

Post Evaluation Mechanical Challenge 2005



Directions For Numbers 101- 125 : Read each of the following multiple-choice items and the possible answers carefully. Mark the letter of the correct answer on your answer sheet or as instructed by your teacher. Remember: Make no marks on this test.

101



Fig.MC07.02

Pulleys A and B are connected with a belt. Pulley A has two times the circumference of B. (see Fig.MC07.02) If A turns 5 times, how many times will B turn?

- A 2.5
- B 5
- C 10
- D 20

102

As long as we have movement in a device, there is a need for

- A Machines
- B Wind
- C Electricity
- D Friction

103

Which step of the DEAL design process is a student performing when making repairs and modifications to a completed project?

- A Define
- B Explore
- C Act
- D Look back

104

Which step of the DEAL design process is a student performing reading the Mechanical Challenge rules?

- A Define
- B Explore
- C Act
- D Look back

105

Which statement is the **MOST** accurate in describing the current state of mechanical devices in our society?

- A Present but less visible
- B Quickly disappearing
- C All but gone in our digital world
- D Antiques of the past

106

When attempting to loosen a lug nut on an automobile wheel, increasing the length of the lug wrench will:

- A Increase friction applied.
- B Decrease friction applied.
- C Make it harder to loosen the nut
- D Make it easier to loosen the nut

107

Which simple machine transmits the force used to activate a front wheel brake on a bicycle?

- A Wheel and axle
- B Lever
- C Wedge
- D Pulley

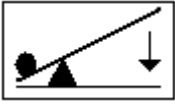
Post Evaluation Mechanical Challenge 2005

- 108** Which device would use the **MOST** simple machines?
- A Shovel
 - B Butter knife
 - C Bicycle
 - D Scissors
- 109** Early stone tools such as a flint knife are examples of which type of machine?
- A Complex
 - B Compound
 - C Simple
 - D Not a machine
- 110** If the input of a pulley is to pull the rope, then the lifted object would be called the:
- A Effort force.
 - B Potential energy.
 - C Output.
 - D Kinetic energy.
- 111** The steering wheel of a car is an example of what type of simple machine?
- A Screw
 - B Wheel and Axle
 - C Pulley
 - D Robot
- 112** The enemies of all machines are?
- A Friction and heat
 - B Gravity and time
 - C Light and heat
 - D Friction and gravity
- 113** In 1908 Henry Ford invented the?
- A First automobile
 - B First internal combustion engine
 - C First production line
 - D the Thunder Bird automobile
- 114** The accurate calculation of longitude was accomplished in 1764 using which device?
- A Lunar telescope
 - B Nautical Sextant
 - C Transit
 - D Mechanical clock
- 115** Which activities are considered part of the “Act” step in the DEAL design process?
- A Brainstorming
 - B Making a final sketch
 - C Measuring and drilling holes
 - D Reviewing the design a year later
- 116** Which is considered a prototype?
- A A sketch of the model
 - B A working cardboard model
 - C A finished Mechanical Challenge device
 - D A photograph of the device

Post Evaluation Mechanical Challenge 2005

117 Which fulcrum placement requires the **LEAST** effort force to lift the round load?

A



B



C



D



118 Which fulcrum placement would lift the round load the **GREATEST** distance?

A



B



C



D



119 A ramp is used to load a truck. Which action would result in requiring less effort?

A Increasing its length

B Decreasing its length

C Increasing the ramp width

D Decreasing the ramp width

120 Which are simple machines?

A Lever, pulley, wedge

B Inclined plane, lever, computer

C Wheel and axle, pulley, robot

D Screw, computer, robot

121 How many simple machines are there?

A 2

B 4

C 6

D 8

122 Using a lever you are able to lift a 45 lb block with only 15 lbs of effort force. What is the mechanical advantage of the lever?

A 0.3

B 1.3

C 3

D 30

123 Using the formula $\text{Work} = \text{Force} * \text{Distance}$, how much work is needed to lift a 40 lb weight 5 feet into the air?

A 8

B 20

C 200

D 2,000

Post Evaluation Mechanical Challenge 2005

124 A Block and Tackle has a mechanical advantage of 4. To lift a motor that weighs 40 lbs, how much effort force is required?

- A 10
- B 25
- C 40
- D 160

125

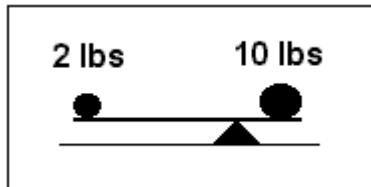


Fig.MC07.01

Using the formula, Mechanical Advantage = Resistant Force / Effort Force, what is the mechanical advantage of the lever in Fig.MC07.01

- A 2
- B 5
- C 10
- D 20

Post Evaluation Mechanical Challenge 2005

?	⊙	Answer/ Scale	Objective	?	⊙	Answer/ Scale	Objective
101	101	C	MC07.01 Math	114	114	D	MC07.03 Technology
102	102	A	MC07.03 Technology	115	115	C	MC07.03 Technology
103	103	D	MC07.03 Technology	116	116	B	MC07.03 Technology
104	104	A	MC07.03 Technology	117	117	A	MC07.02 Science
105	105	A	MC07.03 Technology	118	118	D	MC07.02 Science
106	106	D	MC07.03 Technology	119	119	A	MC07.02 Science
107	107	B	MC07.03 Technology	120	120	A	MC07.02 Science
108	108	C	MC07.03 Technology	121	121	C	MC07.02 Science
109	109	C	MC07.03 Technology	122	122	C	MC07.01 Math
110	110	C	MC07.03 Technology	123	123	C	MC07.01 Math
111	111	B	MC07.03 Technology	124	124	A	MC07.01 Math
112	112	D	MC07.03 Technology	125	125	B	MC07.01 Math
113	113	C	MC07.03 Technology				

Minimum points
required to achieve
mastery category

Total questions on test: 25

Objectives measured: 3	Items	Points	●	◐	Questions measuring this objective
MC07.01 Math	5	5	4	3	101 122 123 124 125
MC07.03 Technology	15	15	11	10	102 103 104 105 106 107 108 109 110 111 112
MC07.03 Technology					113 114 115 116
MC07.02 Science	5	5	4	3	117 118 119 120 121
Totals		25	19	16	

MC07

? = Test Question Number ⊙ = line on GP Form

Post Evaluation Mechanical Challenge 2005

Items used in test

?	Item name	?	Item name	?	Item name
101	MC07.01.00.06	110	MC07.03.00.15	118	MC07.02.00.03
102	MC07.03.00.05	111	MC07.03.00.02	119	MC07.02.00.05
103	MC07.03.00.09	112	MC07.03.00.04	120	MC07.02.00.01
104	MC07.03.00.10	113	MC07.03.00.08	121	MC07.02.00.04
105	MC07.03.00.01	114	MC07.03.00.06	122	MC07.01.00.02
106	MC07.03.00.14	115	MC07.03.00.12	123	MC07.01.00.03
107	MC07.03.00.07	116	MC07.03.00.11	124	MC07.01.00.01
108	MC07.03.00.13	117	MC07.02.00.02	125	MC07.01.00.04
109	MC07.03.00.03				

MC07

? = Test Question Number ● = line on GP Form