Shree H.N.Shukla group of colleges

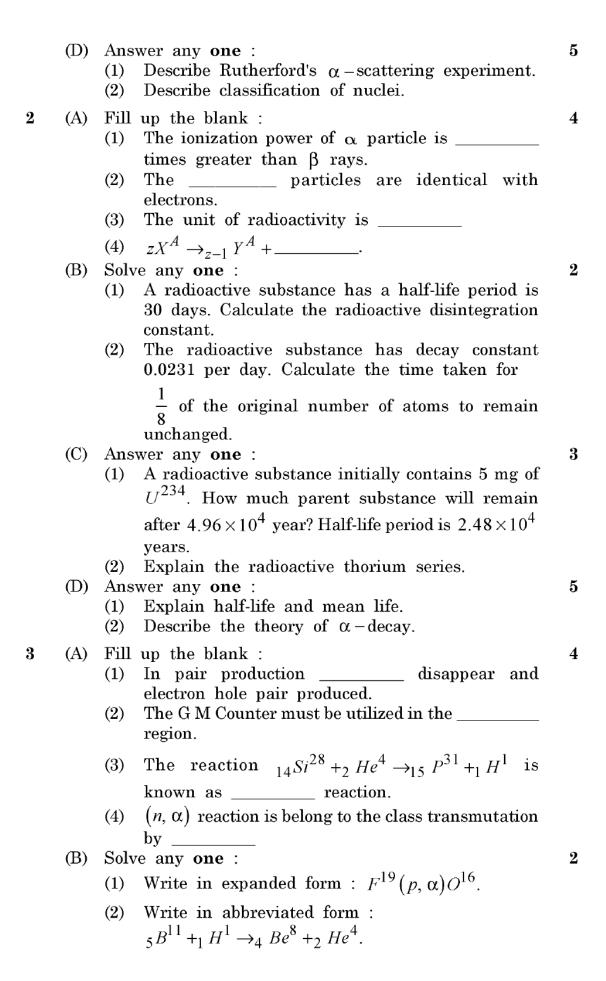


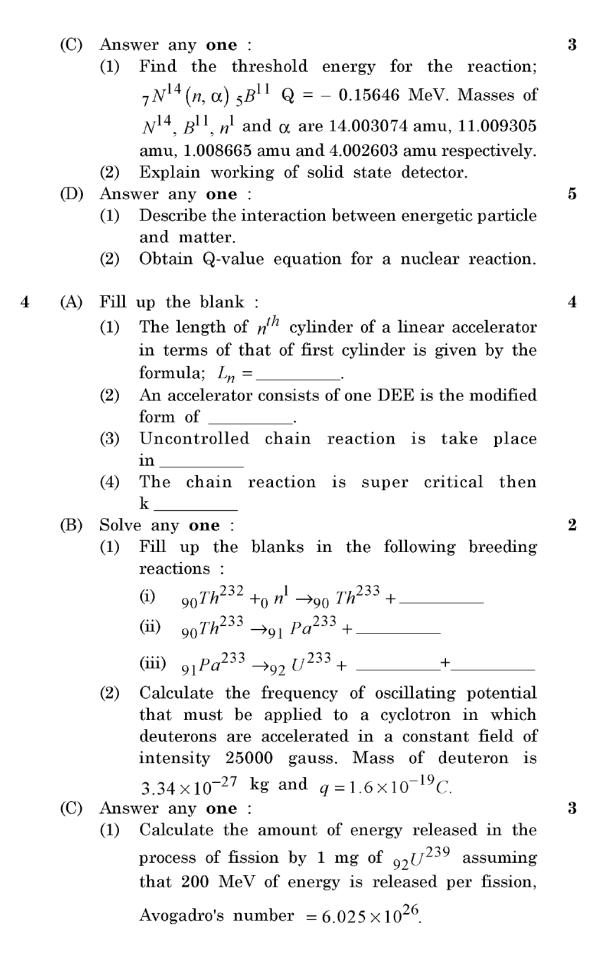
PHYSICS

T.Y.B.Sc. (Sem. VI) (CBCS) Preliminary Examination PAPER- 603

NULCEAR AND PARTICLE PHYSICS

Time: 2	$2\frac{1}{2}$ Hours] [Total Marks : 7	0
Instruct	 ions: (1) All questions are compulsory. (2) Symbols have their usual meaning. (3) Figures on right hand sides indicates full marks 	3.
1 (A)	Fill up the blank: (1) Protons and neutrons are jointly called (2) \[\frac{nuclear mass}{nuclear volume} = (3) The nuclei, having even number of protons and	4
(B)	even number of neutrons are called nuclei. (4) In semi empirical mass formula, the surface term, Es =	2
(-)	(1) Calculate the binding energy of $_{32}Br^{80}$. Atomic masses of Br^{80} , proton and neutron are 79.91 amu, 1.007825 amu and 1.008665 amu respectively.	
	(2) What is the binding energy per nucleon of $_{28}Ni^{64}$ Mass of proton = 1.007275 amu, mass of neutron = 1.008665 amu. and mass of $_{28}Ni^{64}$ nucleus = 63.8126 amu.	
(C)		3
	 (1) Determine the binding energy of 26Fe⁵⁶ using semi-empirical mass formula. The constants of the formula are a = 15.7, b = 17.8, c = 0.711, d = 23.7 and δ = 11.18. (2) Discuss binding energy. 	





		(2)	Draw the schematic diagrams of synchrocyclotron, electron synchrotron and proton synchrotron.	
	(D)	Ans	wer any one :	5
		(1)	Describe construction and working of linear accelerator.	
		(2)	Describe main components of nuclear reactor.	
5	(A)	Fill	up the blank:	4
		(1)	The sun radiates joule energy per second.	
		(2)	Nuclear fusion as an energy source will be a boon to humanity because is available everywhere on this planet.	
		(3)	Positron is anti-particle of	
		(4)	Lambda, sigma, xi and omega particles are known	
	(P)	Salv	as	2
	(B)	(1)	e any one : What is the net result of the following reactions;	4
		(1)		
			$_{1}H^{1} +_{1}H^{1} \rightarrow_{1}H^{2} +_{1}e^{0} + \gamma + 0.42 MeV$ $_{1}H^{2} +_{1}H^{1} \rightarrow_{2}He^{3} + \gamma + 5.5 MeV$	
			$_{2}He^{3} +_{2}He^{3} \rightarrow_{2}He^{4} + 2_{1}H^{1} + 12.8 MeV$	
		(9)		
		(2)	Calculate the energy liberated when a single helium nucleus is formed by the fusion of two	
			deuterium nuclei. Given: mass of $_1H^2 = 2.07478$	
			amu, mass of $_2He^4 = 4.00388$ amu.	
	(C)	Ans	wer any one:	3
		(1)	Calculate the mass of the $_2He^3$ in the following	
			fusion reaction:	
			$_{1}H^{2} +_{1}H^{2} \rightarrow_{2} He^{3} +_{0} n^{1} + 3.26 MeV$	
			Given: mass of $_1H^2 = 2.01471$ amu, mass of	
			$_0n^1 = 1.00898$ amu.	
		(2)	Discuss tokamak for plasma confinement.	
	(D)	Ans	wer any one:	5
		(1)	Describe source of stellar energy.	
		(2)	Give the classification of elementary particles.	