Royal College of Arts Science and Commerce
TYBSc Physics
Semester: V
Paper:I – USPH501: Mathematical, Thermal andStatistical Physics
Sample Questions

1	In a non-uniform sample space, all sample points have	
	a	equal probability
	b	Different probability
	c	Zero probability
	d	Exactly 1 probability.
2	From a group of 10 people how many ways a President and a Vice-President can be chosen?	
	a	10
	b	20
	c	50
	d	90
3	In a Binomial Distribution, if ‘n’ is the number of trials and ‘p’ is the probability of success, then the mean value is given by _____	
	a	np
	b	n
	c	p
	d	np(1-p)

4	Binomial Distribution is a _____.	
	a	Continuous distribution
	b	Discrete distribution
	c	Irregular distribution
	d	Not a Probability distribution
5	In a Binomial Distribution, the mean and variance are----------.	
	a	equal
	b	unequal
	c	mean is twice the variance
	d	variance is twice the mean
6	The value of sin iz, where z is a complex number is also same as	
	a	sinh z
	b	isinh z
	c	cosh z
	d	icosh z
7	A differential equation is considered to be ordinary if it has	
	a	one dependent variable
	b	more than one dependent variable
	c	one independent variable
	d	more than one independent variable

8	The value of sin(ilni) is	
	a	i
	b	1
	c	-1
	d	-i

9	The value of ln(1 + i), where ln is natural logarithm, is	
	a	$\mathrm{Ln}\sqrt{2} - i\pi/4$
	b	$\mathrm{Ln}\sqrt{3} - i\pi/2$
	c	$\mathrm{Ln}\sqrt{2} + i\pi/4$
	d	$\mathrm{Ln}\sqrt{2} - i\pi/2$
10	Which of these does not come under partial differential equations?	
	a	Laplace's equation
	b	Equations of motion
	c	1-D wave equation
	d	Heat equation
11	The property of system which remains same in all parts of a system is known as	
	a	Macroscopic Property
	b	Microscopic and Macroscopic property
	c	Microscopic property
	d	Microscopic state of all states

12	The distribution of energy associated with the dominant configuration is known as	
	a	Bose Einstein distribution
	b	Fermi Dirac distribution
	c	General Distribution
	d	Boltzmann Distribution
13	What is the weight associated with the configuration corresponding to observing 40 heads after flipping a coin 100 times?	
	a	$1.37 * 10^{28}$
	b	$2.37 * 10^{28}$
	c	$3.37 * 10^{28}$
	d	$4.37 * 10^{28}$
14	Consider the general labelling of systems as open, closed, or isolated. The first allows the exchange of matter and energy with its surroundings; the second allows only the exchange of energy, whereas the third allows no exchange at all. Which of the following statements is correct?	
	a	An open system obeys the rules of the canonical ensemble.
	b	An open system obeys the rules of the microcanonical ensemble.
	c	A closed system obeys the rules of the microcanonical ensemble.
	d	An isolated system obeys the rules of the canonical ensemble.

15	The translational partition function of a H atom is $8x10^{33}$ at 3700k in a volume of $0.064m^3$. What is the thermal wavelength value in meter.	
	a	10^{-12}
	b	$4x10^{-12}$
	c	$2x10^{-11}$
	d	$20x10^{-13}$
16	Particles which are identical, indistinguishable and have zero or integral spin are called _____	
	a	Fermions
	b	Positrons
	c	Bosons
	d	Neutrons

17	_____ do not obey Pauli's principal	
	a	Bosons
	b	Neutrons
	c	Positron
	d	Electron

18	According to law of equipartition of energy every mode of vibration is

	associated with an average energy ……	
	a	$\frac{1}{2}kT$
	b	$\frac{3}{2}kT$
	c	kT
	d	$2kT$

19	The number of quantum states lying between p and $p+dp$ from the concept of phase space is given by ……	
	a	$g(p)dp = \frac{4\pi V}{h^3} pdp$
	b	$g(p)dp = \frac{4\pi V}{h^3} p^2 dp$
	c	$g(p)dp = \frac{4\pi V}{h^3} p^3 dp$
	d	$g(p)dp = \frac{4\pi V}{h^3} p^4 dp$
20	If r is coefficient of reflection, t is coefficient of transmission and a is coefficient of absorption. For perfectly black body …… for all wavelengths	
	a	r + a + t =0
	b	r + a + t <1
	c	r + a + t >1
	d	a = 1