

City & Guilds Level 2 Technical Certificate in Land-based Engineering (0171-28)

Sample External Test

Duration: 2 hours

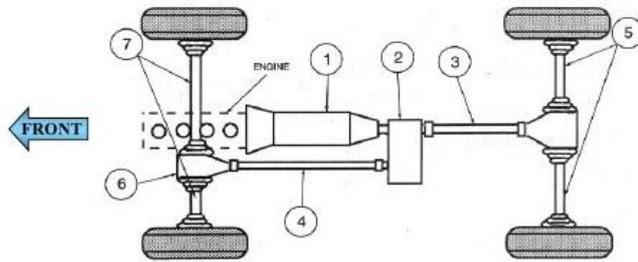
SAMPLE

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SAMPLE

Question / Mark scheme



- | | |
|---------------------|-----------------------|
| 1. TRANSMISSION | 5. REAR AXLES |
| 2. TRANSFER CASE | 6. FRONT DIFFERENTIAL |
| 3. REAR DRIVESHAFT | 7. FRONT AXLES |
| 4. FRONT DRIVESHAFT | |

<https://image.slidesharecdn.com>

1. Which one of the following transmission systems is shown in the image above?

- a) Two wheel drive.
- b) Tracked.
- c) Four wheel drive.
- d) Hydrostatic.

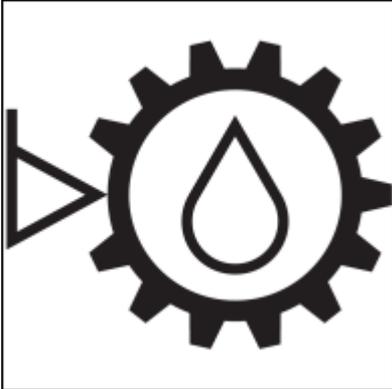
2. Which one of the following types of transmission is **most** likely to be found on a combine harvester driven by wheel motors?

- a) Semi-powershift.
- b) Full powershift.
- c) Mechanical.
- d) Hydrostatic.

3. Which one of the following describes a function of a differential in a mechanical power transmission system?

- a) Allows one wheel on an axel to travel faster than the other.
- b) Transmits drive to the mechanical transmission.
- c) Engages and disengages drive to the wheels.
- d) Enables the power take off to operate independently of the transmission.

Question / Mark scheme



<https://www.iso.org>

4. What does the ISO symbol shown indicate?

- a) Low transmission oil temperature.
- b) Low transmission oil level.
- c) Low engine oil level.
- d) Low engine oil pressure.

5. What is the purpose of an epicyclic reduction unit in a tractor's final drive system?

- a) To increase speed and decrease torque.
- b) To decrease speed and increase torque.
- c) To decrease speed and decrease torque.
- d) To increase speed and increase torque.

6. Which one of the following **best** describes the benefits of a multi-plate clutch compared to a single plate clutch?

- a) Reduced unit weight and operational wear.
- b) Reduced unit cost and maintenance requirements.
- c) Increased size and power transmission surface area.
- d) Compact size with increased power transmission surface area.

7. Before carrying out maintenance on a self-propelled harvester, which one of the following is the **main** purpose of a safe isolation procedure?

- a) To avoid damage to the machine.
- b) To deter theft of the machine.
- c) To prevent harm to personnel.
- d) To increase maintenance efficiency.

8. What is the sequence of the four-stroke cycle in an internal combustion engine?

- 1 – Exhaust
- 2 – Induction
- 3 – Compression
- 4 – Power

Question / Mark scheme

- a) 2, 3, 4, 1.
- b) 4, 2, 3, 1.
- c) 2, 1, 4, 3.
- d) 3, 4, 2, 1.



<http://cms.ukintpress.com>

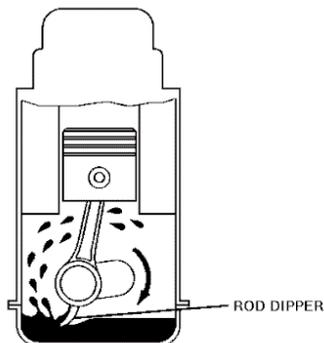
9. Which engine configuration is shown in the image above?

