Zagazig University	**CSE 321b Computer Organization**	**Midterm Examination**
Faculty of Engineering	**CSE 401 Computer Engineering (II)**	**May 5th, 2016**
Computer & Systems Eng.	**(Double-Sided)**	**12:30pm – 1:45pm**
Winter 2016	**(Duration: 75 minutes)**	**4 pages, 28 questions, 25 points**
رقم الجلوس:	**الفرقة:**	**الاسم:**

Circle the letter of the choice that best answers each of the following questions. No more than one letter should be circled.

1. Which of the following is **not** a characteristic of the EEPROM?
   (a) Randomly accessible
   (b) Less dense than EPROM
   (c) Writing faster than reading
   (d) Byte-level writing
   (e) None of the above

2. Which of the following terms best describes an error-correcting code whose Hamming distance is 6?
   (a) Double-error-correction triple-error-detection
   (b) Double-error-correction quadruple-error-detection
   (c) Double-error-correction quintuple-error-detection
   (d) All the above
   (e) None of the above

3. Which of the following memories can be used out-of-the-box as a **buffer** for a data block?
   (a) RDRAM
   (b) CDRAM
   (c) SDRAM
   (d) DRAM
   (e) None of the above

4. Which of the following components are **no longer** used in modern magnetic disks?
   (a) Glass platters
   (b) Magnetizable materials
   (c) Magneto-resistive sensors
   (d) Winchester heads
   (e) None of the above

5. Consider two hard disk drives that are similar in every aspect (including their sector storage capacity) except that: (*i*) the first contains twice as many platters as the second, (*ii*) the second has twice as much track storage capacity as the first. Suppose one sector from each drive is chosen such that they both have the same logical block address. Which component in their physical addresses must be similar?
   (a) Cylinder number
   (b) Head number
   (c) Sector number
   (d) All the above
   (e) None of the above

6. Which of the following statements about "multiple-zone-recording" is **false**?
   (a) Outer tracks have higher capacity than inner tracks
   (b) Inner tracks have less sectors than outer tracks
   (c) Inner sectors have lower capacity than outer sectors
   (d) All the above
   (e) None of the above

7. What is the main disadvantage of RAID 0 (compared to the other RAID levels)?
   (a) Highest disk overhead
   (b) Worst I/O request rate
   (c) Worst data availability
   (d) Most complex controller design
   (e) None of the above

8. Which of the following RAID configurations **cannot** be implemented using three disk drives?
   (a) RAID 0
   (b) RAID 3
   (c) RAID 5
   (d) RAID 6
   (e) None of the above

9. Which of the following RAID configurations requires parallel access to all drives with every I/O request?
   (a) RAID 0
   (b) RAID 4
   (c) RAID 5
   (d) RAID 6
   (e) None of the above

10. Which of the following is **not** among the advantages of solid-state drives over hard disk drives?
   (a) Higher I/O request rate
   (b) Higher data transfer rate
   (c) Lower power consumption
   (d) Longer life span
   (e) None of the above

11. Which of the following techniques is applied for programming NAND flash memories?
   (a) Quantum tunneling ejection
   (b) Quantum tunneling injection
   (c) Hot-electron ejection
   (d) Hot-electron injection
   (e) None of the above

12. Which of the following factors does **not** affect the data transfer rate in optical disk drives?
   (a) Disk capacity
   (b) Linear velocity
   (c) Linear data density
   (d) Angular velocity
   (e) None of the above

13. Which of the following is **not** among the advantages of DVD-ROM over CD-ROM?
   (a) Double-sided disks
   (b) Longer laser-wavelength
   (c) Smaller pit-size
   (d) Larger disk capacity
   (e) None of the above

14. Which of the following statements about “magnetic tape” is **true**?
   (a) It has no open-source standard
   (b) It uses a direct-access method
   (c) It is the most expensive secondary storage device
   (d) It is mainly used for backup purposes
   (e) None of the above

15. Which of the following tasks is performed by an I/O module?
(a) Interrupting CPU when a new packet is received by a wireless adapter
(b) Transforming magnetic patterns on a disk surface into digital data
(c) Converting digital data into electronic signals to control pixel colors on a screen
(d) All the above
(e) None of the above

