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HSSC-I NATIONAL BOOK FOUNDATION FBISE

PHYSICS TEST - CHAPTER 7: PHYSICS OF SOLIDS

Name:		Roll No.		Section:

Total Time: 2:30 Hour
Time Allowed: 150 Minutes

Total Marks: 150

PAPER OBJECTIVE
SECTION-A (MARKS 150)

NOTE: Section-A is compulsory. All parts of this section are to be answered on these pages and handed over to the center superintendent. Deleting / overwriting is not allowed. Do not use lead pencil.

Q.1 Fill the relevant bubble for each part. All parts carry one mark.

Questions	A	B	C	D	A B C D
1. Solids have a definite	neither shape nor volume	shape only	shape and volume	volume only	○○●○
2. On atomic arrangement, solids are classified as	hard, soft, brittle	crystalline, polycrystalline, amorphous	metals, gases, plasmas	solid, liquid, gas	○●○○
3. In a crystalline solid, atoms are arranged in	short-range order only	a random manner	no fixed pattern	a regular repeating pattern	○○○●
4. Atomic arrangement in crystals is studied by	optical lens only	ultrasound	X-ray diffraction	radio waves	○○●○
5. Which is a crystalline solid?	Glue	Rubber	Sodium chloride	Glass	○○●○
6. Which is an amorphous solid?	Copper sulphate	Glass	Quartz	Diamond	○●○○
7. Which is a polycrystalline solid?	Most metals	Glass	Rubber	Glue	●○○○
8. Crystalline solids have	no melting point	sharp melting points	gradual softening	a range of melting temperatures	○●○○
9. Amorphous solids melt	at one exact temperature	over a range of temperature	only under pressure	never	○●○○
10. Anisotropy of a crystal means its properties	are same in all directions	depend on direction	are zero	never change	○●○○
11. Polycrystalline solids are generally	gaseous	anisotropic	isotropic	liquid-like	○○●○
12. Tiny crystals in a polycrystalline solid are called	lattices	basis	unit cells	grains	○○○●
13. Regions between grains are called	unit cells	lattice points	grain boundaries	basis	○○●○
14. Amorphous solids are also called	glassy solids	crystals	alloys	ceramics	●○○○

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Questions	A	B	C	D	A B C D
15. Amorphous solids have structure like	gases	plasma	perfect crystals	frozen liquids	○○○●
16. Glass is sometimes called a	super-cooled liquid	crystal	metal	gas	●○○○
17. Polymers are formed from small molecules by	fusion	oxidation	sublimation	polymerization	○○○●
18. A natural polymer is	PVC	polythene	polystyrene	rubber	○○○●
19. A synthetic polymer is	wood	rubber	polythene	resin	○○●○
20. Polymers are generally	superconductors	strongly magnetic	good conductors	poor conductors of heat and electricity	○○○●
21. A unit cell is the	whole crystal	smallest repeating portion of a crystal	single molecule	imaginary line	○●○○
22. A crystal lattice is obtained by	melting the solid	compressing the solid	removing atoms	repeating the unit cell	○○○●
23. Atoms, ions or molecules that make up a crystal are called	lattice	basis	grains	stress	○●○○
24. Atoms per unit cell in simple cubic (SC)	4	2	1	8	○○●○
25. Atoms per unit cell in body-centred cubic (BCC)	8	2	1	4	○●○○
26. Atoms per unit cell in face-centred cubic (FCC)	1	8	2	4	○○○●
27. A BCC unit cell has atoms at corners and at the	nowhere else	centre of the body	centre of each face	centre of each edge	○●○○
28. An FCC unit cell has atoms at corners and at the	centre of each face	centre of the body	centre of each edge	nowhere else	●○○○
29. Number of distinct shapes of unit cells is	14	3	7	5	○○●○
30. Deformation is a change in	colour	mass	shape, length or volume	temperature only	○○●○
31. A force applied to a solid can produce	loss of mass	deformation	no effect	increase of density	○●○○