- a) Rotary.
- b) Horizontally opposed.
- c) Vee.
- d) Inline.

10. Which one of the following is a firing order of a four-stroke engine's cylinders?

- 1 – First engine cylinder
- 2 – Second engine cylinder
- 3 – Third engine cylinder
- 4 – Fourth engine cylinder

- a) 3, 1, 2, 4.
- b) 1, 4, 2, 3.
- c) 1, 3, 4, 2.
- d) 3, 2, 1, 4.



<http://www.sweethaven02.com>

Question / Mark scheme

11. What type of lubrication system is shown in the image above?

- a) Splash feed.
- b) Force feed.
- c) Two-stroke.
- d) Mist feed.



<http://www.standardbrand.com>

12. What type of component is shown in the image above?

- a) Pintaux fuel injector.
- b) Two stage fuel injector.
- c) Mechanical fuel injector.
- d) Electronic fuel injector.

13. How does a Selective Catalytic Reduction (SCR) system reduce the emission of Nitrogen Oxides?

- a) Diesel exhaust fluid chemically reacts with exhaust emissions.
- b) Exhaust emissions are removed by the diesel particulate filter.
- c) Exhaust emissions are removed by the catalytic convertor.
- d) Proportion of exhaust gases are recirculated into the inlet manifold.

14. What are the **main** functions of a lubricating oil in an engine?

- a) Acts as a sealant, transfers heat, filters out contaminants.
- b) Transfers heat, prevents ingress of contaminants, acts as a sealant.
- c) Reduces friction, transfers heat, transports contaminants to filter.
- d) Filters out contaminants, reduces friction, prevents ingress of moisture.

15. What is the correct sequence of the inlet stroke on a two-stroke cycle?

- 1 – Pressure drops in crankcase
- 2 – Fuel and air mixture drawn into the crankcase
- 3 – Piston moves towards Top Dead Centre (TDC)
- 4 – Inlet port is uncovered

- a) 1, 3, 4, 2.
- b) 3, 1, 4, 2.
- c) 4, 2, 3, 1.
- d) 2, 3, 1, 4.

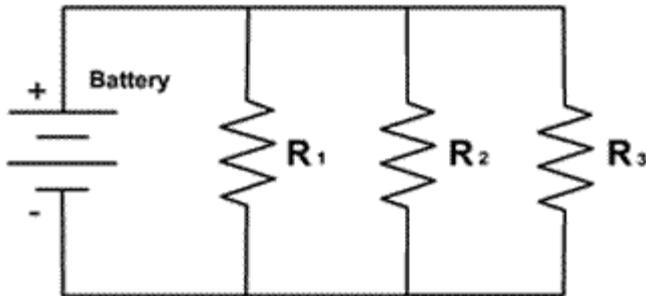
Question / Mark scheme



<http://i.ebayimg.com>

16. Which one of the following **best** describes the function of the component shown above?

- a) Larger particulates are removed by centrifugal force, and smaller particulates are removed by dry filter elements.
- b) An oil bath is used to trap airborne particulates before they can enter the engine.
- c) An oil soaked foam is used to trap airborne particulates before they can enter the engine.
- d) Smaller particulates are removed by centrifugal force, and larger particulates are removed by dry filter elements.

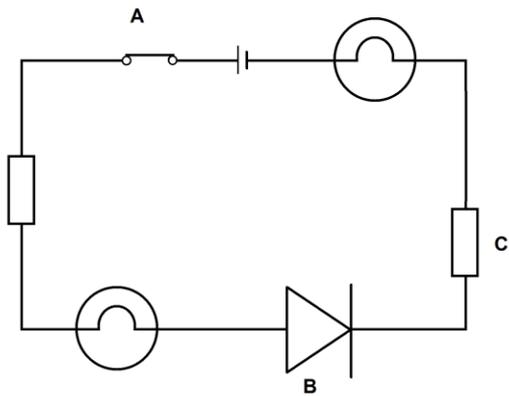


<http://www.electronicsteacher.com>

17. What type of circuit is shown in the image above?

- a) Earth return.
- b) Potential divider.
- c) Parallel circuit.
- d) Series circuit.

