Applied Science (Physics) – 22211 Semester -II
MSBTE I-Scheme

Unit – III: Modern Physics (Photoelectricity)

Q. No.	Questions	Option A	Option B	Option C	Option D	Correct Option
1	The phenomenon of photoelectric emission was discovered in 1887 by	Heinrich Hertz	Albert Einstein	Max Planck	None of these	A
2	Metals like zinc, cadmium, magnesium, etc. emitted electrons only in	visible light	ultraviolet light	Both (A) and (B)	None of these	B
3	Planck quantum theory suggested that emission and absorption of energy is not a continuous process. The emission or absorption of energy is in form of	small units	packets of energy	quanta	All of these	D
4	Each quanta of energy which is emitted or absorbed in small units or packets is called	protons	photons	photo	ions	B
5	Energy of photon is given as	$E = nh\gamma$	$E = nhc/\lambda$	Both (A) and (B)	None of these	C
6	In the formula $E = nh\gamma$, E represents	energy of photon	planck's constant	frequency of photon	None of these	A
7	In the formula $E = nh\gamma$, n represents	energy of photon	planck's constant	frequency of photon	discrete units	D
8	In the formula $E = nh\gamma$, h represents	energy of photon	planck's constant	frequency of photon	discrete units	B
9	In the formula $E = nh\gamma$, γ represents	energy of photon	planck's constant	frequency of photon	None of these	C
10	In the formula $E = nhc/\lambda$, λ represents	energy of photon	planck's constant		on wavelength of	D
11	In the formula $E = nhc/\lambda$, c represents	energy of photon	velocity of light		on wavelength of	B
12	The value of Planck's constant (h) is	6.63´10-34 Js	1.69´10-19 eV	3´108 m/s	8.39 MKS	A
13	The correct formula frequency (γ) is	c/λ	$c\lambda$	λ/c	$1/\lambda$	A
14	Which is the correct property of photons?	They are electrically neutral	They cannot be deflected by electric field	They cannot be deflected by magnetic field	All of these	D

15	Which is the correct property of photons?	They do not ionize	They travel with speed of light	They cannot be deflected by electric field or magnetic field	All of these	D
16	The formula for mass (m) of photon is given by	m = E/c2	m = hγ/c2	m = h/cλ	All of these	D
17	The formula for momentum (p) of photon is given by	p = mc	p = hγ/c	p = h/λ	All of these	D
18	The energy of photon is 5.28×10^{-19} J. The frequency of photon is	$\gamma = 0.8\times10^{15}$ Hz	$\gamma = 1.25\times10^{15}$ Hz	$\lambda = 3797\times10^{-10}$ m	$\lambda = 3797\times10^{-10}$ A°	A
19	The energy of photon is 5.28×10^{-19} J. The wavelength of photon is	$\gamma = 0.8\times10^{15}$ Hz	$\gamma = 1.25\times10^{15}$ Hz	$\lambda = 3797\times10^{-10}$ m	$\lambda = 3797\times10^{-10}$ A°	C
20	The energy of photon is 5.28×10^{-19} J. The wavelength of photon is	$\gamma = 0.8\times10^{15}$ Hz	$\gamma = 1.25\times10^{15}$ Hz	$\lambda = 3797\times10^{-10}$ m	$\lambda = 3797$ A°	D

MSBTE I-Scheme
Applied Science (Physics) – 22211 Semester -II

Q. No.	Questions	Option A	Option B	Option C	Option D	Correct Option
21	An accelerated electron emits a photon of frequency 0.8×10^{15} Hz. What will be the energy of photon, if h = 6.625×10^{-34} Js and 1eV = 1.6×10^{-19} J?	3312.5 eV	33.125 eV	33125 eV	331.25 eV	C
22	The emission of electron from a metal surface by light or any other radiation of suitable frequency (or wavelength) is called _____.	photoelectron	Photoelectricity	photoelectric effect	photo emission	C
23	_____ is defined as minimum or critical frequency of incident light required for emission of photoelectron.	Threshold wavelength	Threshold frequency	Stopping Potential	Work function	B
24	_____ is defined as maximum wavelength of incident light required for emission of photoelectron.	Threshold wavelength	Threshold frequency	Stopping Potential	Work function	A
25	The negative potential at which photoelectric current becomes zero is called _____	Threshold wavelength	Threshold frequency	Stopping Potential	Work function	C

