		Reg. No.										
	प्रज्ञानं ब्रह्म MANIPAI	L UNIVEF	RSIT	ΓY								
	DEPARTME	ENT OF SCII	ENCI	ES								
	Manipal INSPIRED BY LIFE THIRD SEMESTER MSc END SEME	ESTER EXAM	IINA	ΓION	NOV	V. – D	DEC.	- 201	5			
	SUBJECT: NUCLEA	R PHYSIC	S I (1	PHY	-707	7.5)						
	(CREE	DIT SYSTEM	)									
TIME	2: 3 HOURS							М	AX. ]	MAR	KS: 5	60
Answe	r Any FIVE full questions.											-
1.	(a) Obtain momentum distribution func	tion for bet	a deo	cay.							[5]	
	(b) Explain Bragg curve and particle "range" for alpha radiation with the help of particle											icle
	transmission experiment.										[5]	
2.	(a) Derive the expression for kinetic energy transferred to an electron by a heavy charged											ged
	particle.										[5]	
	(b) What is scintillation process? Explai	n working p	orinc	iple	of in	orga	nic s	scint	illati	on ra	adiat	ion
	detector?										[1-	+3]
3.	(a) Explain the working of Photo Multin	lier Tube in	a ga	mm;	a spe	octro	met	er se	tun	with	a bl	ock
0.	diagram.		- 8-					0.00			[5]	
	(b) Draw the block diagram of Ge(Li) de	etector with	n nro	ner	hiasi	ng o	of the	∍ iun	ctio	n C	alcul	ate
	the scintillation efficiency of Anthracene if 1.33 MeV of narticle energy loss creates 20.000										100	
	nhotons with average wavelength of 45	0 nm		0, 5,		e en	.6.91	100.		acco	[2-	+3J
		0 1111.									[2	. 2]
4.	(a) Explain angular correlation between	the directi	ons d	of er	nissi	on o	ftwo	o suc	cess	ive g	gamr	na-
	gamma radiations.										[5]	
	(b) Hydrogenous materials are best	suited for	nei	utroi	n m	oder	atio	n, J	ustify	y. Fi	ind	the
	approximate energy loss of 1 MeV alpha particles in a thickness of 5 $\mu$ m of gold. Given											en:
	specific energy loss is 380 MeV. cm <sup>2</sup> g <sup>-1</sup> ;	density is 1	.9.3 ք	g cm	3.						[2-	+3]
5.	(a) Draw and explain, range and transn	nission curv	ves fo	or m	ono-	ene	rgeti	c ele	ectro	ns a	nd b	eta
	particles.							[5]				
	(b) How to measure the resolution of HPGe detector system using Co-60 radiation sources											
	The average energy required to produce an ion pair in gas by the energetic radiation is 35 eV											
	A neutron fission counter is lined with L	J-235 to det	tect	neut	rons	by i	oniz	ing f	issio	n fra	gme	nts

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that produces an average energy of 200 MeV. Find the pulse height at a capacitor of capacitance 40pF connected to the collecting cathode. [2+3]

6. (a) With relevant nuclear reaction, explain slow neutron detection using  $BF_3$  counter. What is the reason for "wall effect". [3+2]

(b) Write the decay scheme of Cs - 137 radioisotope. Compute the maximum energy of the Compton recoil electrons resulting from the absorption in Al of 2.19 MeV. [2+3]

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