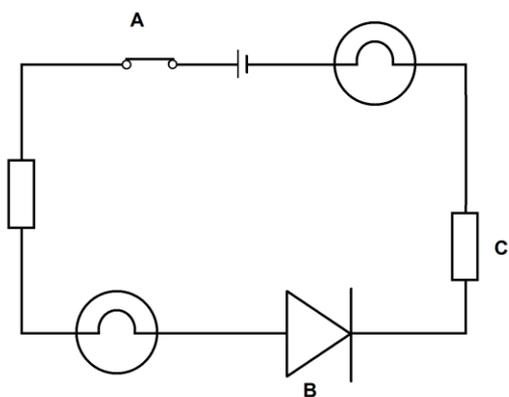
Question / Mark scheme



<https://electronarrative.files.wordpress.com>

18. What is component A shown in the image above?

- a) Diode.
- b) Switch.
- c) Resistor.
- d) Fuse.

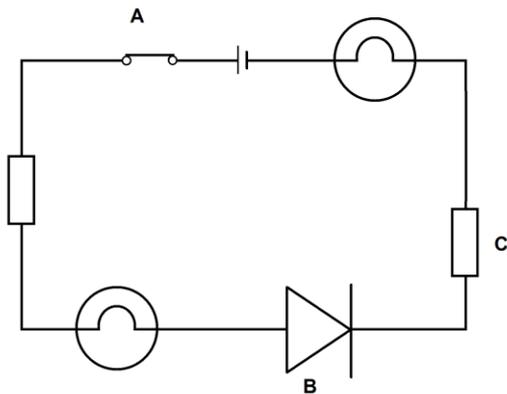


<https://electronarrative.files.wordpress.com>

19. What is component B shown in the image above?

- a) Resistor.
- b) Switch.
- c) Fuse.
- d) Diode.

Question / Mark scheme



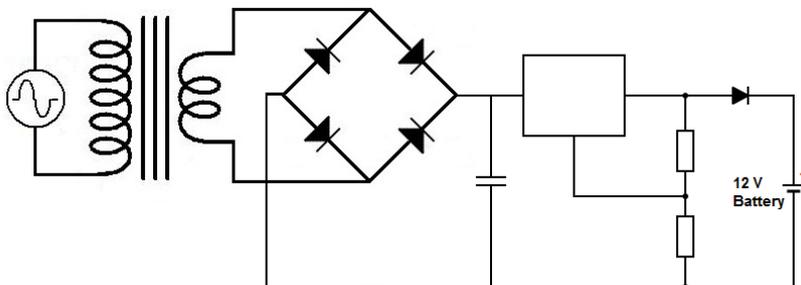
<https://electronarrative.files.wordpress.com>

20. What is component C shown in the image above?

- a) Fuse.
- b) Switch.
- c) Diode.
- d) Resistor.

21. Which one of the following is measured in Ohms (Ω)?

- a) Power.
- b) Resistance.
- c) Voltage.
- d) Current.

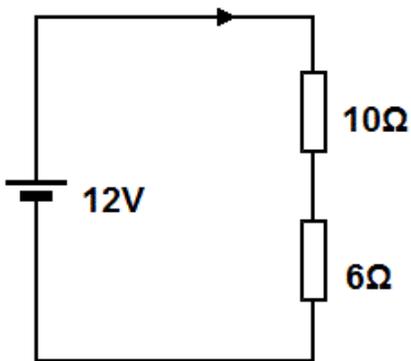


<http://2.bp.blogspot.com>

22. What type of circuit is shown in the image above?

- a) Charging circuit.
- b) Starting circuit.
- c) Lighting circuit.
- d) Fuel gauge circuit.

