperature range.
Spec reference	71.2.1 (b) (i)

Q39	Which safety precaution is required before working on pneumatic and hydraulic systems? (1 mark)
	a) Controlled release of stored energy. b) Locking off and tagging the energy supply. c) Securing moving parts to prevent unexpected movement. d) Wearing suitable personal protective equipment.
Spec reference	71.3.1 (b)

Q40	A machine component with a mass of 4 kg is accelerating at 3 m/s². According to Newton's Second Law of Motion, what force is acting on the component? (1 mark)
	a) 12 N b) 7 N c) 1.33 N d) 0.75 N
Spec reference	72.1.1 (a)

Q41	Which **best** describes acceleration? (1 mark)
	a) The rate of change of velocity with respect to time. b) The rate of change of speed with respect to direction. c) The rate of change in velocity with respect to direction. d) The rate of change of speed with respect to time.
Spec reference	72.1.2 (a)

Q42	A 10 mm diameter bolt is subjected to a tensile load of 50 N. What is the tensile stress loading in the bolt? (1 mark)
	a) 0.6366 kPa b) 6.366 kPa c) 63.66 kPa d) 636.6 kPa
Spec reference	72.2.1 (a) (i)

Q43	What is the **primary** function of a shaft in a mechanical system? (1 mark)
	a) To support linear motion in a hydraulic or pneumatic cylinder. b) To reduce friction and support rotating components. c) To transmit rotational power and torque between components. d) To convert rotational motion into reciprocating motion.
Spec reference	73.1.1 (c)

Q44	What is the **primary** function of serrated washers? (1 mark)
	a) To increase the torque in nuts and bolts. b) To prevent nuts and bolts from becoming loose. c) To stop damage to the surrounding area. d) To increase the force on the surrounding area.
Spec reference	73.2.1 a)

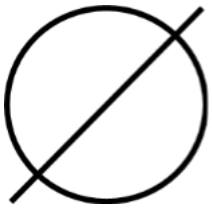
Q45	What are bellows used for on mechanical assemblies? (1 mark)
	a) To heat assemblies. b) To keep assemblies cool. c) To maintain optimal pressure in assemblies. d) To allow for thermal expansion in assemblies.
Spec reference	73.3.1 (b)

Q46	Which material type is **best** suited to be joined using thread-forming self-tapping screws? (1 mark)
	a) Hard metals. b) Soft metals. c) Thin metal. d) Rubber sheets.
Spec reference	79.1.1 (d) (i)

Q47	Which creates a permanent mechanical joint when assembled? (1 mark)
	a) Split pin. b) Circlips. c) Rivets. d) Screws.
Spec reference	79.1.2 (c)

Q48	What are the SI units of torque? (1 mark)
	a) Nm b) lb/ft c) Kg/cm^2 d) m/s
Spec reference	79.1.3 (a)

Q49	Which describes an isometric view on a drawing? (1 mark)
	a) A 2D representation used to show an object or structure from different elevations on a two-dimensional surface. b) A type of 3D representation used to show an object or structure from different elevations on a three-dimensional surface. c) A type of 3D representation used to show an object or structure in three dimensions on a two-dimensional surface. d) A 2D representation used to show an object or structure from different elevations on a three-dimensional surface.
Spec reference	80.1.1 (b)

Q50	What does this symbol represent on a standard engineering drawing?  (1 mark)
	a) Radius. b) Threads. c) Countersink. d) Diameter.
Spec reference	80.2.1 (c)

3 9331-304 End-point Assessment – multiple-choice knowledge test (answer sheet)

Candidate name:

Date of test: Click or tap to enter a date.

