Principal Learning

Engineering

Unit **F548:** The engineered world

OCR Level 2 Principal Learning

Mark Scheme for June 2015

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

Question			Question/Answer	Mark	Guidance
1			**Name an engineer, and then talk about their engineering achievements.** Band 1 Limited explanation – award one mark for naming an engineer and up to a further two marks for giving details about their engineering achievements. Band 2 Adequate explanation – award one mark for naming an engineer and up to a further five marks for giving details in depth or breadth describing their engineering achievements. Band 3 Detailed explanation – award one mark for naming an engineer and up to a further nine marks for giving details in depth and breadth describing their engineering achievements. The assessment criteria 1.1 asks for one engineer to be named and an explanation of their achievements. The exemplification gives the names of over twenty engineers, so notes will be provided for Michael Faraday and his achievement. **Reference acknowledged:** http://web311.pavilion.net/SCfaraday.htm Engineer - Michael Faraday Born in London in 1791. After becoming interested in science, Faraday applied to Humphry Davy for a job. In 1813 Faraday became his temporary assistant and spent the next 18 months touring Europe while during Davy's investigations into his theory of volcanic action. Davy gave Faraday a valuable scientific education and also introduced him to important scientists in Europe. After Davy retired in 1827, Faraday replaced him as professor of chemistry at the Royal Institution. Faraday began to publish details of his research including condensation of gases, optical deceptions and the isolation of benzene from gas oils. Faraday's greatest contribution to science was in the field of electricity. In 1821 he began experimenting with electromagnetism and by demonstrating the conversion of electrical	Up to [3] Up to [6] Up to [10]	For **all** questions. For answers marked by level of response: **To determine the level –** Start at the highest level and work down until you reach the level that matches the answer **To determine the mark within this level,** refer to the chart in paragraph 10.

Question			Question/Answer	Mark	Guidance
			energy into motive force, invented the electric motor. In 1831 Faraday discovered the induction of electric currents and made the first dynamo. In 1837 he demonstrated that electrostatic force consists of a field of curved lines of force, and conceived a specific inductive capacity. This led to Faraday being able to develop his theories on light and gravitational systems. The government recognized his contribution to science by granting him a pension and giving him a house in Hampton Court. However, Faraday was unwilling to use his scientific knowledge to help military action and in 1853 refused to help develop poison gases to be used in the Crimean War. Michael Faraday died in 1867 Depth: Expansion of a single achievement. Breadth: Expansion involving multiple achievements. Lower end of mark band just meets criteria. Middle of mark band adequately meets criteria. Upper end of mark band convincingly meets criteria. **.....** **Please tell me about any issues, for example, economic, human or technical, which had to be overcome during the development of the engineering achievements you have researched.**		
2			Band 1 Limited explanation – award one mark for identifying a single issue and up to a further two marks for relevant points.	Up to [3]	
			Band 2 Adequate explanation – award up to six marks for a response that considers at least two issues in depth or breadth.	Up to [6]	
			Band 3 Detailed explanation – award up to six marks for a response that considers at least two issues and up to a further four marks for including logical and relevant supporting evidence that demonstrates both depth and breadth.	Up to [10]	

Question			Question/Answer	Mark	Guidance
			Depth: Expansion of a single issue. Breadth: Expansion covering multiple issues. Lower end of mark band just meets criteria. Middle of mark band adequately meets criteria. Upper end of mark band convincingly meets criteria.		
3			**Please explain what is meant by the "Energy and Utility Sector" giving examples of its purpose and contribution to the engineering industry**		
			Band 1 Limited information – award up to three marks for a basic explanation, of what is meant by the "Energy and Utility Sector".	Up to [3]	
			Band 2 Adequate information – award up to six marks for an adequate explanation, of what is meant by the "Energy and Utility Sector" giving at least one example of its purpose and contribution to the engineering industry.	Up to [6]	
			Band 3 Detailed information – award up to ten marks for a detailed explanation, of what is meant by the "Energy and Utility Sector" giving several examples of its purpose and contribution to the engineering industry.	Up to [10]	
			Energy & Utility Skills (EU Skills) is one of twenty five Sector Skills Councils licensed by the UK Commission for Employment and Skills. It is an employer led body covering the sectors of gas, power, and waste management and water industries. Its main aim is to identify the skills needs of employers in its sector. Lower end of mark band just meets criteria. Middle of mark band adequately meets criteria. Upper end of mark band convincingly meets criteria.		