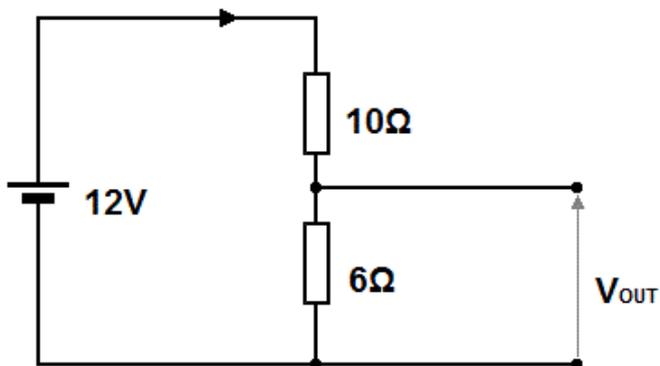
Question / Mark scheme



<https://www.technologyuk.net>

23. What is the total current in the circuit shown above?

- a) 192A
- b) 1.75A
- c) 1.33A
- d) 0.75A



<https://www.technologyuk.net>

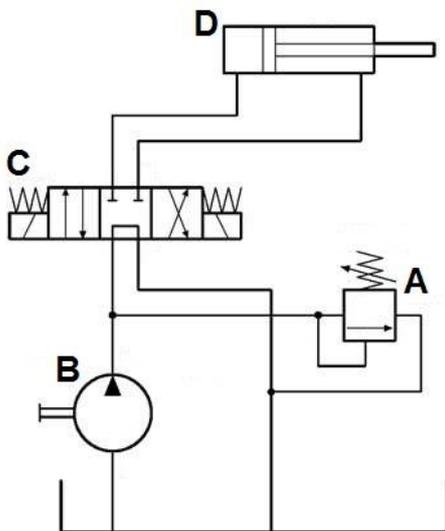
24. What is the voltage at V_{OUT} in the circuit shown above?

- a) 0.47V
- b) 7.5V
- c) 10V
- d) 75V

25. What is the **main** reason a battery should be isolated before working on an electrical circuit?

- a) To prevent damaging components.
- b) To prevent an electrical open circuit.
- c) To prevent an electrical short circuit.
- d) To prevent blowing fuses.

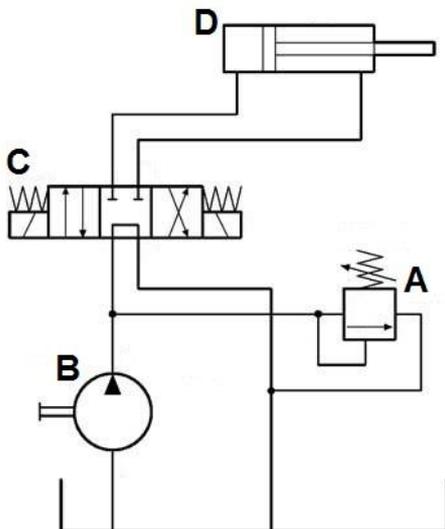
Question / Mark scheme



<http://media.noria.com>

26. What is component A in the image shown?

- a) Flow control valve.
- b) Pressure regulating valve.
- c) Control valve.
- d) Pressure relief valve.

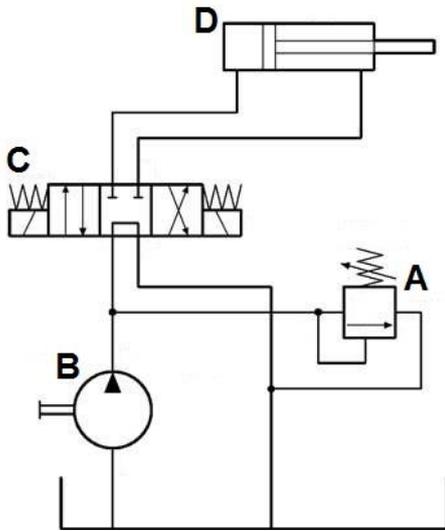


<http://media.noria.com>

27. What is component B in the image shown?

- a) Fixed displacement hydraulic motor.
- b) Variable displacement hydraulic motor.
- c) Fixed displacement hydraulic pump.
- d) Variable displacement hydraulic pump.