26	The minimum energy required to eject the photoelectrons from the metal surface is called _____	Threshold wavelength	Threshold frequency	Stopping Potential	Work function	D
27	In Einstein photoelectric equation $h\gamma = W0 + 1/2\ mv2$, $h\gamma$ represents _____	energy of photon	work function	kinetic energy	None of these	A
28	In Einstein photoelectric equation $h\gamma = W0 + 1/2\ mv2$, W0 represents _____	energy of photon	work function	kinetic energy	None of these	B
29	In Einstein photoelectric equation $h\gamma = W_0 + 1/2\ mv^2$, $1/2\ mv^2$represents _____	energy of photon	work function	kinetic energy	None of these	C
30	In Einstein photoelectric equation $\gamma > \gamma_0$ then Kinetic energy is _____	positive	Negative	zero	infinity	A
31	In Einstein photoelectric equation $\gamma < \gamma_0$ then Kinetic energy is _____	positive	Negative	zero	infinity	B
32	In Einstein photoelectric equation $\gamma = \gamma_0$ then Kinetic energy is _____	positive	Negative	zero	infinity	C
33	In Einstein photoelectric equation $\gamma > \gamma_0$ then photoelectron _____	are emitted	cannot be emitted	are free, but no movement	are not free, but there is movement	A
34	In Einstein photoelectric equation $\gamma < \gamma_0$ then photoelectron _____	are emitted	cannot be emitted	are free, but no movement	are not free, but there is movement	B
35	In Einstein photoelectric equation $\gamma = \gamma_0$ then photoelectron _____	are emitted	cannot be emitted	are free, but no movement	are not free, but there is movement	C
36	The threshold frequency for photoelectric work function of certain metal is $W_0 = 6.625\times10^{-34}$ J is?	0.45×10^{15} Hz	4.5×10^{15} Hz	45×10^{15} Hz	0.45 Hz	A

MSBTE I-Scheme
Applied Science (Physics) – 22211 Semester -II

Q. No.	Questions	Option A	Option B	Option C	Option D	Correct Option
37	When light of wavelength 3800 A⁰ is incident on a metal plate, electrons are emitted with zero velocity. The threshold frequency is	78.9×10^{15} Hz	7.89×10^{15} Hz	0.789×10^{15} Hz	0.789 Hz	C

38	When light of wavelength 3800 A⁰ is incident on a metal plate, electrons are emitted with zero velocity. The Work function is	52.3×10^{-19} J	5.23×10^{-19} J	523×10^{-19} J	523 J	B
39	Photoelectric cell	converts light energy to electric energy	converts electric energy to light energy	emits light energy	absorbs electric energy	A
40	Photoelectrons emitted by photocell are attracted by	Cathode	Anode	Both (A) and (B)	None of these	B
41	Choose the correct applications of photoelectric effect	Exposure meter	Reproduction of sound in cinema	Burglar alarm	All of these	D
42	Choose the correct applications of photoelectric effect	Automatic doors	Photoelectric counters	Automatic switching of street lights	All of these	D
43	Choose the correct applications of photoelectric effect	Electric Eye	Illumination meters	lux meter	All of these	D
44	Choose the correct applications of photoelectric effect	Space	Photo counters	lux meter	All of these	D
45	The following figure shows the production of –	Laser	Photoelectric current	X-rays	None of these	B
46	The following figure is the experimental arrangement of –	Laser	Photoelectric effect	X-rays	None of these	B

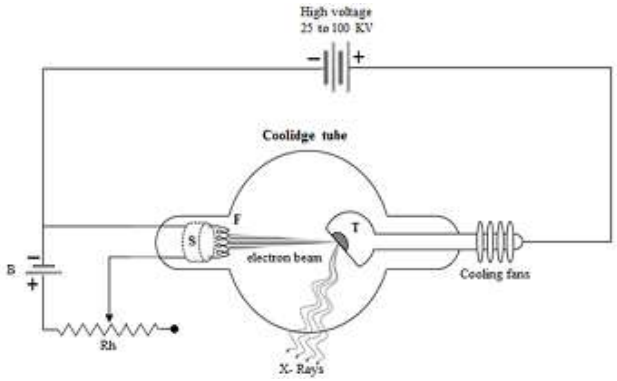
MSBTE I-Scheme
Applied Science (Physics) – 22211 Semester -II

Unit – III: Modern Physics (X-rays)

