Marking scheme

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| **SECTION A** | | |
| 1 | MSR = 6.90cm  VSR = 0.04cm  = (6.90+ 0.04) cm  Actual width = 6.94cm-0.06  = 6.58cm | 2 marks |
| 2 | It prevents the return of the mercury to the bulb when the thermometer is removed from the body to the surrounding | 1mark |
| 3 | Pressure = Press. Due to atm. + press. due to liquid column  = (76+50) cmHg  = 126cmHg OR 1260mmHg | 3 marks |
| 4 | Power = work done = mgh  Time Time    Power = 50x 10x 4  4  Power = 500W | 2 marks |
| 5 | i) Dynamo | 1 mark |
| ii) Solar panel | 1 mark |
| 6 | V = 5 = 250 cm/s  0.02  U = 2 = 100m/s  0.02  a= v-u  t  a = 250-100  0.06  a = 2500cm/s² or 25cm/s² | 3 marks |
| 7 | Reading =1.35 A | 1mark |
| 8 | 30 x 20 + 10 x 2 = 30 x +10W  600 + 20 =30X +200  620 = 30X +200  X = 14N | 3MKS |
| 9 | -200 + 273=**73K**  Working must not be shown | 1 marks |
| 10 | e = F  e =30  2X3  e =5cm | 3marks |
| 11 | Standing passengers raise the center of gravity making the bus unstable |  |
| 12 | Mercury has a higher density than water  Mercury does not stick on walls of the glass | 2mks |

**SECTION B**

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| 13 | (a) | Efficiency is the ratio of work done on the load(work output) to the work done by the effort(work input) expressed as a percentage | 1mk |
|  | (b) | (i) MA = L  E  MA= 150  50  = 3 | 2mks |
|  |  | (ii) VR = 2πR  2πr  VR = 2π x 6.5  2 π 1.5  = 4.333 | 2mks |
|  |  | (iii) efficiency = MA X100  VR  (iii) efficiency = 3 x100  4.333  = 69.23% | 2mks |
|  |  | (iv) the friction between the moving parts | 1mk |
|  | (c) | The sum of kinetic energy and potential energy of a system is constant  **Or**  Energy can neither be created nor destroyed but can only be changed from one form to another | 1mk |
| **09marks** |
| 14 | (a) | The bodies undergo deformation  OR  Some of the energy is transformed to heat, sound or light | 1mk |
|  | (b) | M1v1 +m2v2 = v(m1 +m2)  30000x20 + 10000x0 = v(30000 + 10000)  600000 = v(40000)  V = 15m/s | 3mks |
|  | (c) | (i) hmax = u²  g  hmax = 30²  10  = 90m | 2mks |
|  |  | (ii) T = 2u  g  T = 2x30  10  = 6s | 2mks |
|  | (d) | Fr = µR  Fr = 0.03x5x10  =1.5N  Resultant force= 10-1.5  = 8.5N  F = ma  8.5 = 5a  α = 1.7m/s² | 3mks   |  | | --- | |  | |
| **11mks** |
| 15 | (a) | For a helical spring or any other elastic material, extension is directly proportional to the stretching force provided the elastic limit is not exceeded | 1mk |
|  | (b) | (i) work done = area under the graph  Work done = 1 Fe  2  Work done = 1x6x0.06  2  =0.18j | 3mks |
|  |  | (ii) spring constant = gradient of the graph  = force  Extension  = 6 - 0  0.06 - 0  = 100N/m | 3mks |
|  |  | (iii) - Nature of the material of the spring  Thickness of the wire of the spring  The diameter of the spring  The number of turns per unit length | 2mks |
| 16 | (a) | There is low atmospheric pressure hence the ink pressure in the pen is higher, forcing the ink out | 1mk |
|  | (b) | (i) p = force  Area  p = 120  0.006  p = 20000 pa | 2mks |
|  |  | (ii) 20000 = F  0.5  Load = 10000N | 2mks |
|  |  | (iii) – Oil is incompressible  The oil does not corrode the parts the machine  Have a high boiling point and a low freezing point | 2mks |
|  | (c) | Pressure due to air column = Pressure difference  haęag = hmęmg  ha = hmęm  ęa  ha = 0.1x13600  1.25  = 1088m | 3mks |
| **10mks** |
| 17 | (a) | Streamline flow is a flow in which all particles of the fluid at a point in a tube of flow are travelling at the same velocity and same direction while turbulent flow is a flow in which particles at a point move with different speeds and in different direction. | **2 mks** |
|  | b | The papers move away from each other, the fast moving area reduces the pressure; the atmospheric pressure in between the papers pushes them apart | **2 mks** |
|  | c | A1v1 = A2 V2  0.056 X 2.5  A1 = 0.6  = 0.2.233cm² | **3mks** |
|  | d | Provided the fluid is non - viscous, incompressible and flowing steadily, an increase in speed of the fluid produces a corresponding decrease in pressure. | **1 mks** |
|  | e | 1. the fluid in incompressible  2. the fluid is non - viscous  3. the flow is streamlined  Any 2 x 1 | **2mks** |
| **10 marks** |
| 18 | a | For a system in equilibrium, the sum of clockwise moments must be equal to the sum of ant - clockwise moments at a point of support. |  |
|  | b | i) w = 0.03 x 0.005 x 2700 x 10  W = 4.05N | **2mks** |
| ii) Sum of clockwise moments - sum of the anticlockwise moments  20x F = 15x 4.05  F = 3.0375 N | **3mks** |
| **06 marks** |