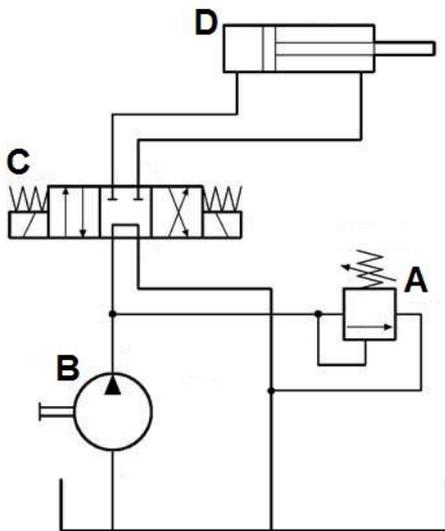
Question / Mark scheme



<http://media.noria.com>

28. What is component C in the image shown?

- a) Four way open centre directional control valve.
- b) Three way open centre directional control valve.
- c) Three way closed centre directional control valve.
- d) Four way closed centre directional control valve.

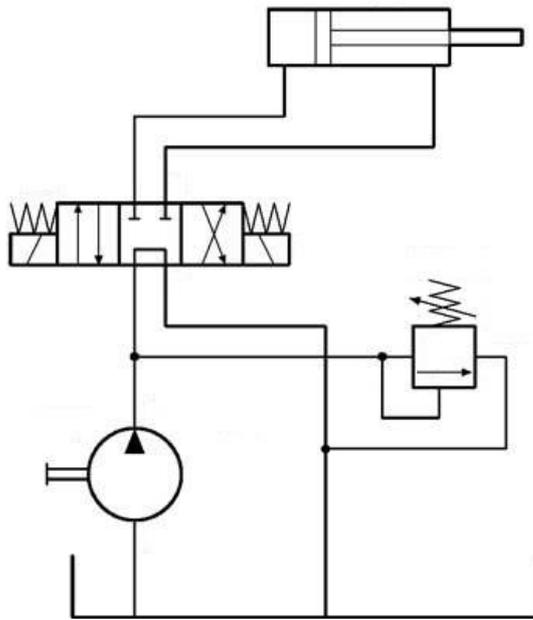


<http://media.noria.com>

29. What is component D in the image shown?

- a) Double acting balanced hydraulic actuator.
- b) Single acting balanced hydraulic actuator.
- c) Double acting unbalanced hydraulic actuator.
- d) Single acting unbalanced hydraulic actuator.

Question / Mark scheme



<http://media.noria.com>

30. What type of hydraulic circuit is shown above?

- a) Open centre.
- b) Load sensing.
- c) Closed centre.
- d) Double acting.

31. Which one of the following **best** describes the functions of a hydraulic reservoir?

- a) To store hydraulic oil, to dissipate heat, to prevent aeration and surging.
- b) To dissipate heat, to store hydraulic oil, to prevent moisture ingress.
- c) To filter hydraulic oil, to dissipate heat, to prevent aeration and surging.
- d) To dissipate heat, to store hydraulic oil, to separate water from hydraulic oil.

32. Which of the following PPE selections would be **most** suitable when working on a high pressure hydraulic system?

- 1 – Safety boots
- 2 – Overalls
- 3 – Hard hat
- 4 – Gloves
- 5 – Reflective jacket
- 6 – Safety glasses
- 7 – Respirator

- a) 1, 2, 3, 6.
- b) 2, 3, 4, 5.
- c) 2, 4, 6, 7.
- d) 1, 2, 4, 6.

33. Which one of the following pieces of equipment would be **most** suitable for measuring the performance of a hydraulic pump?

- a) Pressure gauge.

Question / Mark scheme

- b) Flow meter.
- c) Temperature gauge.
- d) Tachometer.



[Source: New Holland T5 Operator's Manual]

34. Which one of the following is represented by the indicator light shown above?

- a) Anti-lock brakes engaged.
- b) Trailer brake pressure low.
- c) Differential lock engaged.
- d) Transmission brake engaged.



[Source: New Holland T5 Operator's Manual]

35. Which one of the following is represented by the indicator light shown above?

- a) Differential lock engaged.
- b) Rear PTO engaged.
- c) Trailer brake engaged.
- d) Four wheel drive engaged.



[Source: New Holland T5 Operator's Manual]

36. Which one of the following is represented by the indicator light shown above?

- a) Low engine oil pressure.
- b) High hydraulic oil temperature.
- c) Low engine oil level.
- d) High engine coolant temperature.