Question			Question/Answer	Mark	Guidance
4			**Describe the job role and responsibilities of a craft person OR a professional managerial person within any engineering sector you have studied** Band 1 Limited information – award up to three marks for a basic description of the job role and responsibilities of a craft person OR a managerial person within an engineering sector. Band 2 Adequate information – award up to six marks for an adequate description in breadth or depth, of the job role and responsibilities of a craft person OR a managerial person within an engineering sector. Band 3 Detailed information – award up to ten marks for a detailed description in breadth and depth, of the job role and responsibilities of a craft person OR a managerial person within an engineering sector. Depth: Focussing on a single job role/responsibilities. Breadth: Focussing on jobs in a single sector or, a single job in more than one sector. A craftsman or artisan is a skilled manual worker who makes items that may be functional or strictly decorative. Managerial responsibilities: Supervise and manage the overall performance of staff in the department. Analyzing, reporting, giving recommendations and developing strategies on how to improve quality and quantity. Achieve business and organization goals, visions and objectives. Involved in employee selection, career development, succession planning and periodic training. Working out compensations and rewards. Responsible for the growth and increase in the organizations' finances and earnings. Identifying problems, creating choices and providing alternatives courses of actions. Lower end of mark band just meets criteria. Middle of mark band adequately meets criteria. Upper end of mark band convincingly meets criteria.	Up to [3] Up to [6] Up to [10]	

Question			Question/Answer	Mark	Guidance
5			**Please explain, giving examples, the difference between a renewable resource and a non-renewable resource** Band 1 Limited explanation – award up to three marks for a brief explanation of the difference between a renewable resource and a non-renewable resource. Band 2 Adequate explanation – award up to six marks for an adequate explanation of the difference between a renewable resource and a non-renewable resource which includes relevant examples. Band 3 Detailed explanation – award up to ten marks for a detailed explanation of the difference between a renewable resource and a non-renewable resource which includes logical and relevant supporting examples. A **renewable resource** is a natural **resource** which can replenish with the passage of time, either through biological reproduction or other naturally recurring processes. Eg. Sun/Wind/Geothermal/Biomass/Water/Oxygen/Timber/Fruit and vegetables /Meat from animals. A non-renewable resource is a natural resource which cannot be reproduced, grown, generated, or used on a scale which can sustain its consumption rate; once depleted there will be no more available for future use. Eg. Fossil fuels such as coal, petroleum, and natural gas, nuclear power (uranium). Metal ores are prime examples of non-renewable resources. Lower end of mark band just meets criteria. Middle of mark band adequately meets criteria. Upper end of mark band convincingly meets criteria.	Up to [3] Up to [6] Up to [10]	

Question			Question/Answer	Mark	Guidance
6			**What can you tell Wendy about her employer responsibilities and her responsibilities as an employee, with regard to health and safety** Band 1 Limited explanation – award up to three marks for a basic explanation of the rights of an employer and the rights of an employee. Band 2 Adequate explanation – award up to four marks for an adequate explanation of the rights of an employer and the rights of an employee. Award up to two marks for a clear reference to health and safety. Band 3 Detailed explanation – award up to six marks for a detailed explanation of the rights of an employer and the rights of an employee. Award up to four marks for clear references to the Health & Safety at Work Act. Employee should: Make them-selves familiar with and adhere to safety procedures, including the fire alarm procedure and the evacuation routes. Report all accidents/incidents to a manager/supervisor and carry out health and safety instructions given to them by the manager/supervisor. Report any dangerous equipment, situations, or practices at work that we become aware of. Co-operate with the company at all times on matters of health and safety Employers should: Employers are expected to abide by a range of requirements governing such aspects as providing safe machinery and equipment, carrying out regular health and safety checks, ensuring the training of employees in health and safety issues, and carrying out a risk assessment to assess the dangers of particular work activities. There are also specific regulations about the way in which potentially harmful substances should be used and stored. There are a number of requirements about the minimum temperature at work, and other aspects of working conditions. Lower end of mark band just meets criteria. Middle of mark band adequately meets criteria. Upper end of mark band convincingly meets criteria.	Up to [3] Up to [6] Up to [10]	

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