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Questions	A	B	C	D	A B C D
32. Stress is defined as	force per unit volume	area per unit force	force times area	force per unit area	○○○●
33. SI unit of stress is	N m	N	N m^2	N m^{-2}	○○○●
34. Dimensions of stress are	ML^{2}T^{-2}	MLT^{-2}	ML^{-2}T^{-2}	ML^{-1}T^{-2}	○○○●
35. Strain is	measured in Pa	measured in kg	dimensionless	measured in m	○○●○
36. Tensile strain equals	force ÷ area	change in length ÷ original length	change × original length	original length ÷ change	○●○○
37. Tensile stress is a	tangential force per unit area	twisting force	uniform pressure	stretching force per unit area	○○○●
38. Shear stress produces a change in	length only	density	mass	shape	○○○●
39. Volume stress is a force acting	along the length	by twisting	uniformly from all directions	tangentially	○○●○
40. Hooke's law states that within the proportional limit	stress ∝ strain^2	stress ∝ strain	stress = strain	stress ∝ 1/strain	○●○○
41. Young's modulus is the ratio	stress × strain	force × area	stress / strain	strain / stress	○○●○
42. SI unit of Young's modulus is	newton	pascal	pascal metre	dimensionless	○●○○
43. Young's modulus of a wire of length L, area A and extension ΔL is	AΔL/(FL)	FA/(LΔL)	FL/(AΔL)	F/(ALΔL)	○○●○
44. Young's modulus measures a material's	stiffness	colour	brittleness	density	●○○○
45. A larger Young's modulus means the material is	stiffer	softer	more stretchy	lighter	●○○○
46. Of steel and rubber, larger Young's modulus belongs to	rubber	steel	both equally	neither	○●○○
47. Force 100 N acts on wire of area 1 mm^2. Stress is	100 Pa	1 × 10^5 Pa	1 × 10^8 Pa	1 × 10^{-4} Pa	○○●○
48. A 2 m wire stretches 1 mm. Strain is	2 × 10^{-3}	0.5	5 × 10^{-4}	5 × 10^{-2}	○○●○

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Questions	A	B	C	D	A B C D
49. Stress 2×10^{8} Pa gives strain 1×10^{-3}. Young's modulus is	2×10^{5} Pa	2×10^{11} Pa	2×10^{-11} Pa	5×10^{-12} Pa	○●○○
50. Young's modulus of a wire depends on	its diameter	its length	the load applied	its material	○○○●
51. If wire diameter doubles under the same force, stress becomes	one quarter	half	four times	double	●○○○
52. If wire length doubles (same force and area), extension becomes	double	four times	same	half	●○○○
53. Force to stretch a 2 m steel wire (Y = 2×10^{11} Pa, area 1 mm^2) by 1 mm is	1 N	1000 N	10 N	100 N	○○○●
54. Young's modulus experiment measures extension for different	temperatures	colours	densities	loads	○○○●
55. Wire diameter in the experiment is best measured with	screw gauge	thermometer	stopwatch	metre rule	●○○○
56. Wire length in the experiment is measured with	barometer	balance	screw gauge	metre rule	○○○●
57. A long thin wire is used so that extension is	zero	measurable	infinite	negligible	○●○○
58. In elastic deformation, a body regains its shape when load is	doubled	removed	applied	heated	○●○○
59. In plastic deformation, the body	fully regains its shape	does not fully regain its shape	always breaks	becomes liquid	○●○○
60. Elastic limit is the maximum stress up to which	deformation is fully recoverable	strain is zero	wire breaks	Hooke's law fails always	●○○○
61. Beyond the elastic limit a wire shows	permanent deformation	zero stress	perfect recovery	no strain	●○○○
62. Hooke's law is obeyed up to the	breaking point	proportional limit	fracture point	yield point	○●○○
63. The maximum stress on a stress–strain curve is the	yield point	ultimate tensile stress	proportional limit	elastic limit	○●○○
64. The point where a wire finally breaks is the	origin	proportional limit	fracture point	elastic limit	○○●○
65. A ductile material can be	drawn into wires	compressed into gas	melted without heat	shattered easily	●○○○

