**UNIVERSITY OF KWAZULU-NATAL**

**Information & Communications Technology MCQ Answer Sheet**

| STUDENT NUMBER | SURNAME | INITIALS |
|---|---|---|
| 215394103 | CELE | PK |

GRADE

DATE: MONTH / DAY / YEAR

**ADDITIONAL DATA**

Please do not mark outside this box

COURSE

TEST

DATE

YOUR NAME

SEAT NUMBER

SPECIAL CODES: A B C D E F G H I J

**INSTRUCTIONS**

- Use HB Pencil ONLY
- Mark dark heavy mark that fill the block completely
- Erase unwanted marks cleanly
- Make no stray marks on this answer sheet

Correct Mark

Incorrect Marks

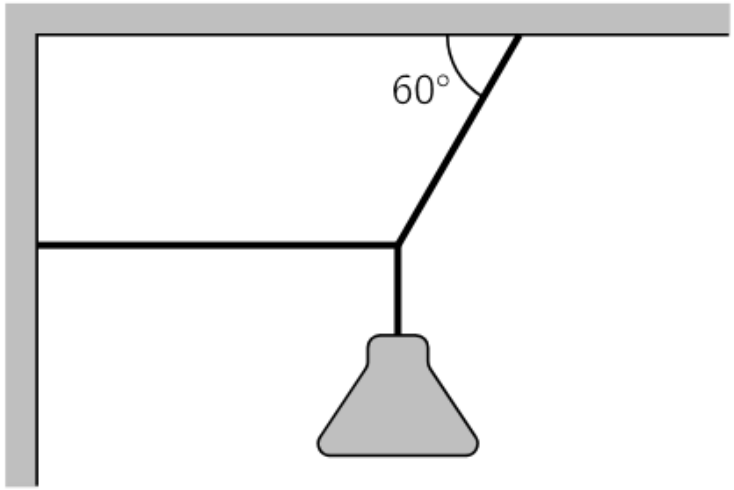
| | T | F | | | | T | F | | | | T | F | | | | T | F | | | | T | F | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | 11 | | | | | 21 | | | | | 31 | | | | | 41 | | | | | |
| 2 | | | | | 12 | | | | | 22 | | | | | 32 | | | | | 42 | | | | | |
| 3 | | | | | 13 | | | | | 23 | | | | | 33 | | | | | 43 | | | | | |
| 4 | | | | | 14 | | | | | 24 | | | | | 34 | | | | | 44 | | | | | |
| 5 | | | | | 15 | | | | | 25 | | | | | 35 | | | | | 45 | | | | | |
| 6 | | | | | 16 | | | | | 26 | | | | | 36 | | | | | 46 | | | | | |
| 7 | | | | | 17 | | | | | 27 | | | | | 37 | | | | | 47 | | | | | |
| 8 | | | | | 18 | | | | | 28 | | | | | 38 | | | | | 48 | | | | | |
| 9 | | | | | 19 | | | | | 29 | | | | | 39 | | | | | 49 | | | | | |
| 10 | | | | | 20 | | | | | 30 | | | | | 40 | | | | | 50 | | | | | |
| | T | F | | | | T | F | | | | T | F | | | | T | F | | | | T | F | | | |
| 51 | | | | | 61 | | | | | 71 | | | | | 81 | | | | | 91 | | | | | |
| 52 | | | | | 62 | | | | | 72 | | | | | 82 | | | | | 92 | | | | | |
| 53 | | | | | 63 | | | | | 73 | | | | | 83 | | | | | 93 | | | | | |
| 54 | | | | | 64 | | | | | 74 | | | | | 84 | | | | | 94 | | | | | |
| 55 | | | | | 65 | | | | | 75 | | | | | 85 | | | | | 95 | | | | | |
| 56 | | | | | 66 | | | | | 76 | | | | | 86 | | | | | 96 | | | | | |
| 57 | | | | | 67 | | | | | 77 | | | | | 87 | | | | | 97 | | | | | |
| 58 | | | | | 68 | | | | | 78 | | | | | 88 | | | | | 98 | | | | | |
| 59 | | | | | 69 | | | | | 79 | | | | | 89 | | | | | 99 | | | | | |
| 60 | | | | | 70 | | | | | 80 | | | | | 90 | | | | | 100 | | | | | |
| | T | F | | | | T | F | | | | T | F | | | | T | F | | | | T | F | | | |
| 101 | | | | | 111 | | | | | 121 | | | | | 131 | | | | | 141 | | | | | |
| 102 | | | | | 112 | | | | | 122 | | | | | 132 | | | | | 142 | | | | | |
| 103 | | | | | 113 | | | | | 123 | | | | | 133 | | | | | 143 | | | | | |
| 104 | | | | | 114 | | | | | 124 | | | | | 134 | | | | | 144 | | | | | |
| 105 | | | | | 115 | | | | | 125 | | | | | 135 | | | | | 145 | | | | | |
| 106 | | | | | 116 | | | | | 126 | | | | | 136 | | | | | 146 | | | | | |
| 107 | | | | | 117 | | | | | 127 | | | | | 137 | | | | | 147 | | | | | |
| 108 | | | | | 118 | | | | | 128 | | | | | 138 | | | | | 148 | | | | | |
| 109 | | | | | 119 | | | | | 129 | | | | | 139 | | | | | 149 | | | | | |
| 110 | | | | | 120 | | | | | 130 | | | | | 140 | | | | | 150 | | | | | |
| | T | F | | | | T | F | | | | T | F | | | | T | F | | | | T | F | | | |
| 151 | | | | | 161 | | | | | 171 | | | | | 181 | | | | | 191 | | | | | |
| 152 | | | | | 162 | | | | | 172 | | | | | 182 | | | | | 192 | | | | | |
| 153 | | | | | 163 | | | | | 173 | | | | | 183 | | | | | 193 | | | | | |
| 154 | | | | | 164 | | | | | 174 | | | | | 184 | | | | | 194 | | | | | |
| 155 | | | | | 165 | | | | | 175 | | | | | 185 | | | | | 195 | | | | | |
| 156 | | | | | 166 | | | | | 176 | | | | | 186 | | | | | 196 | | | | | |
| 157 | | | | | 167 | | | | | 177 | | | | | 187 | | | | | 197 | | | | | |
| 158 | | | | | 168 | | | | | 178 | | | | | 188 | | | | | 198 | | | | | |
| 159 | | | | | 169 | | | | | 179 | | | | | 189 | | | | | 199 | | | | | |
| 160 | | | | | 170 | | | | | 180 | | | | | 190 | | | | | 200 | | | | | |

