PRN No. 018	Total No. of Questions: 12

QP Code: FYESPE425049A

JSPM's

Rajarshi Shahu College of Engineering, Tathawade, Pune- 411033

(An autonomous institute affiliated to Savitribai Phule Pune University)

Examination: End Semester Examinations

Semester: I **Academic Year: 2024-25**

Class: F. Y. B. Tech. (All Programs)

Department: Engineering Sciences and Humanities

Subject Code: ES1206T **Subject Name and pattern: Physics for Engineers (2024)**

Duration: 2 Hour **Max. Marks: 50 Marks**

Instructions to the Candidates :- Solve Sections A, B, C.

1. ~~In Section A, Q.1, Q.2 and Q.3 is compulsory.~~
2. ~~In section B, Solve Q.4 or Q.5, Q.6 or Q.7 and Q.8 or Q.9.~~
3. Assume suitable and necessary data wherever required.
4. **Constants**

   Charge of electron(e)=1.6×10^{-19} C

   Mass of electron (M_e)= 9.1×10^{-31} Kg

   Planck's constant (h)=6.626×10^{-34} J-sec

   Avogadro's no (N A)= 6.022×10^{23}

   Mass of Proton (M_p)= 1.6×10^{-27} Kg

Section-A

Q. No.			Marks	BL	CO
1	a	What are springs? Enumerate their types.	3	BL1	CO1
		OR			
1	b	Define Mach number and Mach angle?	3	BL1	CO1
2	a	What is noise? Explain different types of noise.	3	BL1	CO1
		OR			
2	b	Define 1) Reverberation time 2)Timbre 3)Echo	3	BL1	CO1
3	a	Define 1) Pumping 2) Population Inversion 3) Active System	3	BL1	CO2
		OR			
3	b	Calculate the maximum value of angle of incidence such that Light rays can travel through the fiber. Data given: $n_1 = 1.6$, $n_2=1.5$	3	BL2	CO2
4	a	State and explain De-Broglie's hypothesis.	3	BL1	CO4
		OR			
4	b	The lowest energy of an electron trapped in an infinite potential well is 38 eV. Calculate the width of the well.	3	BL1	CO4
5	a	White light falls at an angle of 45^0 on a parallel soap film of refractive index 1.33. At what minimum thickness of the film will it appear	3	BL2	CO3

bright yellow of wavelength 5900Å in the reflected light?

OR

5	b	What is diffraction? Distinguish between Fresnel and Fraunhofer types of diffraction	3	BL1	CO3
6	a	Write any three differences between hazards and disasters.	3	BL1	CO4

OR

6	b	What are the characteristics of Tsunami?	3	BL1	CO4

Section-B

7	a	State and explain Heisenberg's uncertainty principle. Illustrate it with an example of electron diffraction at single slit.	5	BL2	CO4

OR

7	b	What is De-Broglie's hypothesis? Discuss any four properties of matter waves.	5	BL2	CO4
8	a	Derive an expression for path difference between light rays reflected by a thin transparent parallel film of refractive index μ. Write the mathematical conditions for brightness and darkness of the thin film.	5	BL1	CO3

OR

8	b	A slit of width a is illuminated by white light. For what value of a will the first minimum for red light fall at an angle of 30^0? (Wavelength of red light is 6500 A^0)	5	BL2	CO3
9	a	Describe the impacts of earthquake and Tsunami on the economic development of a nation.	4	BL2	CO4

OR

9	b	Mention the short term and long term effects of landslides.	4	BL3	CO4

Section-C

10	a	Deduce Schrodinger's time independent wave equation.	6	BL3	CO4

OR

10	b	Obtain an expression for energy of a particle trapped in a rigid quantum box.	6	BL3	CO4
11	a	Explain Fraunhofer diffraction at a single slit. Derive expressions for resultant amplitude and resultant intensity due to single slit. State the mathematical conditions for central (principal) maximum and minima	6	BL3	CO3

OR

11	b	How are Newton's rings formed in laboratory? Show that the diameters of Bright rings are directly proportional to the square root of odd natural numbers.	6	BL3	CO3
12	a	What is an earthquake? Enlist and describe different types of earthquakes.	6	BL3	CO4

OR

12	b	What are landslides? Discuss the types of landslides. What are their causes?	6	BL3	CO4

**********ALL THE BEST **********