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Questions	A	B	C	D	A B C D
66. A brittle material breaks	only by heating	after large stretching	with little plastic deformation	never	○○●○
67. A ductile material is	copper	glass	chalk	ceramic	●○○○
68. A brittle material is	aluminium	glass	copper	gold	○●○○
69. Slope of the straight part of a stress-strain graph is	strain	work	energy	Young's modulus	○○○●
70. Slope of a force-extension graph of a spring is	force constant	strain	Young's modulus	stress	●○○○
71. Area under a force–extension graph represents	force	strain	power	work done	○○○●
72. Work done in stretching a wire by extension x with force F is	F x	F/x	2 F x	½ F x	○○○●
73. Elastic potential energy of a spring is	½ k x^2	2 k x^2	½ k x	k x^2	●○○○
74. Elastic potential energy also equals	strain ÷ stress	stress × strain	½ × stress × strain × volume	½ × stress ÷ strain	○○●○
75. A spring (k = 200 N m^{-1}) is stretched 0.1 m. Stored energy is	1 J	2 J	10 J	20 J	●○○○
76. If spring extension doubles, stored energy becomes	4 times	8 times	half	2 times	●○○○
77. A 20 N force stretches a spring 4 mm. Force constant is	5000 N m^{-1}	500 N m^{-1}	80 N m^{-1}	0.2 N m^{-1}	●○○○
78. Energy stored by a 10 N load stretching a wire 2 mm is	0.1 J	0.01 J	20 J	0.02 J	○●○○
79. Elastic energy per unit volume is	strain ÷ stress	½ × stress ÷ strain	stress × strain	½ × stress × strain	○○○●
80. Unit of elastic energy per unit volume is	J m	J m^{-2}	J m^{-3}	J	○○●○
81. Elastic potential energy of a stretched wire is	infinite	always positive	zero	negative	○●○○
82. Repeated bending breaks a wire because it	undergoes plastic deformation	cools down	becomes elastic	gains mass	●○○○

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Questions	A	B	C	D	A B C D
83. Steel is harder than lead because of	atomic structure and bonding	size	colour	shape	●○○○
84. Teflon is used on pans and engine parts because of	high friction	high stress	high density	very low friction	○○○●
85. Diamond is an example of a	amorphous solid	liquid	crystalline solid	polymer	○○●○
86. Quartz is widely used in	solar panels	watches and clocks	pipes	tyres	○●○○
87. Amorphous silica is used in	diamond cutters	solar panels	magnets	watch crystals	○●○○
88. Glass and rubber are examples of	amorphous solids	liquids	polycrystalline solids	crystalline solids	●○○○
89. Most inorganic metals are	amorphous	gaseous	polycrystalline	liquid	○○●○
90. At atomic level, a crystal under pressure may deform by slip or	twinning	boiling	evaporation	melting	●○○○
91. Slope of stress-strain graph within proportional limit is	zero	infinite	constant	decreasing	○○●○
92. Within the elastic limit, strain is	directly proportional to stress	zero	independent of stress	inversely proportional to stress	●○○○
93. Materials with high Young's modulus are used for	elastic bands	balloons	bridge cables and girders	cushions	○○●○
94. Stress is measured in the same units as	force	pressure	energy	work	○●○○
95. Volume strain is the ratio of	change in volume to original volume	volume to mass	force to area	mass to volume	●○○○
96. Bulk modulus equals	volume stress ÷ volume strain	tensile stress ÷ shear	force ÷ volume	stress × strain	●○○○
97. Shear modulus equals	strain ÷ stress	force × area	shear stress ÷ shear strain	volume stress ÷ strain	○○●○
98. Compressive stress tends to	lengthen a body	shorten a body	twist a body	slide layers	○●○○
99. Tensile stress tends to	twist a body	shorten a body	lengthen a body	change volume only	○○●○

