Student Name: ....   Student No. : ....

Group: ....   **Midterm Test**   **Date:** 18 / 12 / 2018

Important Notes:
- This paper contains **THREE** questions in **THREE** pages.   - Attempt **ALL** questions.
- Total time allowed **TWO HOURS.**   - Total Marks: **100**

Q.1 [35 marks] In your own words explain the main differences between:

A. LDI and LDS instructions.
B. RISC and CISC.
C. Address bus and Data bus.
D. Harvard and Von Neumann architectures.
E. Microprocessor and Microcontroller.
F. Direct addressing mode and indirect addressing mode.
G. Carry flag and half carry flag.

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Q.2 [30 marks] Briefly write the purpose of the following ATmega328p registers:

A. Program Counter.
B. Status register.
C. Data pointer registers.
D. ADCL and ADCH Registers.
E. OCR0A Register.
F. DDRC Register.

Student Name: …………………………………………………… Student No. :………………………

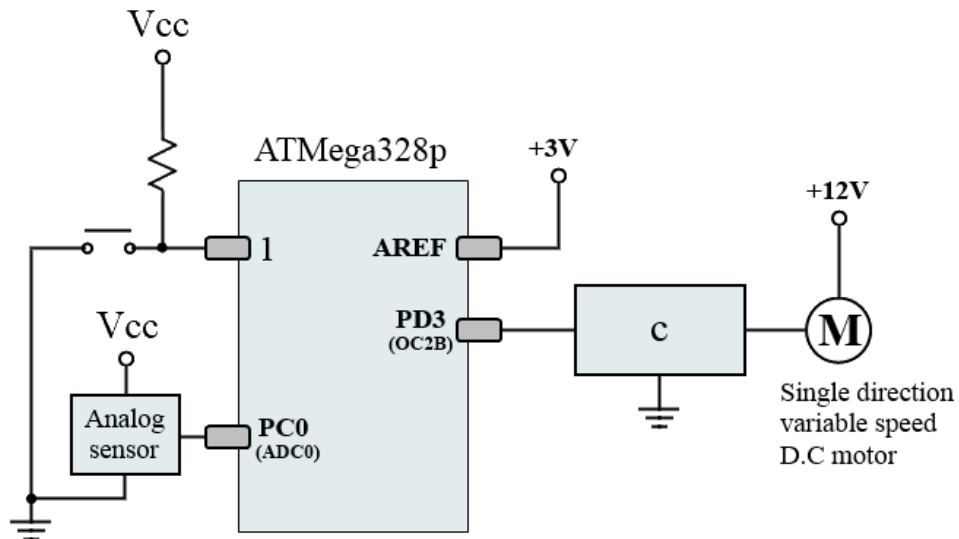**Q.3 [35 marks]** Study the circuit shown in figure (1) below and then answer all questions:

Fig. (1)

A. What is the name and purpose of block **c**? Redraw this block showing internal components.

B. For the current configuration (Vref=3v), What is the step size and accuracy of the internal ADC?

C. What will be the digital equivalent of sensor value if its output voltage is 2V?

D. Write assembly instruction(s) to initialize motor control pin as output.

E. Write assembly instruction(s) to run the motor at half speed.

End of questions
Good luck!