Maulana Azad National Urdu University

Department of Computer Science and Information Technology

B.Tech

Semester 3 - Examination November/December - 2015

BT234 : Computer Organization

Total Marks : 70 Time: 3 hours

Time: 3Hrs MM: 70

Note: Attempt any 5 Questions. Each Question carries equal marks.

1. a) Design the circuit of Half Adder and Full Adder with justifiable logical difference in both circuits. **10**

   b) The following memory units are specified by number of words times the number of bits per words. How many address lines and Input -Output data lines are needed in each case? (i) 2K×16 (ii) 64K×8 (iii) 16M×32 (iv) 4G×64 **04**

2. (a) Design a digital computer bus that has a common bus system for 16 registers of 32 bits each. The bus is constructed with multiplexers. Also state following
   (i) How many selection inputs are there in each multiplexer
   (ii) What size of multiplexers are needed
   (iii) How many multiplexers are there in the bus **12**

   (b) Draw the block diagram for the hardware that implements the following

   x+yz: AR←AR+BR

   where AR and BR are n-bit registers and x,y,z are control variables. **02**

3. (a) Write a program to evaluate the arithmetic statement:
   X = (A-B+C*(D*E-F))/G+H*K
   (i) Using General Register computer with three address instructions.
   (ii) Using General Register computer with two address instructions.
   (iii) Using one address instructions.
   (iv) Using zero address instructions. **10**

   (b) Draw the stack operations to evaluate the following expression: **04**

   3*4+5*6+8/4

4. (a) Design I/O Interface unit. What is difference between isolated I/O and Memory –mapped I/O? **04**

   (b) Names the different Modes of data transfer. How proceed the DMA transfer in the computer? sketch the whole process. **10**

5. A computer consist of RAM chips of 128×8 and ROM chips of 512×8. The computer system needs 2K×8 of RAM, 4K×8 of ROM, and eight interface unit, each with 8 registers. A memory mapped I/O configuration is used. the two

(b) Prove that arithmetic mean of the coefficients of regression is greater than the coefficient of correlation.

Q5. (a) Barber A takes 15 minutes to complete one hair cut. Customers arrive in his shop at an average rate of one every 30 minutes. Barber B takes 25 minutes to complete one hair cut and customers arrive at the shop at an average rate of one every 50 minutes. The arrival processes are Poisson and the service time follow an exponential distribution. (i) Where would you expect a bigger queue? (ii) Where would you require more time waiting included to complete a haircut?

(b) At a railway station, only one train is handled at a time. The railway yard is sufficient only for two trains to wait while other is given signal to leave the station. Trains arrive at the station at an average rate of 6 per hour and the railway station can handle them on an average of 12 per hour. Assuming Poisson arrivals and exponential service distribution, find the steady state probabilities for the various number of trains in the system. Find also the average waiting time of a new train coming into the yard.

Q6. (a) If X is a normal variate with mean 30 and standard deviation 5. Find the probabilities that (i) $26 \leq X \leq 40$ (ii) $X \geq 45$.

(b) In a city 250 men out of 750 were found to be smokers. Does this information support the conclusion that the majority of men in this city are smokers?

Q7. (a) Two independent samples of 7 items respectively had the following values

Sample I	11	11	13	11	15	9	12	14
Sample II	9	11	10	13	9	8	10	–

Is the difference between the means of sample significant?

(b) Find the probability of getting a sum of 10 if we throw two dice.