

## Application of Health and Safety and Electrical Principles 2330-203

**Paper 203:** Application of health and safety and electrical principles

**Test duration:** 45 minutes (30 item multiple choice)

From the guidance given in the C&G 2330 syllabus, the actual GOLA examination is likely to be broken down as follows:

Unit	Outcome	No of questions
3	<b>Part 1</b>	
	1 Safe systems of working	10
	2 Using technical information	5
	<b>Part 2</b>	
	3 Electrical machines and a.c. theory	5
	4 Poly-phase systems	5
	5 Over-current, short circuit and earth fault protection	5

Therefore what follows is an examination for use as a 'progress' test with apprentices

There are 30 multi-choice questions that roughly address the content of the above C&G unit as indicated in the table above.

Following discussion with centres we have tried to follow a similar style to that experienced with GOLA.

Hopefully use of this mock examination will highlight areas of strength and weakness for each candidate.

## **Safe systems of working**

1. In order for fire to exist, three properties are needed. They are

- (a) fuel, heat and oxygen
- (b) fuel, heat and petrol
- (c) fuel, heat and CO<sub>2</sub>
- (d) fuel, heat and a vacuum

2. The definition of a risk is:

- (a) something that can cause harm
- (b) falsely claiming hours worked on a time sheet
- (c) the Regular Inspection of Site Cabins
- (d) the chance that someone will be harmed by a hazard

3. The Health and Safety at Work Act places a duty on employers to provide:

- (a) all employees with a copy of the company equal opportunities policy
- (b) suitable instruction, training and supervision to ensure health & safety
- (c) at least one apprentice for every qualified electrician working at height
- (d) a written Health & Safety policy if more than two people are employed

4. Trestle scaffolding that is higher than 2 metres must have:

- (a) toe boards and guard rails
- (b) vertical posts every 2 metres
- (c) scaffold boards of differing length and thickness
- (d) access at three separate points

5. When manually handling an object, it should be lifted:

- (a) smoothly with the body balanced and using the leg muscles
- (b) with the heaviest side furthest away from the body
- (c) by twisting, stretching and then using the arm muscles only
- (d) by making a jerk and snatch movement

6. At the end of each working day, rubbish and waste materials should be:

- (a) left on site for the cleaners
- (b) placed under any floor spaces or in the loft
- (c) safely removed and placed in suitable off site containers
- (d) distributed evenly around the site

7. Before working on a fluorescent lighting fitting in a domestic property, an electrician should:

- (a) safely isolate and lock off the supply
- (b) only use insulated step ladders
- (c) obtain a set of insulated tools
- (d) tell the house owner not to touch the switch

## Using technical information

8. When installing a new fire alarm system, the installing electrician should refer to:

- (a) manufacturers data and user instructions
- (b) HSE publications
- (c) job sheets and time sheets
- (d) reports and schedules

9. The person normally responsible for designing the appearance of a building will be the:

- (a) Quantity Surveyor
- (b) site manager
- (c) Clerk of Works
- (d) architect

10. To accurately carry out an electrical installation on site, an electrician must be:

- (a) qualified to design the installation
- (b) capable of using Gantt charts
- (c) able to interpret drawings and diagrams
- (d) qualified to the 15<sup>th</sup> Edition Wiring Regulations

11. On a scaled drawing 10 mm is shown as representing 1m. What scale is this:

- (a) 1:10
- (b) 1:100
- (c) 1:1000
- (d) 1:500

12. Which of the following would you NOT expect to find on an initial materials list:

- (a) labour quantities
- (b) cable quantities
- (c) lighting fitting quantities
- (d) types and quantity of fixings

13. An 'In situ' measurement means:

- (a) measurements taken from a photograph
- (b) measurements taken by a third party
- (c) measurement of actual dimensions on site
- (d) measurements provided by an external institute

14. When materials are delivered to site by a wholesaler, you should always:

- (a) record this action on your time sheet
- (b) check each item against the delivery note
- (c) immediately inform the architect
- (d) establish a site meeting

15. Your employer urgently requires a small, in colour wiring diagram to be sent from a manufacturer in Europe. This could normally be most easily achieved by the manufacturer:

- (a) contacting your employer on the telephone
- (b) sending your employer a CD or DVD
- (c) sending the wiring diagram by Air Mail
- (d) sending the diagram by e-mail

16. When explaining how their new domestic central heating controls work to the houseowner, you should:

- (a) let them know that this is not your responsibility
- (b) ensure that they understand the information
- (c) give them the instructions and tell them to read them
- (d) ask them to contact a qualified plumber

### Electrical machines and a.c. theory

17. In a fluorescent lighting fitting, the 'choke' should be more accurately referred to as an:

- (a) inductor
- (b) resistor
- (c) capacitor
- (d) armature

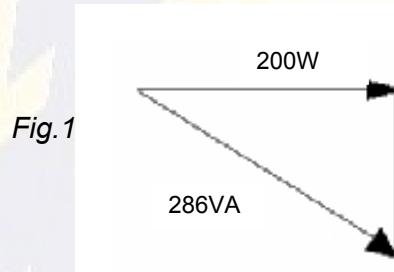
18. A transformer has a turns ratio of 2:7. If it is connected to a 230V supply, the output voltage will be:

- (a) 3220V
- (b) 8.05V
- (c) 65.7V
- (d) 805V

19. When a series circuit containing resistance and inductive reactance is connected to an a.c. supply, the current will:

- (a) be in phase with the voltage
- (b) lead the voltage
- (c) lag the voltage
- (d) oppose the voltage

20. Fig. 1 shows a phasor diagram representing the power and voltamperes measured in a circuit connected to an a.c. supply. The power factor of the circuit is:



- (a) 1.43
- (b) 0.9
- (c) 0.7
- (d) 0.8

21. Power factor correction in circuits that have lagging power factors can be achieved by connecting:

- (a) inductors across the load
- (b) resistors across the load
- (c) resistors in series with the load
- (d) capacitors across the load

## **Principles and operation of polyphase systems**

22. When electrical energy is distributed by an R.E.C., it normally arrives at the local sub-station as:

- (a) 400kV
- (b) 11kV
- (c) 230V
- (d) 132,000V

23. The relationship between the line voltage ( $V_L$ ) and phase voltage ( $V_P$ ) in a three phase delta connected system is shown by:

- (a)  $V_L = V_P$
- (b)  $V_L = 1.732 \times V_P$
- (c)  $V_P = 1.732 \times V_L$
- (d)  $V_P = \sqrt{3} \times V_L$

24. R.E.C.'s require load balancing as a condition of providing their electricity supply in order to:

- (a) reduce the cost of electricity
- (b) improve the system power factor
- (c) minimise cable and switchgear size
- (d) allow disconnection of the neutral conductor

## **Over current, short circuit and earth fault protection**

25. When a current occurs in a circuit that has no faults, but is now carrying a higher current than the design value due to overloaded machine, we refer to this as:

- (a) a short circuit current
- (b) an overload current
- (c) a high resistance fault
- (d) an open circuit fault

26. Which of the following is classed as an exposed conductive part:

- (a) a metal electric kettle
- (b) air conditioning ductwork
- (c) plumbing pipework
- (d) gas pipework

27. A factory installation has been designed with a series of protective devices between the incoming supply and final electrical outlets. The ideal being that when a fault occurs, only the device nearest the fault operates, thus avoiding disruption to other circuits. This arrangement of devices is called:

- (a) circuit co-ordination
- (b) fusing factor
- (c) discrimination
- (d) supplementary protection

28. A fuse is the weak link in a circuit that is designed to break if too much current flows. It's main priority is to protect:

- (a) any fixed appliances
- (b) the circuit conductors
- (c) the person using the equipment
- (d) any portable appliances

29. The risk of electric shock when using a lawnmower in domestic property, can be reduced by the use of a:

- (a) residual current device
- (b) re-wireable fuse
- (c) 230V a.c. supply
- (d) miniature circuit breaker

30. A good earth path should have

- (a) a low current flow
- (b) a high resistance
- (c) a high back emf
- (d) a low resistance