Marking Scheme

Total No. of Questions – [5]   Total No. of Printed Pages 04 ~~05~~

G.R. No. [   ]

Paper Code :- U117-105A (RE-FS&F)

DECEMBER 2017 / ~~ENDSEM~~ RE-EXAM

F. Y. B. TECH. (COMMON) (SEMESTER - I)

COURSE NAME: ENGINEERING PHYSICS

COURSE CODE: ES10175A

(2017 PATTERN)

Time: [2 Hours]   [Max. Marks: 50]

(*) Instructions to candidates:
1) Answer Q.1 OR Q.2, Q.3 OR Q.4 and Q.5
2) Figures to the right indicate full marks.
3) Use of scientific calculator is allowed
4) Use suitable data wherever required

				Marking scheme	Cctive lev	Difficult lev	CO
Q.1	a)	With the help of neat diagram, disc the construction and working Carbon dioxide Laser.	[6]	Construction diagram – 1M Energy level diagram -1M Description – 4M	C	M	5
	b)	Explain the following terms as build blocks of a Laser. i)Active medium. ii)Pumping mechanism. iii)Optical cavity.	[6]	2M each	C	M	5
	c)	For some optical fiber the refrac index of the core and cladding is 1 and 1.45, respectively. Calculate numerical aperture, acceptance an and critical a angle.	[4]	$NA = n_1 \sqrt{2\left(\dfrac{n_1 - n_2}{n_1}\right)}$ $NA = 1.65 \sqrt{2\left(\dfrac{1.65 - 1.45}{1.65}\right)} = 0.81$ $\theta_0 = sin^{-1}(NA) = 54.33°$ $\emptyset_c = sin^{-1}\left(\dfrac{n_2}{n_1}\right) = 61.5°$	A	H	5
		OR					

Q							
Q	a)	Explain the following terms characteristics of Laser : i)Monochromaticity. ii)Coherence. iii)Directionality.	[6]	2M each	C	M	5
	b)	State different applications of L and explain any one mechan industry application of Laser.	[6]	State applications (minimum 4) – 2M One detailed – 4M	K	M	5
	c)	Explain the difference betw Spontaneous emission and Stimul emission.	[4]	2M each	C	M	5
Q	a)	Obtain energy and wave function particle trapped in rigid box.	[6]	Diagram -1M Upto Energy – 3M Normalised wave function – 2M	C	H	6
	b)	What is Q-value of nuclear react How it can be calculated in terms of energies of the particles?	[4]	Q-value – 1M Explanation – 3M	C	M	6
	c)	Let the average energy released fission of U^{235} be 200MeV. If 100gm of U^{235} undergoes fiss calculate the energy generated. (Given: Avogadro's no. = 6.023x1 atoms/gm mole)	[4]	100g of U^{235} contains $\frac{6.023 \times 10^{23}}{235} \times 100 \; nuclei$ Energy $= \frac{6.023 \times 10^{23}}{235} \times 100 \times 200 MeV$ $= 512.6 \times 10^{23}$ MeV	A	M	6
OR							
Q	a)	With the help of neat diagram exp the construction and working of nuclear fission reactor.	[6]	Diagram – 2M Explanation - 4M	C	M	6
	b)	Draw BE curve. Explain significance with respect to nuc fission and nuclear fusion.	[4]	BE curve – 1M Explanation – 3M	C	M	6
	c)	You are given the following ato masses: i) U^{238} : 238.05079 a.m.u. ii)Th^{234}: 234.04363 a.m.u. iii)He^4 : 4.002604 a.m.u.	[4]	$U^{238} \rightarrow Th^{234} + He^4 + Q$ Q = +4.244 MeV (exothermic)	A	H	6

		Calculate the energy released dur the alpha decay of U^{238}.					
Q		Attempt following multiple choice questions: [1x20=20 marks					
	a)	Loudness of sound depends on _____. i)velocity. ii)frequency. iii)wavelength. iv)intensity.	[1]	iv	K	M	1
	b)	Which of the following cause focusing of sound in a hall? i)Curtains. ii)Convex walls. iii)Concave walls. iv)Flat walls.	[1]	iii	K	M	1
	c)	Ultrasonic waves show_____. i)reflection ii)interference iii)diffraction iv)all the above	[1]	iv	K	M	1
	d)	Ultrasonic waves are used in the industry for _____. i)Cleaning of machine parts ii)drilling iii)welding iv) all the above	[1]	iv	K	M	1
	e)	Which of the following is an application of echo sounding? i)Flaw detection. ii)SONAR. iii)Sonography. iv)all the above.	[1]	iv	K	M	1
	f)	Interference is constructive if the path difference is ___. i)$n\lambda$ ii)$(2n-1)\lambda$ iii)$(2n+1)\lambda$ iv)$(2n-2)\lambda$	[1]	i	K	M	2
	g)	An excessively thin film illuminated by white light appe _____ in the reflected system. i)uniformly bright ii)coloured iii)dark iv)red	[1]	iii	K	M	2
	h)	If the angle of wedge is increased, the fringe width _____ i)increases ii)decreases iii)remains same iv) first increases t decreases	[1]	ii	K	M	2
	i)	For a single slit if the width is double of the wavelength of light used, the first minimum will be obtained at ____. i)30^0 ii)45^0 iii)15^0 iv)60^0	[1]	i	A	H	2

j)	In case of grating the quantity (a + b) is called _____. i)width of the grating $\qquad$ ii)grating element iii)power of grating $\qquad$ iv) none of the above	[1]	ii	K	L	2
k)	An electron can exist in _____. i)valance band $\qquad$ ii)conduction band iii)forbidden band $\qquad$ iv)both i) and ii)	[1]	iv	K	M	3
l)	Energy bands are formed in_____. i)solids $\qquad$ ii)liquids iii)gases $\qquad$ iv)all the above	[1]	i	K	M	3
m)	The Fermi function for $E=E_F$ at $T > 0K$ is_____. i) 1 $\qquad$ ii)1/2 iii) 0 $\qquad$ iv)2/3	[1]	ii	K	M	3
n)	Ohm's law relates to the electric field E, conductivity σ current density J as- i) $J = E/\sigma$. $\qquad$ ii)$J = \sigma E^2$. iii)$J = \sigma/E$. $\qquad$ iv) $J = \sigma E$.	[1]	iv	K	M	3
o)	The forbidden gap in an insulator is of the order of _____. i)0eV $\qquad$ ii)1eV iii)6eV $\qquad$ iv) none of the above	[1]	iii	K	L	3
p)	Generation of e.m.f. across an open circuited P-N junction w light is incident on it is known as _____ effect. i)photovoltaic $\qquad$ ii)photoconductive iii)photoelectric $\qquad$ iv)none of the above	[1]	i	K	M	4
q)	When light is incident on a solar cell , the electron-hole pairs separated due to_____. i)applied voltage $\qquad$ ii)incident light iii)electric field in depletion region $\qquad$ iv)all the above	[1]	iii	C	M	4
r)	The ideal power of the solar cell is given by_____. i)Vm.Im $\qquad$ ii)Voc.Isc iii)Voc/Isc $\qquad$ iv) Vm/Im	[1]	ii	K	M	4
s)	The Fill factor of the solar cell is given by –	[1]	i	K	M	4

	i)Vm.Im/Voc.Isc	ii)Voc.Isc/Vm.Im				
	iii)Vm.Im	iv)Voc.Isc				
t)	To increase current o/p from an array of solar cells, they are to connected in _____. i)series ii)parallel ii)both i) and ii) iv)none of the above		[1]	ii	C	M	4