designed & printed by CSX 011 663-9300 **CSX308** **09/2013** 100gsm

# Application of Newton’s laws-Equilibrium application

**Example 3.6: Tension in a cord, one dimension (equilibrium case)**
A lamp is suspended from the ceiling by a cord. If the lamp has a mass of 5 kg, determine the tension in the cord.

**Example 3.7: Tension in a cord, two dimensions (equilibrium case)**
A lamp is suspended by three cords as depicted in the diagram below. The cord attached to the ceiling makes an angle of 60° with the ceiling and the cord attached to the wall is stretched horizontally. If the lamp has a mass of 5 kg, determine the tensions in the cords.



# Application of Newton's laws: Non-Equilibrium application

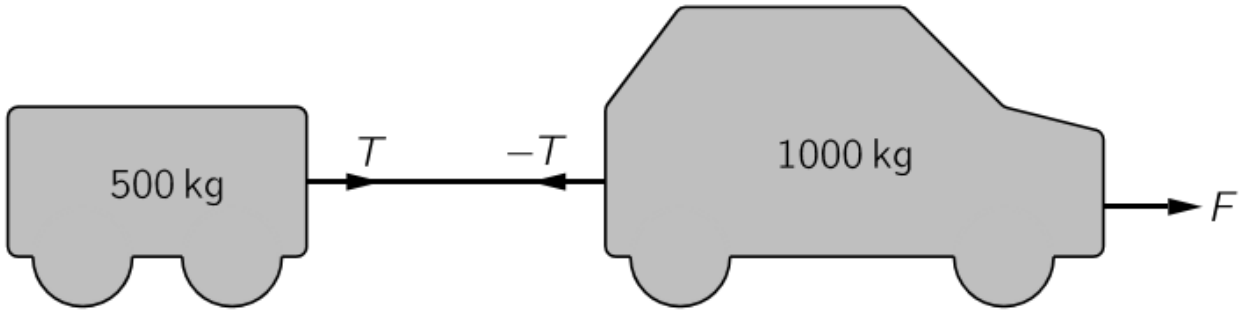
When an object is not in equilibrium, there are unbalanced forces acting on the object and hence the net force is not zero. The approach to solving non-equilibrium problems is almost identical to the approach used to treat equilibrium problems. Instead of equating the net force to zero, we must use Newton's second law. Thus for an accelerating object in two dimensions