Q. No.	Questions	Option A	Option B	Option C	Option D	Correct Option
1	X-rays have	short wavelength	high frequency	Both (A) and (B)	longest wavelength	C
2	If fast moving electrons rapidly decelerate, then rays produced are	alpha rays	beta rays	gamma rays	x-rays	D
3	Wavelength of x-rays is in range	$10^{-8}$to 10^{-11} m	$10^{-7}$to 10^{-14} m	$10^{-10}$to 10^{-15} m	10^{2} to 10^{9} m	A
4	A low energy x-ray photon is said to have a _____ frequency and a _____ wavelength.	high, short	low, short	high, long	low, long	D
5	Type of x-rays used to detect break in bone is	hard	soft	Both (A) and (B)	moderate	A
6	Which of the following disease can be detected by X Ray?	Bladder infection	Pneumonia	Diarrhea	Fever	B
7	Who discovered the X-rays while studying the phenomenon of discharge of electricity through rarified gases?	W. K. Rontgen	Max Planck's	Albert Einstein	None of the above	A
8	When a high energetic electron is incident on the atom, the electron penetrates inside the atom and will either remove electron or get deflect from the innermost electron. As a result, some rays will produce which are called _____.	alpha rays	beta rays	X-rays	gamma rays	C
9	Depending on the origin of X-rays, they are classified as -	Characteristics X rays (Line spectra)	Continuous X-rays (Bremsstrahlung)	Both (A) and (B)	None of the above	C
10	X-rays which are emitted when a highly energetic charge particle eject an electron from the inner shells of the incident atoms is called _____.	Characteristics X rays (Line spectra)	Continuous X-rays (Bremsstrahlung)	Hard X-rays	Soft X-rays	A

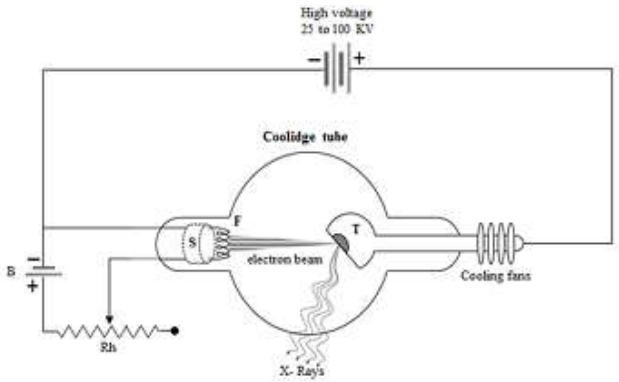
12	The X-rays emitted when fast moving electron is rapidly slows down by an electric field around the nucleus is called _____.	Hard X-rays	Soft X-rays	Continuous X-rays (Bremsstrahlung)	Characteristics X rays (Line spectra)	C

MSBTE I-Scheme
Applied Science (Physics) – 22211 Semester -II

Q. No.	Questions	Option A	Option B	Option C	Option D	Correct Option
13	Continuous X-rays are also called as	Hard X-rays	Soft X-rays	Line spectra	Bremsstrahlung X rays	D
14	Characteristics X-rays are also called as	Hard X-rays	Soft X-rays	Line spectra	Bremsstrahlung X rays	C
16	In the figure of X-ray production by Coolidge tube, F represents – 	tungsten filament	low tension battery	molybdenum cylinder	molybdenum or tungsten target	A
17	From the Q.16 figure of X-ray production by Coolidge tube, S represents -	tungsten filament	low tension battery	molybdenum cylinder	molybdenum or tungsten target	C
18	From the Q.16 figure of X-ray production by Coolidge tube, B represents -	tungsten filament	low tension battery	molybdenum cylinder	molybdenum or tungsten target	B
19	From the Q.16 figure of X-ray production by Coolidge tube, T represents -	tungsten filament	low tension battery	molybdenum cylinder	molybdenum or tungsten target	D

