Name: Entry #: \_\_EC\_\_JoS\_\_ Marks: do not 60 >

MAJOR EXAM NOV 22 2008; Instructor: SUBRAT KAR 120 mins EEL705 EMBEDDED SYSTEMS

All multiple choice questions carry (1+1) marks each and must have a justification. All bonus-marked questions carry 1 mark each. Answer any four questions from Q.34 onwards; NOTA stands for "None of the above", AOTA stands for "All of the above"

- RAMBUS is a type of DDR memory [a] true [b] false [c] only true for 3-2-0-0 cycles [d] only true for 3-0-0-2 cycles
- Multiple buses are possible in \_\_ architectures [a] Von Neumann [b] non von Neumann [c] Paul Newman [d] NOTA
- In SPI the transfer is [a] asynchronous [b] synchronous [c] master-clock driven [d] slave-acknowledgment driven
- In FPM-DRAM, the tCAS \_\_ the tRAS [a] follows [b] precedes [c] has no relationship except a standard [d] NOTA
- 5. What may be re-done at any stage [a] specification [b] requirements [c] evolution [d] AOTA
- When we finalize a requirement on a particular architecture, the architecture is taken to mean [a] hardware [b] software [c] ergonomics [d] AOTA
- In a Harvard architecture, the \_\_ and \_\_ are space-multiplexed
   [a] address bus,data bus [b] address bus, instructions [c] flow
   of data, flow of instructions [d] NOTA
- 8. In the state-of-the-art, CISC architectures \_\_ RISC architectures [a] out-performs [b] under-performs [c] equals in performance [d] NOTA
- 9. If a embedded processor has to work with both a low-speed bus and high-speed bus, then the possible work-around is to [a] have separate buses with a bridge [b] insert NOPS at CPU end [c] insert NOPS at peripheral end [d] AOTA
- 10. In EDO DRAM, the guard time before \_\_ is \_\_ [a] tCAS, nil [b] tRAS, reduced [c] tCAS, increased [d] NOTA
- 11. ISRs are best depicted in a \_\_\_ diagram [a] collaboration [b] component [c] sequence [d] AOTA (choose one choice only)
- 12. In software development, UML finally produces code in [a] any language [b] any OOP language [c] any meta-language [d] NOTA
- 13. Producing code for PowerPC processor on a PC hosted needs a [a] cross-compiler [b] PowerPC OS [c] virtual machine [d] a hardware emulator
- 14. In VHDL development using Xilinx, the test-bench is [a] cycle-accurate [b] instruction-accurate [c] an approximate debugger [d] inexact, serving merely to convey approximate behavioural information
- gdb, ICE, logic analyzers are all involved with [a] debugging
   program construction [c] co-design [d] NOTA
- 16. If we needed to execute concurrent threads without a OS, we could use [a] processes [b] context-switching [c] co-routines [d] AOTA
- 17. IPC can use [a] signals [b] semaphores [c] message-based communications [d] AOTA
- State machines are captured through [a] sequence diagrams
   deployment diagrams [c] collaboration diagrams [d] NOTA
- The GPU is [a] generic processor module [b] graphics coprocessor [c] global process utilization factor [d] NOTA
- 20. FPGAs need [a] floor-planning [b] layout [c] clock-skew management [d] AOTA

- 21. [Bonus-ATTINY13] In the RC5 remote control demo, the detector used was [a] ultrasonic [b] infrasonic [c] IR [d] Bluetooth
- 22. [Bonus-ATTinyl3] In the OOK link, the carrier frequency used was [a] 2.4 GHz [b] 917 MHz [c] 433 Mhz [d] 637 MHz
- 23. [Bonus-Amnyl3] In the ultrasonic distance measurement set-up demonstrated, the distance measurable was [a] 42±4 in [b] 20±5 in [c] 40±3 in [d] NOTA
- 24. [Banus-ATTinyl3] In the line-follower, it was better to \_\_\_\_\_ the \_\_\_\_ contact sensors [a] drag, two [b] drag, four [c] push, two [d] push, three
- 25. [BONUS-ATTINYIS] In the electronic lock, the programmed code length was \_\_-bits [a] 5 [b] 4 [c] 3 [d] 2
- 26. [BONUS-ATINYL] In the LDR dependent VF flasher, the flash rate should have \_\_\_\_ then \_\_\_ if the incident light was decreased from 6 lumens to 4 lumens and then to 2 lumens [a] increased, increased [b] increased, decreased [c] decreased, increased [d] decreased, decreased
- 27. [Bonus-ATTinyl3] In the temperature range indicator, a drop in degrees caused the first LED to go off and the next to go on [a] 3 [b] 5 [c] 8 [d] 10
- 28. [BONUS-ATTINY13] In the PWM motor drive, the motor did not turn on because of the \_\_\_\_ of the control signal [a] small holding time [b] large bit-width [c] fast rise and fall time [d] incorrect filament firing sequence
- 29. [Bonus-ATTINYL3] In the shaft encoder, the direction of rotation was detected using the \_\_\_\_ of the two amplified signals [a] phase [b] sequence of the activation [c] amplitude [d] phasors
- 30. [Annus-Attiny13] The programmer for the ATTiny13 used for the demo used the [a] parallel port [b] serial port [c] JTAG [d] ISP
- 31. [Bonus-ATTinyl3] The ATTinyl3 has \_\_\_ADCs [a] four [b] three [c] two [d] NOTA
- 32. [Bonus-Seminar] The Zigbee stack discussed in the seminar is at

  \_\_\_\_layer [a] transport [b] transport+datalink [c]
  transport+datalink+network [d]
  transport+datalink+network+transport
- 33. [Bonus-Seminar] The Cortex-M3 has all of the following features. [a] ARM7 compatibility, Harvard architecture, Thumb2 instructions [b] ARM7 compatibility, Harvard architecture, Thumb2 instructions [c] ARM7 compatibility, von-Neumann architecture, Thumb2 incompatible [d] ARM9/ARM11 pin compatibility, Harvard architecture, Thumb2 compatibility
- COMMENT ON <u>ANY FOUR</u> OF THE FOLLOWING:
- [5 marks] NUMA is a suitable architecture for singleprocessor architectures.
- 35. [5 marks] VHDL complements ADL but does not replace it.
- 36. [5 marks] Scheduling processes does not need a OS.
- 37. [5 marks] Soft modems can be created by bit banging.
- 38. [5 marks] A unterminated PCI bus would still be faster than ISA or EISA bus.

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