$$\sum F_x = ma_x$$

$$\sum F_y = ma_y$$

**Example 3.8: The tension in a rope (non-equilibrium)**

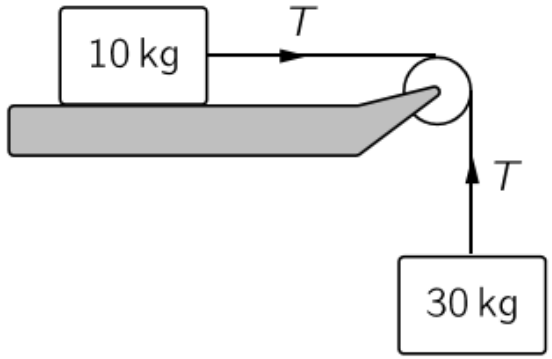
Suppose the magnitude of the net force accelerating a car and trailer is F = 3000 N. The mass of the car is 1000 kg and the mass of the trailer is 500 kg. Determine the acceleration of the car and trailer, and the tension in the rope. Assume the mass of the rope is negligible.



# Application of Newton's laws: Non-Equilibrium application

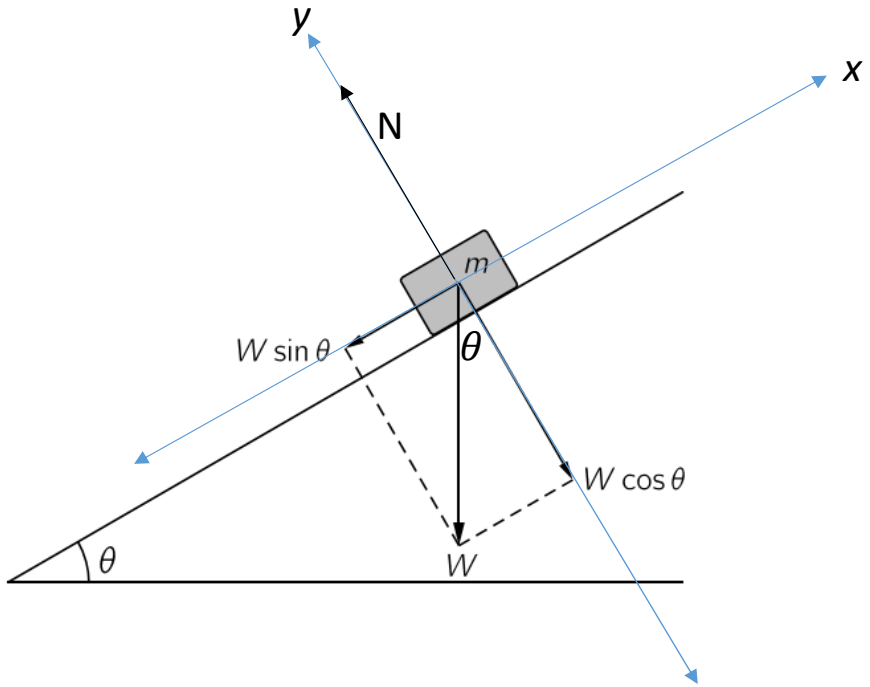
**Example 3.9: Objects connected by a rope**

A block of mass 10 kg on a table is attached to a block of mass 30 kg by a rope passing over a pulley as shown in the diagram alongside. Ignoring all frictional effects and assuming the pulley to be massless, find (a) the acceleration of the two blocks and (b) the tension in the cord. (Take g = 10 $ms^{-2}$.)



# Motion on a smooth inclined plane

When a block of mass $m$ is placed on a smooth frictionless inclined plane, as shown in the figure below, the block will be accelerated down the plane. Let us consider a coordinate system such that the x-axis is along the plane and the y-axis is along the normal. The weight of the block is now at an angle $\theta$ with the negative y-axis, Thus it has two components, one perpendicular to the plane, called $W_{\perp} = Wcos\theta$ and another one is parallel to the plane, called $W_{||} = Wsin\theta$. The block is not moving along the y-axis meaning the $\sum F_y = 0$ i.e. $N = W_{\perp} = Wcos\theta$. Thus the force that accelerates the block downward is $W_{||}$.



# Motion on a smooth inclined plane

**Example 3.10: Motion on an inclined plane**

Show that the acceleration of a sliding body down a frictionless plane is independent of the mass of the body. If the plane in inclined at an angle of $40^{o}$ and $80^{o}$, determine the acceleration of the body.