Homework for VG 100 Summer 2017

Name: Student No: Grade:

Technical Communication Part (60 pts)

1. Please choose the correct answer for the following questions and provide your answer in the bracket (**Giving the answer outside the bracket will NOT be accepted**). Some question may have multiple answers. **(16 points, 2 points each)**

1) Which of the following activities are unsafe in the lab? [ ]

A. Sit while operating machines
B. Try to stop machines with your hands
C. Wear sandals or flip flops in the lab
D. Use approved UV welding helmets/glasses when welding
E. Drink in an electrical lab

2) Which of the following actuators may have a leakage issue? [ ]

A. DC motors
B. AC motors
C. Pneumatic motors
D. Piezoelectric actuators
E. Hydraulic actuators

3) Which of the following are active range sensors? [ ]

A. Compass
B. Optical encoders
C. Gyroscopes
D. Ultrasonic sensors
E. Laser rangefinders

4) What is the main function of the Enable pin on L298N motor driver? [ ]

A. Control the direction of the motor
B. Write a HIGH or a LOW to pin on Arduino
C. Assign digital signals to Arduino
D. Control the output voltage
E. Adjust the spin velocity of the motor

5) Which is the correct way to write a HIGH voltage to pin 8? [ ]

A. digitalWrite(8, HIGH)
B. Digitalwrite(8, HIGH)
C. analogWrite(8, 255)
D. Analogwrite(8, 255)
E. analogWrite(8, HIGH)

6) Which of the following descriptions of error are correct? [ ]

A. Describe difference between the measured value and the true value
B. Describe the lack of accuracy
C. Describe the lack of precision
D. Random errors are produced by recurring courses
E. Errors are inevitable

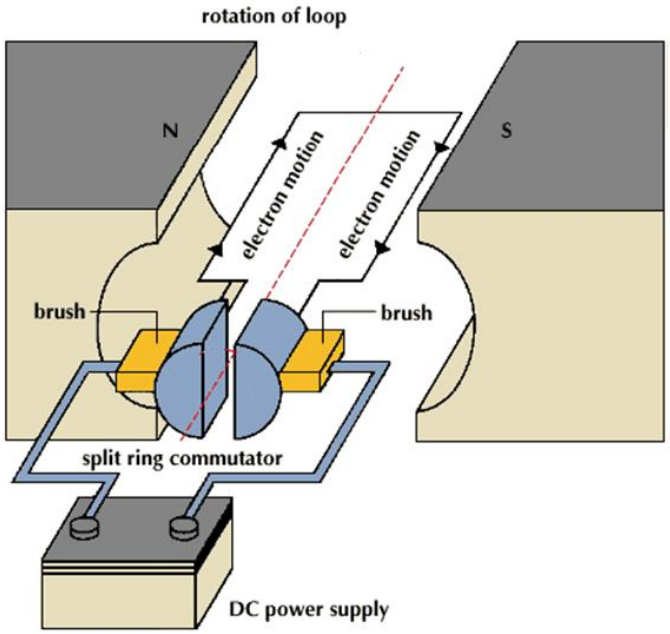
7) Which of the following statements are true for the Gaussian distribution? [ ]

A. All the Gaussian distributions are symmetric
B. The range extends from negative infinity to positive infinity
C. The distribution curve may have a negative value
D. The distribution has an analytic expression
E. The area between the distribution curve and the x-axis is 1

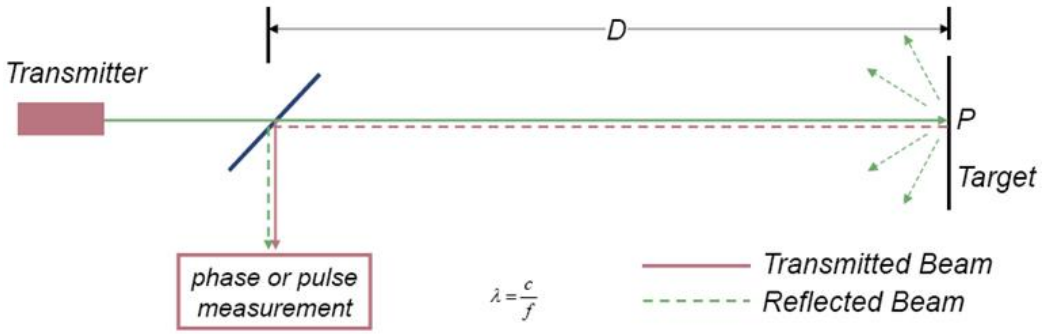
8) Which of the following statements are true for engineering design? [ ]

A. It is a one-time process
B. It is all about problem solving
C. It is a creative thinking process
D. There is no standard right answer
E. It is a process to meet customer’s needs

2. Describe the working principle of the DC motor shown in the following figure. Draw the direction of force applied to and the direction of rotation of the coiled wire. **(10 points)**