16. Which of the following registers gets affected by the last instruction of an interrupt-service routine?
(a) Program counter
(b) Stack pointer
(c) Program status word
(d) All the above
(e) None of the above

17. Which of the following techniques **cannot** handle simultaneous interrupts?
(a) Software polling
(b) Hardware polling
(c) Bus mastering
(d) All the above
(e) None of the above

18. Which of the following signals does **not** get produced by a typical DMA controller?
(a) Interrupt
(b) Request to DMA
(c) Address
(d) Acknowledge from DMA
(e) None of the above

19. Which of the following statements about "I/O channel" is **true**?
(a) Multiplexor channels handle high speed devices
(b) Selector channels handle low speed devices
(c) I/O channels can execute I/O programs from their local memories
(d) All the above
(e) None of the above

20. Which of the following memories can be **completely** implemented using $x*y$ transistors?
(a) $x\times y$ SRAM
(b) $x\times y$ DRAM
(c) $x\times y$ EPROM
(d) $x\times y$ EEPROM
(e) None of the above

21. Suppose a $(2x)\times y$ memory module is to be built using two $x\times y$ memory chips (whose chip select signals are "active-high"). Which of the following connections must be made to ensure that locations of the first memory chip take even addresses and locations of the second memory chip take odd addresses?
(a) Most significant address line is connected to the first chip select through an inverter
(b) Most significant address line is connected to the second chip select through an inverter
(c) Least significant address line is connected to the first chip select through an inverter
(d) Least significant address line is connected to the second chip select through an inverter
(e) None of the above

22. Consider a DRAM whose cells are organized into x rows. Suppose the DRAM follows a distributed refreshment approach in which only y rows are refreshed every cycle. If each memory cell can retain its data for up to z ms, what must be the minimum number of refresh cycles per second?
(a) $1000/z$

(b) $(1000*x*y)/z$
(c) $(1000*x)/(y*z)$
(d) $(1000*y)/(x*z)$
(e) None of the above

23. Which of the following memories may contain **no more than** $x*2^y$ memory cells?
(a) $x\times(2^y-y)$ DRAM equipped with a SEC Hamming code
(b) $x\times(2^y-y-1)$ DRAM equipped with a SEC-DED Hamming code
(c) $x\times(2^y-y-1)$ **DRAM equipped with a SEC Hamming code**
(d) $x\times(2^y-y+1)$ DRAM equipped with a SEC-DED Hamming code
(e) None of the above

24. What is the maximum number of words produced in a second by a DDR3-SDRAM chip whose internal clock speed is f Hz?
(a) $2*f$ word/s
(b) $4*f$ word/s
(c) $8*f$ **word/s**
(d) $16*f$ word/s
(e) None of the above

25. Consider a magnetic disk in which tracks are divided into pie-shaped sectors. Suppose the head is moved from a given sector on a given track to the corresponding sector on another track. If the seek time between these two tracks is x (seconds) and the spindle speed is y (r.p.s.), what is the rotational delay?
(a) Zero
(b) $x \bmod (1/y)$
(c) $(1/y)-x$
(d) All the above
(e) None of the above

26. Suppose a RAID 1 configuration is built using x hard disk drives. If one of these drives fails, what are the chances that an immediate failure of a second drive will result in partial data loss?
(a) $1/(x-1)*100$ **%**
(b) $1/x*100$ %
(c) $1/(x/2)*100$ %
(d) 50 %
(e) None of the above

27. A magnetic tape drive applies parallel recoding to store textual data on a 9-track tape. Suppose each track can store x data bits/m. How long does it take to record y bytes of data if the tape linear speed is z m/s?
(a) $(8*y)/(9*x*z)$
(b) $(8*y)/(x*z)$
(c) $y/(x*z)$
(d) $y/(9*x*z)$
(e) None of the above

28. In isolated I/O, how many address lines are needed to support x memory locations and y I/O devices?
(a) $\log_2(x)$
(b) $\log_2(y)$
(c) $\log_2(x+y)$
(d) $\log_2(\max(x,y))$
(e) None of the above

** End of Exam **