

## Heritage Institute of Technology, Kolkata

### *Nature of Admission Test for Admission to M.Tech. programmes (2010-2011)*

Multiple choice questions, each carrying 1 mark.

*i) For AEIE*

Syllabus: Undergraduate syllabus of relevant discipline with emphasis on Process Control, Control Theory, Microprocessors & Microcontrollers, Basic Electronics, Industrial Instrumentation, Transducers & Sensors, Electrical & Electronic Measurement, Power Electronics and Biomedical Instrumentation

Sample questions :

1. The Maximum mode of 8086 is used for the :  
a) single processor environment      b) less than five processor environment  
c) multi processor environment      d) none of the above
2. The linearity & sensitivity of potentiometer type transducer is :  
a) very high & very low      b) very low & very high  
c) both are very low      d) both are moderate value.
3. The step response of a system with transfer function  $G(S) = 1/(1+\tau s)$  attains more than 98% of its final value in time  $t$  equal to  
a)  $\tau$       b)  $2\tau$       c)  $3\tau$       d)  $4\tau$
4. A sinusoidal input of 50HZ is applied to the horizontal plate of a CRO. If the lissajous pattern is a circle the signal frequency applied to the vertical plate is  
a) 100HZ      b) 50HZ      c) changing with time      d) none of the above
5. For a thyristor, the correct relation between the latching current ( $I_L$ ) and the holding current ( $I_H$ ) is:  
a)  $I_L < I_H$       b)  $0.5I_H < I_L < I_H$       c)  $I_L = I_H$       d)  $I_L > I_H$

*ii) For BT*

Syllabus : B. Tech course with emphasis on Biochemistry, Microbiology, Molecular Biology, Recombinant DNA Technology, Enzyme Technology, Thermodynamics, Process Control, Transfer Operations and relevant subjects.

Sample questions :

1. Which one is the separation and display tool in proteomics?  
a) capillary electrophoresis    b) X-ray crystallography    c) NMR spectroscopy    d) DNA microarray
2. To study peptides, proteins and DNA, upto 500 KD by Mass spectrometry which ionization method will be the best?  
a) Electron Impact Ionization      b) Electro-spray Ionization (ESI)  
c) Matrix-Assisted Laser Desorption Ionization (MALDI)      d) Fast Atom Bombardment (FAB)

3. The sugar phosphate backbone of DNA is held together by
  - a) hydrogen bonds
  - b) disulfide bonds
  - c) phosphodiester bonds
  - d) peptide bonds
4. The relationship between genes and proteins as we understand today is
  - a) one gene one enzyme
  - b) one gene one polypeptide
  - c) one gene one protein
  - d) one gene one amino acid
5. One ketogenic amino acid is
  - a) leucine
  - b) arginine
  - c) alanine
  - d) glutamine
6. The central metabolic pathway in human beings is
  - a) glycolysis and TCA cycle
  - b) beta oxidation
  - c) pentose phosphate pathway
  - d) urea cycle
7. Clinical deterioration in AIDS is due to the loss of
  - a) neutrophils
  - b) cytotoxic T cells
  - c) helper T cells
  - d) macrophages
8. In which phase of growth curve of callus/ cell suspension culture of plant secondary metabolites accumulate?
  - a) stationary phase
  - b) lag phase
  - c) log phase
  - d) lag and stationary phase
9. WIPO stands for
  - a) World International People's Organization
  - b) World Interest People's Organization
  - c) World Intellectual Property Organization
  - d) None of these
10. A separator is being tested for air separation. At a feed rate of 24 L/min (STP), the separator gave 4.7 L/min of 40% O<sub>2</sub> as permeate and a residue with 17% O<sub>2</sub>. the flow rate (L) for the feed size is
  - a) 17.3
  - b) 14
  - c) 11
  - d) 19.3
11. Dimension of the first order rate constant is
  - a) gm/L hr
  - b) gm hr/ L
  - c) L/ gm hr
  - d) gm hr / L
12. For enzymatic reaction at low substrate concentration rate equation is
  - a) 1<sup>st</sup> order with respect to substrate concentration
  - b) zero order with respect to substrate concentration
  - c) fractional order with respect to substrate concentration
  - d) none of these
13. Hollow fibre reactor is a special type of
  - a) fluidized bed reactor
  - b) packed bed reactor
  - c) membrane reactor
  - d) CSTR
14. Choose the right form of blast.
  - a) Basic Local Alignment Search Tool
  - b) Basic Locally Alignment Search Tool
  - c) Basic Local Alignment Searching Tool
  - d) Basis Local Alignment Search Tool
15. Find the odd one out:
  - a) PAM
  - b) BLOSUM
  - c) GONNET
  - d) BLAST

iii) For Ch.E.

