Name of the Student:_____
Max. Marks : 19 Marks **Time : 19 Minutes**

Mark Schemes

Q1.

(a) g.p.e. = mass × gravitational field strength × height

accept $E_p = mgh$

1

(b) $E_p = 50 \times 9.8 \times 20$

1

9800 (J)

*allow 9800 (J) with no working shown for **2** marks*
answer may also be correctly calculated using W = Fs
*ie allow W = 490 × 20 for **1** mark*
*or answer of 9800 (J) using this method for **2** marks*

1

(c) 7840 (J)

allow ecf from '11.2'

1

(d) $7840 = ½ \times 50 \times v^2$

1

$v = \sqrt{\frac{7840}{1/2 \times 50}}$

allow $v^2 = \frac{7840}{(1/2 \times 50)}$ *for this point*

1

17.7(0875) (m / s)

1

18 (m / s)

*allow ecf from '11.3' correctly calculated for **3** marks*
*allow 18 (m / s) with no working for **2** marks*
answer may also be correctly calculated using $v^2 – u^2 = 2as$

1

(e) extension = 35 (m) and conversion of 24.5 kJ to 24500 J

1

$24\ 500 = ½ \times k \times 35^2$

1

40

*allow 40 with no working shown for **3** marks*
*an answer of '16.2' gains **2** marks*

1

[11]

Q2.

(a) any **two** from:

- cost per kWh is lower (than all other energy resources)
  allow it is cheaper
  ignore fuel cost
  ignore energy released per kg of nuclear fuel

- infrastructure for nuclear power already exists
  accept cost of setting up renewable energy resources is high
  accept many renewable power stations would be needed to replace one nuclear power station
  accept (France in 2011 already had a) surplus of nuclear energy, so less need to develop more renewable capacity for increased demand in the future
  accept France benefits economically from selling electricity

- more reliable (than renewable energy resources)
  accept (nuclear) fuel is readily available
  ignore destruction of habitats for renewables

2

(b) any **two** from:

- non-renewable
  allow nuclear fuel is running out

- high decommissioning costs
  accept high commissioning costs

- produces radioactive / nuclear waste
  allow waste has a long half-life

- long start-up time

- nuclear accidents have widespread implications
  allow for nuclear accident a named nuclear accident
  eg Fukushima, Chernobyl
  ignore visual pollution

2

(c) 0.48 (kW)
*allow **1** mark for correct substitution*
ie 0.15 = P / 3.2
*an answer of 480 W gains **2** marks*
*an answer of 48 or 480 scores **1** mark*

2

(d) the higher the efficiency, the higher the cost (per m^2 to manufacture)

accept a specific numerical example

1

more electricity could be generated for the same (manufacturing) cost using lower efficiency solar panels

or

(reducing the cost) allows more solar panels to be bought

accept a specific numerical example

1

[8]