MSBTE I-Scheme
Applied Science (Physics) – 22211 Semester -II

Q. No.	Questions	Option A	Option B	Option C	Option D	Correct Option
20	What is the purpose of cooling fan, in production of X ray by Coolidge tube?	to accelerate the electron towards target T	to save the target from getting destroyed	Both (A) and (B)	None of the above	B
21	The filament of the Coolidge tube is surrounded by molybdenum cylinder kept at _____ potential to the filament.	positive	negative	Zero	None of the above	B
22	The target in Coolidge tube is placed at an angle of _____ with the path of electron beam.	180°	90°	45°	0°	C
23	X-rays with high penetrating power is called _____	Hard X-rays	Soft X-rays	Continuous X-rays	Characteristics X-rays	A
24	X-rays with low penetrating power is called _____	Hard X-rays	Soft X-rays	Continuous X-rays	Characteristics X-rays	B
25	The minimum wavelength of x-ray is _____ to applied voltage.	directly	inversely	exponentially	None of the above	B
26	An X-ray tube is operated at 30 KV. The minimum wavelength of X-rays emitted by it is _____	413 A°	41.3 A°	4.13 A°	0.413A°	D
27	An X-ray tube is operated at 30 KV. The maximum frequency of X-rays emitted by it is _____ $\times 10^{18}$ Hz	72.6	7.26	726	7260	B
28	X-ray tube works on 80 KV. The minimum wavelength of X-ray produced by X-ray tube is _____ A°	155	1.55	15.5	0.155	D
29	X-rays are electromagnetic radiations with short wavelength of order	(0.1 - 100) A°	(1 - 100) A°	(1 - 10) A°	(0.1 - 1) A°	A
30	X-rays are	negatively charged	positively charged	charge less	None of the above	C
31	X-rays	cannot be polarized	can be polarized	Both (A) and (B)	None of the above	B

32	X-rays have	no penetrating power	low penetrating power	high penetrating power	None of the above	C
33	The following figure shows the production of – 	Laser	Photoelectric current	X-rays	None of these	C

MSBTE I-Scheme
Applied Science (Physics) – 22211 Semester -II

Unit – III: Modern Physics (LASER)

Q. No.	Questions	Option A	Option B	Option C	Option D	Correct Option
1	LASER stands for	Light Amplification by Spontaneous Emitted of Radiation	Light Amplification by Spontaneous Emission of Radiation	Light Amplification by Stimulus Emitted of Radiation	Light Amplification by Stimulated Emission of Radiation	D
2	A beam of light which is coherent, monochromatic, unidirectional and intense is called	LASER	MASER	Photoelectricity	X-rays	A
3	Which is the correct property of LASER?	Monochromaticity	Unidirectionality	Coherence	All the above	D
4	Which is the correct property of LASER?	Monochromaticity	Unidirectionality	Extreme Intensity	All the above	D
5	The laser light has	one colour	two colour	many colour	no colour	A

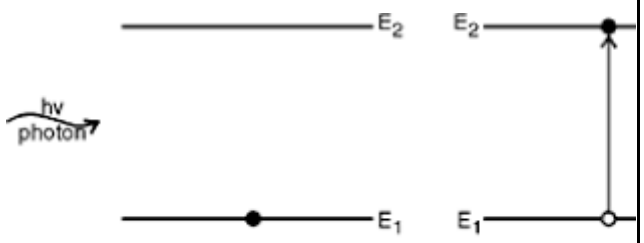
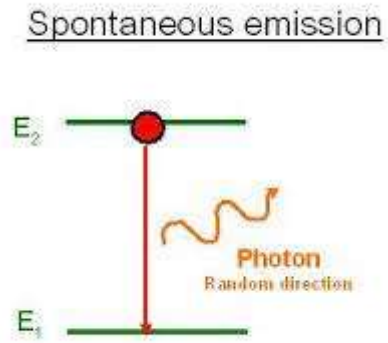
6	The laser light has	One colour	narrow beam with sharp focus	Both (A) and (B)	None of the above	C
7	Coherence means	the wavelength are out of phase	the waves are in phase	one colour	extremely intense	B
8	The laser light is extremely _____ and creates more brightness at a particular spot than ordinary light	weak	moderate	Intense	None of the above	C
9	The time during which an atom remains in _____ is unlimited.	metastable state	ground state	metastable excited state	ordinary excited state	B
10	The lifetime of ordinary excited state is of order _____ second.	10-8	greater than 10-8	less than 10-8	10-3	A
11	The lifetime of metastable state is of order _____ second.	10-8	greater than 10-8	less than 10-8	10-3	B
12	The lifetime of metastable excited state is of order _____ second.	10-8	greater than 10-8	10-3	less than 10-8	C
13	The process when a photon of energy hn is incident on an atom then the atom moves from lower energy level E1 to higher energy level E2 is called _____.	Stimulated emission	Stimulated absorption	Spontaneous absorption	Spontaneous emission	B
14	After completion of life time of the atom, the excited atom comes to ground state spontaneously by emitting a photon of energy hn, this is known as _____.	Stimulated emission	Stimulated absorption	Spontaneous absorption	Spontaneous emission	D