**Syllabus** : B.Tech. course with emphasis on Heat Transfer, Mass Transfer, Reaction Engineering, Fluid Mechanics, Instrumentation & Process Control, Process Equipment Design and Pollution Control

Sample questions :

1. Flash distillation operation is suitable for separating components which
  - a. boil at very close temperature
  - b. boil at wide different temperature
  - c. form minimum boiling azeotrope
  - d. form maximum boiling azeotrope
2. Which of the following flow-metering instruments is an area-meter?
  - a. Venturi Meter
  - a. Rotameter
  - b. Orifice Meter
  - c. Pitot Tube
3. Which is the most suitable evaporator for cold viscous feed?
  - a. Forward feed
  - b. Backward feed
  - c. Mixed feed
  - d. Parallel feed

iv) For CSE

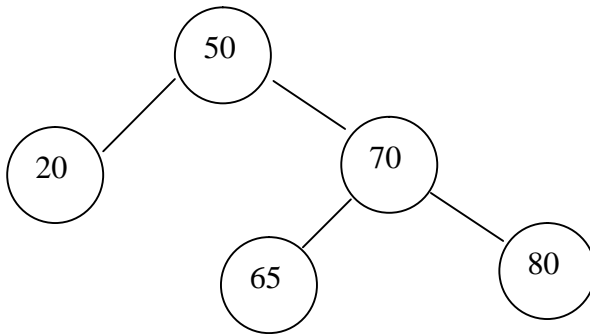
**Syllabus** : Undergraduate Level covering:

- a) Discrete Mathematics
- b) Logical Reasoning
- c) Digital Logic
- d) Data Structure and Algorithm
- e) Basic C programming concepts
- f) Operating System
- g) Networking concepts

Sample questions :

1. If integer is stored as two's complement and the most significant bit is 1 for negative value, find the code for -1 for 8 bit representation.
  - d. 10000001
  - e. 11111110
  - f. 11111111
  - g. 00000001
2. If the input sequence given to a sorting algorithm is already sorted, then it signifies a
  - a. worst-case for a bubble sort algorithm
  - b. worst-case for a quick-sort algorithm
  - c. worst-case for insertion-sort algorithm
  - d. none of the above

3. A binary tree is given as



Preorder traversal will generate the sequence

- 20 50 65 70 80
  - 20 65 80 70 50
  - 50 20 70 65 80
  - 20 50 70 65 80
4. Which technique was introduced because a single process could not keep both the CPU and I/O devices busy ?
- Time sharing
  - Spooling
  - Preemptive scheduling
  - Multi-programming
5. In a directed graph having 20 vertices and 50 edges, a Depth First Search is done and it is found there are 3 DFS trees in the DFS forest. What is the total number of edges in the DFS forest?
- 49
  - 19
  - 17
  - None of the above.

v) For ECE

Syllabus : B.Tech course with emphasis upon Analog & Digital Communication, Telecommunication and Advanced Communication systems covering Satellite, Mobile & Optical fiber and Mathematics.

Sample questions :

- A BJT is a:  
a) a voltage operated device      b) a current operated device  
c) both (a) and (b)                      d) none of the options is correct
- If  $\alpha = 0.98$ , then the value of  $\beta$  for the BJT will be :  
a) 0.49      b) 50      c) 0.5      d) 0.67
- The pinch-off in a FET takes place in:  
a) the channel      b) the source      c) the drain      d) the gate

4. If carrier frequency is 30 MHz, the wavelength is:  
 a) 1 m.            b) 100 m.        c) 10 m.            d) 10 cm.
  
5. Noise in FM receiver is less than in AM receiver because of :  
 a) greater bandwidth                    b) frequency discriminator  
 c) limiter                                    d) none of these
  
6. If the Fourier transform of a sequence  $x(n)$  is  $X(ej\omega)$ , then the Fourier transform of  $x(n-k)$  is:  
 a) 0    b)  $(e^{-j\omega k}) X(ej\omega)$                     c)  $(ej\omega) X(ej\omega k)$     d) none of these
  
7. An 8-bit microcontroller has an external RAM in the memory map from 6000 H to 7FFF H. The number of bytes the RAM can store is:  
 a) 8191            b) 8190            c) 8000            d) none of these
  
8. A crossbar exchange has a cost capacity index of :  
 a) 0.5            b) 0.67            c) 0.55            d) none of these
  
9. Grade of service for telecom network may be defined as :  
 a) time congestion                    b) call congestion  
 c) waiting time                        d) birth death process
  
10. To direct a signal from earth to a satellite, frequency of uplink should be :  
 a) above 10GHZ                    b) below 20 GHZ  
 c) above MUF                        d) depends on azimuth