Question / Mark scheme



<http://uk.kverneland.com>

37. What is the machine shown in the image above?

- a) Pneumatic seed drill.
- b) Precision seed drill.
- c) Direct drill.
- d) Box drill.



<http://assets.fwi.co.uk>

38. What is the machine mounted on the tractor in the image above?

- a) Rotary mower.
- b) Reciprocating knife.
- c) Finger bar.
- d) Swather/tedder.

39. Which one of the following would help to prevent overlapping when using a field crop sprayer?

- a) Variable rate application.
- b) Mechanical steering system.
- c) Hydrostatic steering system.
- d) Auto-steering system.

40. Which one of the following pieces of machinery should be used to cut and invert soil?

- a) Cultivator.
- b) Plough.
- c) Subsoiler.

Question / Mark scheme
d) Pan lifter.
Scenario 1 A tractor has been brought into the workshop as it has been reported to be a poor starter in all temperatures.
41. If the fuel system appears to be functioning correctly, a visual inspection of the electrical connections and components should be first carried out on the a) charging circuit b) lighting circuit c) engine ancillary circuits d) starting circuit.
42. If the electrical system appears to be functioning correctly and new fuel filters have been installed, which one of the following steps should next be carried out on the fuel system? a) Bleed cooling system. b) Bleed fuel system. c) Replace air filters. d) Check fuel quality.
43. If both the electrical and fuel systems appear to be functioning correctly, which one of the following steps may help to resolve the symptom? a) Change engine oil and filter. b) Install new grid heater. c) Replace air cleaner. d) Check boost pressure.
Scenario 2 A customer has taken delivery of a new tractor and requested operator training. You have been asked to demonstrate the safe starting procedure and the correct sequence for attaching a PTO-driven three point linkage mounted implement.
44. Which one of the following would prevent the tractor's engine from cranking? a) Seat switch disengaged. b) Transmission in neutral. c) Parking brake engaged. d) Independent brakes latched.
45. Which one of the following should the operator do prior to cranking the tractor's engine? a) Engage remote spool valves. b) Depress clutch pedal. c) Depress the brake pedal. d) Disengage parking brake.
46. Which one of the following should be disengaged prior to starting the tractor? a) Independent brake pedals. b) Parking brake. c) Power Take Off (PTO).

Question / Mark scheme
d) Seat switch.
47. What is the correct sequence to attach a PTO-driven three point linkage mounted implement to the tractor? a) Left hand link arm, right hand link arm, PTO, top link. b) Right hand link arm, left hand link arm, top link, PTO. c) Right hand link arm, left hand link arm, PTO, top link. d) Left hand link arm, right hand link arm, top link, PTO.
Scenario 3 A telescopic handler with perished hydraulic hoses on the boom has been brought into the workshop. You have been asked to ensure the telehandler is returned to a safe working condition.
48. What should be carried out prior to commencing repair of the damaged hoses? a) Select crab steering. b) Install the mechanical boom lock. c) Replenish hydraulic oil. d) Run system to operating temperature.
49. Which one of the following must be carried out before removing the hydraulic hoses? a) Depressurise the system. b) Drain hydraulic reservoir. c) Check relief valve pressure. d) Pressurise the system.
50. How can the risk of contamination in the hydraulic system of the telescopic handler be reduced? a) Recycle drained hydraulic oil. b) Use compressed air to clean the connectors. c) Recycle o-rings and seals. d) Clean connectors before removal.

SAMPLE

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Sample external test – Answer Keys

1	C
2	D
3	A
4	B
5	B
6	D
7	C
8	A
9	D
10	C
11	A
12	D
13	A
14	C
15	B
16	A
17	C
18	B
19	D
20	D
21	B
22	A
23	D
24	B
25	C
26	D
27	C
28	A
29	C
30	A
31	A
32	D
33	B
34	C
35	B
36	D
37	A

38	A
39	D
40	B
41	D
42	B
43	C
44	A
45	B
46	C
47	D
48	B
49	A
50	D

SAMPLE