

Radiation Detector 2018/19 (SPA6309), mid-term quiz

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Name:

ID:

[1] Order following particles (A, B, C, D) from light to heavy

- A. bottom quark
- B. strange quark
- C. charm quark
- D. carbon atom

[2] Order following particles (A, B, C, D) from short-lived to long-lived

- A. π^+ meson ($u\bar{d}$)
- B. π^0 meson ($\sim u\bar{u} + d\bar{d}$)
- C. π^- meson ($\bar{u}d$)
- D. Δ^{++} baryon (uuu)

Choose one from the list (A, B, C, D) for the following questions

[3] Choose one particle which is NOT a gauge boson

- A. W-boson
- B. Z-boson
- C. Gluon
- D. Higgs boson

[4] Choose one particle which is NOT a hadron

- A. epsilon
- B. tau
- C. omega
- D. rho

[5] Ξ^0 (uss) baryon decays to a Lambda (uds) and a pion 0 ($\Xi^0 \rightarrow \Lambda + \pi^0$). Then this decay is most likely caused by

- A. strong force
- B. electromagnetic force
- C. weak force
- D. equal probability with all of above

[6] The energy loss of the majority of cosmic muons measured at ground level is

- A. 2 keV/cm in 1g/cm^3
- B. 2 MeV/cm in 1g/cm^3
- C. 2 GeV/cm in 1g/cm^3
- D. 2 TeV/cm in 1g/cm^3

[7] Choose one which is NOT similar order with others.

- A. Radiation length
- B. Cherenkov threshold
- C. Moliere radius
- D. Pair conversion length

[8] Choose the best material to stop neutrons.

- A. water
- B. lead brick
- C. steel plate
- D. tungsten glass

[9] The core-collapse supernova is predicted to happen 3 times in a century, but after 100 years of observation, it has failed to observe any. The 90% confidence level upper limit of this phenomena is roughly

- A. 0 times per 100 year
- B. 2 times per 100 year
- C. 20 times per 100 year
- D. 200 times per 100 year

[10] In a Poisson distribution, mean μ and variance σ^2 are related by

- A. $\mu = \sigma$
- B. $\mu = \sigma^2$
- C. $\mu^2 = \sigma$
- D. none of them

[11] Choose one INCORRECT statement about the resolution of a radiation detector.

- A. Every radiation detector has a different resolution.
- B. The detector resolution can be improved by changing the operation method of the detector.
- C. The resolution of a given detector should be known before data are taken.
- D. Low-resolution detectors are usually more useful.

[12] Choose ONE parameter which is the most important to determine the signal speed in a coaxial cable.

- A. The outer jacket material of the cable
- B. The inner insulator of the cable
- C. A width of the cable
- D. Length of the cable

[13] The signal delay of a pulsed signal in a typical 50Ω coaxial cable is

- A. 5 ps/m
- B. 5 ns/m
- C. 5 μ s/m
- D. 5 ms/m

[14] Signals from a radiation detector are usually analog. However, discriminators and coincidence unit are often used

- A. to propagate signals faster
- B. to register signals
- C. to make a logic signal
- D. to amplify the signal

[15] 2 logic signals "X" and "Y" go into a device. The function of this device is "OR", then the outgoing signal is

- A. $X = Y$
- B. $X \propto Y$
- C. $X \cap Y$
- D. $X \cup Y$

[16] During the 2011 Fukushima nuclear disaster, how many people died immediately by the intense radiation?

- A. 0
- B. 5
- C. 50
- D. unknown

[17] The annual radiation limit for a radiation worker is

- A. 20 mCi
- B. 20 mBq
- C. 20 mGy
- D. 20 mSv

[18] Name one radiation detector you want to pick up for your report topic

solution

[1] B,C,A,D [2] D,B,A,C or D,B,C,A [3] D [4] B [5] C [6] B [7] B [8] A [9] B [10] B [11] D [12] B [13] B [14] C [15] D [16] A [17] D [18] any