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Time taken	3 mins 42 secs
Marks	16.00/16.00
Grade	**100.00** out of 100.00

Question 1

Correct

Mark 1.00 out of 1.00

Why must all computers be parallel?

Select one:

- ⊙ a. adapting to energy and power requirements for performance ✓
- ○ b. ease of programming
- ○ c. adapting to consumer demands
- ○ d. adapting to changes in programming languages

The correct answer is: adapting to energy and power requirements for performance

Question 2

Correct

Mark 1.00 out of 1.00

'Moore's Law' predicts that:

Select one:

- ○ a. Flops per chip will double every year
- ⊙ b. transistors per chip will double every 18 months ✓
- ○ c. transistors per chip will double every year
- ○ d. Flops per chip will double every 18 months

The correct answer is: transistors per chip will double every 18 months

Question 3

Correct

Mark 1.00 out of 1.00

The fastest current machine in the Top 500 is in which range of CPU operations/s? (pick the largest option that can use a integer number to approximate the speed)

Select one:

- ⦿ a. PetaFlop ✓
- ○ b. GigaFlop
- ○ c. TeraFlop
- ○ d. ExaFlop

The correct answer is: PetaFlop

Question 4

Correct

Mark 1.00 out of 1.00

If the feature size of a chip (size of transistor) decreases by a factor of x then the computing power (speedup) available of a program will increase by a factor proportional to:

Select one:

- ○ a. x
- ○ b. x^4
- ○ c. x^2
- ⦿ d. x^3 ✓

The correct answer is: x^3

Question 5

Correct

Mark 1.00 out of 1.00

Most computers in the last Top 500 graph presented (in 2010) had a number of cores in which range?

Select one:

- ○ a. 1025-2048
- ⦿ b. 4k-8k ✓
- ○ c. 513-1024
- ○ d. 2049-4096

The correct answer is: 4k-8k

Question 6

Correct

Mark 1.00 out of 1.00

In the Top 500, which of the following does not have a generally linear behavior on a plot of the log of speed versus time (year)?

Select one:

- ⊙ a. the top machine ✓
- ○ b. the sum computing power of the machines
- ○ c. the slowest machine

The correct answer is: the top machine

Question 7

Correct

Mark 1.00 out of 1.00

Which of the following is not a limitation of experiments and theory that helped computation become 'the third pillar of science'?

Select one:

- ○ a. too dangerous
- ○ b. too difficult
- ⊙ c. too mathematical ✓
- ○ d. too expensive

The correct answer is: too mathematical

Question 8

Correct

Mark 1.00 out of 1.00

Which of the following fields was not mentioned today as one generating or estimated to generate Peta-byte data sets:

Select one:

- ○ a. Photon science
- ○ b. Genome science
- ○ c. Climate modeling
- ⊙ d. Education ✓
- ○ e. Astrophysics

The correct answer is: Education

Question 9

Correct

Mark 1.00 out of 1.00

The largest part of the technical computing market between 1998 and 2003 was:

Select one:

○ a. Biosciences

○ b. Imaging

○ c. Classified Defense

○ d. Simulation

◉ e. Scientific Research and R \& D ✓

The correct answer is: Scientific Research and R \& D

Question 10

Correct

Mark 1.00 out of 1.00

How many Computational Dwarfs did High Performance Computing believe they needed to cover all computations within their field well?

Select one:

○ a. three

○ b. thirteen

◉ c. seven ✓

○ d. eleven

The correct answer is: seven

Question 11

Correct

Mark 1.00 out of 1.00

Which type of architecture has been gaining substantial share in the Top500 list during the last decade?

Select one:

◉ a. Clusters with accelerators ✓

○ b. Constellations

○ c. Vector computers

○ d. SMPs

Your answer is correct.

The correct answer is: Clusters with accelerators

Question 12

Correct

Mark 1.00 out of 1.00

Mark all 2018 re-interpretations of Moore's law.

Select one or more:

- ☑ a. Number of cores per chip can double every two years ✓
- ☑ b. Clock speed will not increase ✓
- ☑ c. Need to deal with systems with millions of concurrent threads ✓
- ☑ d. Need to deal with inter-chip parallelism as well as intra-chip parallelism ✓
- ☐ e. Clock speeds will double every two years

Your answer is correct.

The correct answers are: Clock speed will not increase, Number of cores per chip can double every two years, Need to deal with systems with millions of concurrent threads, Need to deal with inter-chip parallelism as well as intra-chip parallelism

Question 13

Correct

Mark 1.00 out of 1.00

After looking at other areas than HPC how many Motifs were needed to cover all areas?

Select one:

- ○ a. fifteen
- ○ b. five
- ○ c. seven
- ◉ d. thirteen ✓

The correct answer is: thirteen

Question 14

Correct

Mark 1.00 out of 1.00

Which of the following is not an example of 'automatic parallelism' that the CPUs already do?

Select one:

- ○ a. Instruction Level Parallelism (multiple instructions per clock cycle)
- ○ b. Memory System Parallelism (overlap of memory operations with computations)
- ◉ c. Network Parallelism (CPU uses network resources to run multiple jobs) ✓
- ○ d. OS Parallelism (multiple jobs run in parallel)

The correct answer is: Network Parallelism (CPU uses network resources to run multiple jobs)

Question 15

Correct

Mark 1.00 out of 1.00

Which of the following is not an example of parallelism overhead?

Select one:

○ a. cost of starting a thread

○ b. cost of synchronization

⦿ c. cost of reading in initial data ✔

○ d. cost of communication between threads

The correct answer is: cost of reading in initial data

Question 16

Correct

Mark 1.00 out of 1.00

Processor-memory performance gap is growing each year because

Select one:

⦿ a. DRAM performance (memory access speed) is increasing exponentially but slower than Processors ✔

○ b. DRAM is not increasing in performance (memory access speed)

○ c. DRAM is not increasing in performance (memory access speed) exponentially

○ d. DRAM performance (memory access speed) is increasing exponentially at the same rate as Processors

The correct answer is: DRAM performance (memory access speed) is increasing exponentially but slower than Processors

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