

**B O A R D O F S T U D I E S**  
NEW SOUTH WALES

## **2011 Electrotechnology HSC Examination 'Sample Answers'**

When examination committees develop questions for the examination, they may write 'sample answers' or, in the case of some questions, 'answers could include'. The committees do this to ensure that the questions will effectively assess students' knowledge and skills.

This material is also provided to the Supervisor of Marking, to give some guidance about the nature and scope of the responses the committee expected students would produce. How sample answers are used at marking centres varies. Sample answers may be used extensively and even modified at the marking centre OR they may be considered only briefly at the beginning of marking. In a few cases, the sample answers may not be used at all at marking.

The Board publishes this information to assist in understanding how the marking guidelines were implemented.

The 'sample answers' or similar advice contained in this document are not intended to be exemplary or even complete answers or responses. As they are part of the examination committee's 'working document', they may contain typographical errors, omissions, or only some of the possible correct answers.

## Section II

### Question 16 (a)

*Answers could include:*

- 'Out of service' tag can be used on equipment or machinery that is faulty or not suitable for use.
- 'Do not operate' or danger tag can be used for isolation of electrical and non-electrical equipment.

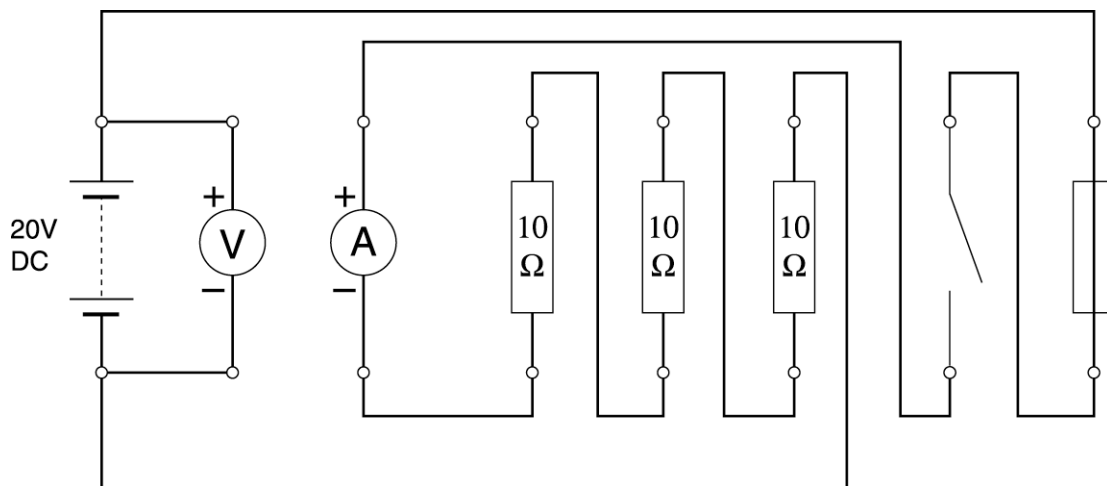
### Question 16 (b)

*Answers could include:*

- The person who fitted it
- The supervisor after conducting a risk assessment

### Question 17 (a)

*Sample answer:*



+ circuit works, ie is rendered inoperable by the wiring.

**Question 17 (b)***Sample answer:*

$$\begin{aligned}R_{\text{TOTAL}} &= R_1 + R_2 + R_3 \\ &= 10\Omega + 10\Omega + 10\Omega \\ &= 30\Omega\end{aligned}$$

$$\text{Ammeter} = 0.66 \text{ Amperes}$$

$$\begin{aligned}I_{\text{total}} &= \frac{V_{\text{supply}}}{R_{\text{total}}} \\ &= \frac{20V}{30\Omega} \\ &= 0.66A\end{aligned}$$

**Question 18 (a)***Sample answer:*

- face to face
- telephone/mobile phone, workplace meetings

**Question 18 (b)***Sample answer:*

- signage
- diagram

**Question 18 (c)***Sample answer:*

- work plans
- memos/messages
- job descriptions/statements
- workplace forms
- rosters

**Question 19 (a)****Sample answer:**

Each branch will be 2 Amperes

**Question 19 (b)****Sample answer:**

For each branch:

$$\text{Voltage across lamp} = 12\text{V}$$

$$\text{Current in branch} = 2\text{A}$$

$$\therefore \text{Power dissipated by 1 lamp} = 24\text{W}$$

**Question 19 (c)****Sample answer:**

12V across each lamp.