1	a ☐	b ☐	c ☐	d ☐
2	a ☐	b ☐	c ☐	d ☐
3	a ☐	b ☐	c ☐	d ☐
4	a ☐	b ☐	c ☐	d ☐
5	a ☐	b ☐	c ☐	d ☐
6	a ☐	b ☐	c ☐	d ☐
7	a ☐	b ☐	c ☐	d ☐
8	a ☐	b ☐	c ☐	d ☐
9	a ☐	b ☐	c ☐	d ☐
10	a ☐	b ☐	c ☐	d ☐
11	a ☐	b ☐	c ☐	d ☐
12	a ☐	b ☐	c ☐	d ☐
13	a ☐	b ☐	c ☐	d ☐
14	a ☐	b ☐	c ☐	d ☐
15	a ☐	b ☐	c ☐	d ☐
16	a ☐	b ☐	c ☐	d ☐
17	a ☐	b ☐	c ☐	d ☐
18	a ☐	b ☐	c ☐	d ☐
19	a ☐	b ☐	c ☐	d ☐
20	a ☐	b ☐	c ☐	d ☐
21	a ☐	b ☐	c ☐	d ☐
22	a ☐	b ☐	c ☐	d ☐

23	a ☐	b ☐	c ☐	d ☐
24	a ☐	b ☐	c ☐	d ☐
25	a ☐	b ☐	c ☐	d ☐
26	a ☐	b ☐	c ☐	d ☐
27	a ☐	b ☐	c ☐	d ☐
28	a ☐	b ☐	c ☐	d ☐
29	a ☐	b ☐	c ☐	d ☐
30	a ☐	b ☐	c ☐	d ☐
31	a ☐	b ☐	c ☐	d ☐
32	a ☐	b ☐	c ☐	d ☐
33	a ☐	b ☐	c ☐	d ☐
34	a ☐	b ☐	c ☐	d ☐
35	a ☐	b ☐	c ☐	d ☐
36	a ☐	b ☐	c ☐	d ☐
37	a ☐	b ☐	c ☐	d ☐
38	a ☐	b ☐	c ☐	d ☐
39	a ☐	b ☐	c ☐	d ☐
40	a ☐	b ☐	c ☐	d ☐
41	a ☐	b ☐	c ☐	d ☐
42	a ☐	b ☐	c ☐	d ☐
43	a ☐	b ☐	c ☐	d ☐
44	a ☐	b ☐	c ☐	d ☐
45	a ☐	b ☐	c ☐	d ☐
46	a ☐	b ☐	c ☐	d ☐
47	a ☐	b ☐	c ☐	d ☐
48	a ☐	b ☐	c ☐	d ☐
49	a ☐	b ☐	c ☐	d ☐
50	a ☐	b ☐	c ☐	d ☐

Number of correct answers: **/ 50**

4 9331-304 End-point Assessment – multiple-choice knowledge test (mark scheme)

Grading

Fail – 34 marks (68%)

Pass – 35 marks (70%)

Question number	Key	Question number	Key
1	C	26	C
2	D	27	D
3	D	28	B
4	B	29	B
5	A	30	A
6	D	31	B
7	C	32	B
8	D	33	A
9	A	34	B
10	B	35	A
11	C	36	D
12	A	37	C
13	B	38	C
14	C	39	A
15	A	40	A
16	A	41	A
17	B	42	D
18	C	43	C
19	B	44	B
20	C	45	D
21	A	46	B
22	C	47	C

Question number	Key	Question number	Key
23	B	48	A
24	D	49	C
25	A	50	D

Who we are

City & Guilds Limited (Registered Company 16513878) is the Awarding Organisation for City & Guilds qualifications.

About City & Guilds

City & Guilds is the global skills partner, empowering people, organisations and economies to develop the skills they need for growth. With almost 150 years of trusted expertise, we support people into work, help them develop on the job and move into the next job.

We work with Governments, employers, training providers, colleges and industry stakeholders to design and deliver high-quality training, qualifications, assessments and credentials that lead to meaningful career progression. We understand the life changing link between skills development, social mobility and success. Our solutions span critical sectors including construction, engineering, transport, energy and electrical, serving over 1 million learners annually.

Through our comprehensive portfolio of brands and trusted global network, we set industry-wide standards for technical, behavioural and commercial skills to improve performance and productivity. We believe you can achieve your potential - and we're here to help make it happen.

City & Guilds

5–6 Giltspur Street
London EC1A 9DE
www.cityandguilds.com