Rewarding Learning

Science: Double Award (Modular)

Forces and Energy

End of Module Test

C Foundation Tier

[GDC01]

FRIDAY 25 FEBRUARY 2011, MORNING

MARK SCHEME

1 **(i)** Sound [1]

   (ii) Chemical [1]   Heat [1] [2]

   (iii) Chemical [1]   Light [1] [2]   5

2 **(a)** Any **two** from HEP, tidal, wave [2]

   (b) **(i)** Geothermal [1]

      (ii) Wind [1]

   (c) **(i)** More efficient use (of fuels) or use more renewable
            sources or use less coal, e.g. [1]

      (ii) Renewable [1]   6

3 **(i)** 2640 (m) [1]

   (ii) Average speed $= \dfrac{\text{distance}}{\text{time}}$ [1]

                   $= \dfrac{2640}{1200}$ [1]   ecf from **(i)**

                   $= 2.2$ (m/s) [1] [3]   4

   Allow ecf from part **(i)**

4 **(a)** Moment $=$ force $\times$ distance to pivot [1]
                    $= 8 \times 30$ [1]
                    $= 240$ (Ncm) [1] [3]

   (b) Anticlockwise [1]   4

5 **(a)** 200 (N) [1]

   (b) 4 [1]

   (c) Newtonmeter [1]   3

6 **(a)** **(i)** "is equal to" [1]

      (ii) Friction or air resistance [1]

   (b) Accelerates or speeds up [1]   3

AVAILABLE MARKS

7 **(a)** 9 cm = 3 N [1]   3 N = 9 cm [1]
1 cm = $\frac{1}{3}$ N [1]   **or**   1 N = 3 cm [1]
21 cm = 7 N [1]   7 N = 21 cm [1]   [3]

(b) **Permanently** deformed   [1]   4

8 **(a)** Black surfaces are better [1] absorbers of heat [1]   [2]

(b) Poor radiators of **heat** [1] or reflects **heat** back in [1]   [1]   3

9 P = F/A **or** equivalent [1]

$= \frac{650}{0.6}$ [1]

= 1 300 [1]   N/m^2 **or** Pa [1]   [4]   4

10 (a) Contravenes the Law of C of E   [1]

(b) Efficiency $= \dfrac{\text{Useful output energy}}{\text{Input energy}}$ [1]

$= \dfrac{240}{600}$ [1]

= 0.4 **or** 40% [1]   [3]   4

11 (a) WD = F × d [1]

= 720 × 20 [1]

= 14 400 (J) [1]   [3]

(b) P $= \dfrac{\text{WD}}{\text{time}}$ [1]

$= \dfrac{14\,400}{24}$ [1]   ecf from **(a)**

= 600 (W) [1]   [3]   6

12 (a) Tension/centripetal force   [1]

(b) Momentum = Mass × Velocity [1]

= 2.5 × 8 [1]

= 20 (kg m/s) [1]   [3]   4

Total   **50**