

G. S. Mandal's
 Maharashtra Institute of Technology, Aurangabad
 (An Autonomous Institute)
 MAKE-UP EXAMINATION
First Year B.Tech (All) -April/May 2022

Course Code : BSC102
 Duration : 2 Hrs

Course Name : Open Elect. I – Engg. Physics
 Max. Marks : 50 Date : 09/05/2022

Instructions :

- i) All questions are compulsory
- ii) Assume suitable data wherever necessary and clearly state it
- iii) Figures to the right indicate full marks

Q. 1		Solve/Answer any five			10 Marks		
		Questions	Marks	CO	BL		
a	Label the parts by drawing Michelson interferometer.		2	1	1		
b	Define nuclear fission reaction.		2	1	1		
c	Define lattice and unit cell.		2	1	1		
d	What is the formula relating wavelength to the momentum as per the de Broglie hypothesis?		2	1	1		
e	List carbon allotropes along with a feature of each.		2	1	1		
f	Label the parts by drawing nuclear reactor.		2	1	1		
Q. 2		Solve the following questions			8 Marks		
a)	The X-rays used for diffraction with wavelength 1.54 \AA and diffracted peak is located at an angle $2\theta = 35.2^\circ$, the peak broadening for the sample is found out to be 0.91° which is 0.10° for standard sample. If the particles are assumed to be spherical in shape estimate the particle size of the sample.		4	3	3		
b)	The photo detector is focused at 4000 \AA (violet) and required to focus at 7000 \AA (red). How much angular rotation would be required if the white light is used as a source in the first-order visible spectrum produced by a plane grating with 2500 slits per cm?		4	3	3		

Q. 3	Solve the following questions	8 Marks		
a)	Make use of given information to confirm whether a quartz crystal with thickness 0.001 meter when vibrating at resonance will be able to produce the ultrasonic waves? Given that Young's modulus of quartz is 7.9×10^{10} Newton/meter ² and density of quartz is 2650 kg/m ³	4	3	3
b)	Apply the step index fiber having the numerical aperture 0.26 and refractive index of core 1.5 by finding the values of refractive index of cladding and acceptance angle.	4	3	3
Q. 4 Solve the following questions 8 Marks				
a	Demonstrate the FCC structure is closely packed structure on the basis of packing efficiency.	4	2	2
b	Explain GM Counter for detection of β (beta)-radiation	4	2	2
Q. 5	Analyze the role of polarization in Laurent half shade polarimeter	8	4	4
OR				
Q. 5	Explain acoustical factors in architectural design	8	4	4
Q. 6	Analyze BCS theory for the experimental observations of superconductivity	8	4	4
OR				
Q. 6	Compare the features of ruby laser and He-Ne laser	8	4	4