$\therefore$  if each lamp is identical then 2 Amperes will flow through each branch

$\therefore$  Power for 1 branch

$$P = V \times I$$

$$= 12 \times 2$$

$$= 24\text{W}$$

$\therefore$  Total power of circuit = 72W

**Question 20 (a)****Sample answer:**

- (i) Point A, Lamp 1 and Lamp 2 will both be bright  
Point B, Lamp 1 and Lamp 2 will be dim
- (ii) It will equal the supply voltage.
- (iii) Open circuit will lead to Zero amps across L1

**Question 20 (b)***Sample answer:*

$$\begin{aligned}R_T &= R_1 + R_2 + R_3 \\ &= 1\text{ k}\Omega + 500\ \Omega + 3.5\ \text{k}\Omega \\ &= 5\ \text{k}\Omega\end{aligned}$$

$$\begin{aligned}I_T &= \frac{V_T}{R_T} \\ &= \frac{24\text{V}}{5\text{k}\Omega} \\ &= 4.8\text{mA}\end{aligned}$$

$$\begin{aligned}V_{R1} &= I_T \times R_1 \\ &= 4.8\text{mA} \times 1\ \text{k}\Omega \\ &= 4.8\text{V}\end{aligned}$$

$$\begin{aligned}V_{R2} &= I_T \times R_2 \\ &= 4.8\text{mA} \times 500\ \Omega \\ &= 2.4\text{V}\end{aligned}$$

$$\begin{aligned}V_0 &= V_{R1} + V_{R2} \\ &= 4.8\text{V} + 2.4\text{V} \\ &= 7.2\text{V}\end{aligned}$$

**Section III****Question 21***Answers could include:*

- Reference to risk assessment
- Reference to hazard assessment
- Site hazards and obstacles
- OHS practices – tools, materials, PPE
- Signs – warning of work carried out
- Plan work or read off drawings
- Carry out work using correct procedures
- Completion of appropriate paperwork
- Truck arrival management
- Pedestrian and/or traffic management
- Trip hazards
- Trolleys, ramps, boards
- Management and storage of chemicals
- Liaison with workers/site office
- Barriers
- Testing and tagging of power tools
- Manual handling requirements
- Explanation of handling/heavy loads
- Team work
- Communication
- MSDS available

## Section IV

### Question 22 (a)

*Answers could include:*

- Mention that if solvent is flammable it would be stored in a metal fireproof cupboard
- Reference to and copy taken of material safety data sheet before handling
- Use appropriate PPE to handle solvent. These may include:
  - Gloves
  - Breathing apparatus
  - Protective clothing such as overall
  - Ventilated area to avoid fumes
- Transporting of solvent may also require special cabinet in vehicle or lockable container
- Reference again to MSDS for safe operating procedures when using solvent
- Check that first aid kit has initial treatment available in case of emergency
- Obtain name of cleaning solvent
- Check MSDS for handling and other safety instructions, advice – transport/usage/etc.
- Keys for storage area
- Locate and identify cleaning solvent
- Transport/handle in accordance with MSDS
- Disposal of rags etc used for cleaning?

### Question 22 (b)

*Answers could include:*

- References risk assessment
- References hazard assessment
- Considers safe work methods
- Site inspections
- Customer relations/Liaise with restaurant employees/management
- Timeframe when work could be carried out – outside restaurant business hours
- Isolation procedures/electrical and mechanical
- OHS practices: manual handling, ladder work harnesses required
- Processes of removing fan, using PPE and manual/power tools.
- Cleaning of fan using solvent. Use of PPE
- Proper disposal of waste after cleaning with rags, cloth or paper
- Barricades or signage
- Testing fan operation before reinstalling using megger and testing procedure

- Completion of appropriate paperwork
- Liaise with restaurant staff when job completed
- Advise Restaurant Manager of arrival and job details
- Locate manager to ensure OK to enter food prep area take relevant precautions re: cleanliness of tools, clothes etc.
- Isolate electricity supply – tag and test
- Remove fan
- Clean fan in an approved manner using solvent, ensuring correct use of PPE and containment of solvent and waste materials ie grease, solvent, rags etc.
- Ventilation/away from food prep
- Clean up any mess, correct disposal of waste
- Replace fan
- Remove tag, then test operation
- Advise manager
- Paperwork
- Leave site