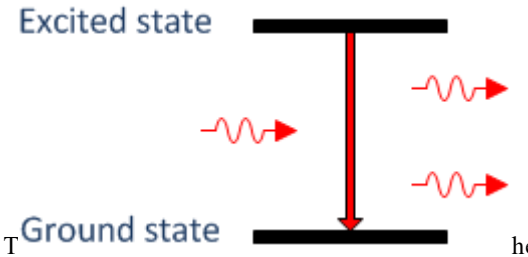
MSBTE I-Scheme
Applied Science (Physics) – 22211 Semester -II

Q. No.	Questions	Option A	Option B	Option C	Option D	Correct Option
15	When the atom is in excited state is triggered by an incident photon. The atom in excited state makes a transition to ground state by emitting another photon which is identical to incident photon. This process of forced emission of photons due to incident photon is called as _____.	Stimulated emission	Stimulated absorption	Spontaneous absorption	Spontaneous emission	A

16	Increasing the number of atom N2 more in higher energy level than the number of atom N1 in lower energy level is called _____.	Absorption	Population inversion	Pumping	Emission	B
17	The process of raising the atoms from lower energy state to higher excited energy state is called as _____.	Absorption	Population inversion	Pumping	Emission	C
18	The process of raising the atoms from lower energy state to higher energy state using light medium is called as _____.	Optical pumping	Absorption	Population inversion	Emission	A
19	In He-Ne gas laser, the mixture of He and Ne gas is in the ratio of -	10:1	1:1	9:1	1:9	A
20	What does the acronym LASER stand for?	Light Absorption by Stimulated Emission of Radiation	Light Amplification by Stimulated Emission of Radiation	Light Alteration by Stimulated Emission of Radiation	Light Amplification by Spontaneous Emission of Radiation	B
21	What determines the color of light?	its intensity	its wavelength	its source	none of these	B
22	The basic principle of the LASER is	Stimulated absorption	Stimulated emission	Spontaneous absorption	Spontaneous emission	B
23	Out of the following which is not property of the laser	Intensity	Directional	Coherence	Non-coherent	D
24	Light emitted by ordinary source of light is	Coherent	Non-coherent	Monochromatic	None of these	B
25	The stimulated emission is dominant over stimulated absorption by the process is called _____ .	Nuclear Energy	Optical Pumping	Population Inversion	None of these	C
26	Which of the following is a unique property of laser?	Directional	Speed	Coherence	Wavelength	C
27	To measure the distance between the earth and moon or other satellites, which concept will be used?	Photoelectricity	X-rays	Laser	None of the above	C
28	During wartimes, the distance of the target can be calculated using _____	Photoelectricity	X-rays	Laser	None of the above	C
29	Which of the following is an example of optical pumping?	Ruby laser	Helium-Neon laser	Semiconductor laser	Dye laser	A

MSBTE I-Scheme
Applied Science (Physics) – 22211 Semester -II

30	From the following figure, figure (a) represents –  	Stimulated emission	Stimulated absorption	Spontaneous absorption	Spontaneous emission	B
31	 The figure represents -	Stimulated emission	Stimulated absorption	Spontaneous absorption	Spontaneous emission	D

32	 The figure in represents -	Spontaneous absorption	Stimulated absorption	Stimulated emission	Spontaneous emission	C
33	Which is the correct application of LASER in field of communication?	Due to narrow angular spread, the laser beams are used to measure the distance between the earth and moon or other satellites.	It is commonly used to read bar-codes.	Lasers are used in treatment of detached retinas.	Lasers are used to investigate the structure of molecules	A

MSBTE I-Scheme
Applied Science (Physics) – 22211Semester -II

MSBTE I-Scheme
Applied Science (Physics) – 22211 Semester -II

34	Which is the correct application of LASER in field of Industry & Engineering?	Due to narrow angular spread, the laser beams are used to measure the distance between the earth and moon or other satellites.	It is commonly used to read bar-codes.	Lasers are used in treatment of detached retinas.	They are used in surgical operations to remove growth and repair tissues	B

MSBTE I-Scheme
Applied Science (Physics) – 22211 Semester -II

35	What is the need to achieve population inversion?	To excite most of the atoms	To bring most of the atoms to ground state	To achieve stable condition	To reduce the time of production of laser	A
36	In Stimulated Absorption, what is the lifetime of atoms in ground state?	1 second	1 minute	1 hour	Infinity	D
37	During Population inversion, which of the following processed is dominant?	Stimulated Absorption	Stimulated Emission	Spontaneous Emission	Spontaneous Absorption	A

MSBTE I-Scheme