3. Describe the phase shift technique of a laser range sensor for measuring distance. **(5 points)**



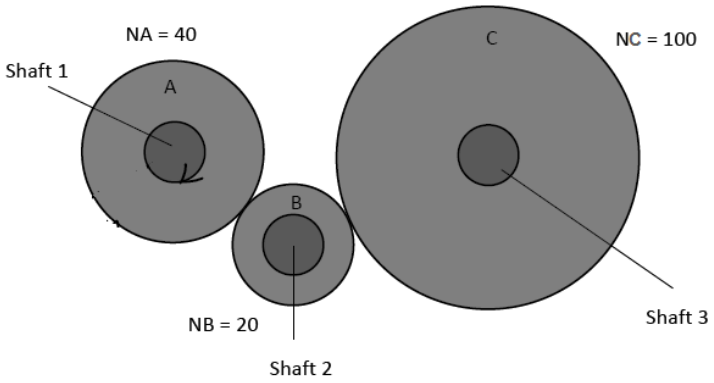
4. Please complete the following program as specified in the comment. **(5 points)**

```
int in1 = 8;
int in2 = 9;
int ena = 5;

void setup(){
  pinMode(in1,OUTPUT);
  pinMode(in2,OUTPUT);
  digitalWrite(in1,HIGH);
  digitalWrite(in2,HIGH);
  delay(2);
}
void loop(){
                              // Please use the space on the left
                              // to make a motor run at full speed in one direction.
                              // Three-line block is suggested
  delay(3000);
                              // Please use the space on the left to make a motor run
                              // at about half speed in the opposite direction
                              // Three-line block is suggested
  delay(3000);

}
```

5. If the shaft carrying gear A rotates at 1000 rpm clockwise, determine the speed and direction of the shaft carrying gear C. If a clockwise torque of 10 Nm is applied at shaft A, how much torque should be applied at shaft C to prevent it from rotating. In the figure, NA, NB, and NC are the number of teeth on each gear. **(10 points)**



6. A random sample of bridge designs from the manufacturing history is collected. The following weights were measured: M = 154g, 148g, 160g, 156g, 154g, 158g, 154g, 148g, 156g, 158g, 156g, 158g, 154g, 160g, 156g, 154g, 152g, 154g, 156g, 150g, 165g, 161g.

(a) Calculate the mean, median, and mode of the weights. **(6 points)**

(b) Calculate the variance and standard deviation. **(8 points)**

Technical Communication Part (40 pts)

REFERENCES (25 pts)

Take the following bibliographic information and arrange it in the correct ASME citation format. Each citation is worth 2.5 points, for a total of 25 points. Each citation has 5 elements (author(s), date of publication, title of book or article, place of publication (publisher and city OR journal and volume/issue number), and page or chapter number), and each element is worth 0.5 points.

NOTE: ***Do not assume*** that any of the elements are already in ASME format. You may have to re-format what is presented below.

Example: The elements listed below—

(1985) • New York, Cambridge University Press • Baron, Jason • pp. 10-12 • *Rationality and intelligence*

—become the following reference once correctly reassembled:

Baron, J., 1985, *Rationality and Intelligence*, Cambridge University Press, New York City, pp. 10-12.

Chap. 5 • Bedford, UK: Silsoe Research Institute • The Development of a Remotely Operated Vehicle (ROV) for Aquaculture • Frost, A. R., A. P. McMaster, K. G. Saunders, and S. R. Lee • 1995

Kreuzer, Edwin, and Fernando C. Pinto • Hamburg, Germany: Technical University Hamburg-Harburg • 2008 • pp. 375-382 • Controlling the Position of a Remotely Operated Underwater Vehicle

ABCS OF TECHNICAL COMMUNICATION (5 points)

Rewrite the following paragraph. If you correctly rewrite in 14 words you will receive a total of 3 points.

We suggest you complete and return the enclosed product registration card promptly to facilitate verification of the date of original purchase. However, return of the product registration card does not eliminate the need for the consumer to maintain the original proof of purchase in order to obtain the warranty benefits. In the event that you do not have proof of purchase date, the purchase date for purposes of this warranty will be the date of manufacture.

For 2 points identify in the following paragraph

1) the important verbs and circle them.
2) the "to be" verbs and cross them out
3) rewrite the sentence following the ABC's of technical communication

"If you damage any parts, it will probably be because they were either not stored properly or, the wrong tool was used to install them."

MULTIPLE CHOICE QUESTIONS (10 pts)

Please choose the correct answer. **There is only one correct answer.** Each answer is worth 2 point

1. What happens when engineers are working on a project?

(a) Informal Communication
(b) Teamwork
(c) Knowledge-sharing
(d) Arguments
(e) Chit Chat
(f) Answers (a), (b), and (c) are correct
(g) Answers (a), (b), (c), and (e) are correct

2. The primary criterion concerning whether or not to cite is the _____ information

(a) brevity
(b) nationality
(c) value
(d) ownership
(e) age
(f) plagiarism

3. What are good habits to acquire when delivering a pitch? (a) Establish eye contact
(b) Speak in a normal voice and slow down your speech
(c) Slow down your speech and speak loudly
(d) Open with an attention-grabber
(e) Never use pathos to arouse empathy
(f) Answers (a), (c), and (d) are correct
(g) Answers (a), (b), and (d) are correct

4. Engineers must show their thinking because_____
(a) They are always right
(b) There is may not be a single right answer to the problem that they are studying
(c) They must prove and justify their critical thinking
(d) Other engineers may want to argue the data produced by the research
(e) Answers (b), (c), and (d) are correct
(f) Answer (b) is correct

5. Engineers must show their thinking to_____
(a) *justify* your decisions
(b) provide *rational* reasons
(c) *evaluate* data produced by research, testing, and experimentation
(d) *publish* in scholarly journals
(e) *become* rich and famous
(f) Answers (a), (b), and (c) are correct
(g) Answers (a), (b), (c), (d), and (e) are correct