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Questions	A	B	C	D	A B C D
100. A solid with no sharp melting point is	metallic crystal	amorphous	ionic	crystalline	○●○○
101. A solid that cleaves along flat planes is	amorphous	crystalline	glassy	polymeric	○●○○
102. A solid whose properties are same in all directions is	mica crystal	polycrystalline	single crystal	calcite crystal	○●○○
103. Single crystals show properties that are	zero	direction independent	constant with temperature	direction dependent	○○○●
104. Ice and many rocks are	liquid	amorphous	single crystals	polycrystalline	○○○●
105. Amorphous solids can be turned crystalline by	compressing	stretching	melting then cooling slowly	heating quickly	○○●○
106. Amorphous solids can withstand	no temperature change	higher temperatures	negative temperature	only low temperatures	○●○○
107. Atomic ordering in amorphous solids is	absent in all parts	perfect	long range	short range	○○○●
108. A material that returns to its original shape after load removal is	ductile	elastic	brittle	plastic	○●○○
109. Hooke's law fails beyond the	proportional limit	zero stress	zero strain	origin	●○○○
110. Extension in a wire is proportional to load up to the	yield point	fracture point	proportional limit	breaking point	○○●○
111. Stress at which permanent deformation begins is	zero stress	elastic limit	strain	breaking stress	○●○○
112. Elastic potential energy stored in a stretched wire comes from	heat	sound	light	work done by stretching force	○○○●
113. Work done by a constant force F over distance x is	½ F x	F/x	F x	F x^2	○○●○
114. Area under force-extension graph for straight line is a	triangle	circle	point	rectangle	●○○○
115. Graph of force against extension within limit is	a curve	a horizontal line	a straight line through origin	a circle	○○●○
116. Steeper stress-strain line means	brittle only	zero modulus	larger Young's modulus	smaller Young's modulus	○○●○

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Questions	A	B	C	D	A B C D
117. Strain has the unit	none	pascal	newton	metre	●○○○
118. Dimensions of Young's modulus are	dimensionless	$ML^{-1}T^{-2}$	MLT^{-2}	$ML^{2}T^{-2}$	○●○○
119. A wire with Young's modulus Y and strain ε has stress	ε/Y	Y/ε	Y + ε	Y ε	○○○●
120. Stress on a wire equals 4×10^{6} Pa and area is 2×10^{-6} m². Force is	0.5 N	2 N	8×10^{-12} N	8 N	○○○●
121. Load of 50 N on wire with area 0.5 mm². Stress is	25 Pa	1×10^{5} Pa	1×10^{7} Pa	1×10^{8} Pa	○○○●
122. Wire of $Y = 1 \times 10^{11}$ Pa has strain 2×10^{-3}. Stress is	2×10^{14} Pa	5×10^{7} Pa	2×10^{8} Pa	5×10^{13} Pa	○○●○
123. Spring stretched 5 cm with force 10 N has stored energy	0.5 J	0.25 J	2.5 J	50 J	○●○○
124. Energy stored in a wire increases if its extension	is zero	is removed	decreases	increases	○○○●
125. Ductile material shows a long	point	elastic region only	plastic region	straight line only	○○●○
126. A rubber band is	more rigid than diamond	more stretchable than steel	more brittle than glass	stiffer than steel	○●○○
127. Nylon and polythene are	crystals	natural polymers	synthetic polymers	metals	○○●○
128. Polymers generally have good	toughness	thermal conductivity	density above steel	electrical conductivity	●○○○
129. Graphene is a layer that is	one atom thick	one hundred atoms thick	one micron thick	one millimetre thick	●○○○
130. Crystals diffract X-rays because of	random atoms	colour	regular atomic spacing	density	○○●○
131. Sharp cleaving is a property of	amorphous solids	liquids	crystalline solids	gases	○○●○
132. Atoms of crystal vibrate about	random places	the surface	no positions	fixed lattice positions	○○○●
133. In SC unit cell, atoms are located at the	eight corners	faces only	edges only	centre only	●○○○

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Questions	A	B	C	D	A B C D
134. In SC, each corner atom is shared among	1 unit cell	2 unit cells	4 unit cells	8 unit cells	○○○●
135. Solid has closely packed particles that	cannot flow	are absent	flow easily	move freely	●○○○
136. Compressive and tensile deformations are examples of	shear	one-dimensional deformation	volume deformation	torsion	○●○○
137. A steel wire is stretched beyond its elastic limit and unloaded. It	stays permanently longer	shrinks below original length	becomes amorphous	returns exactly	●○○○
138. Two wires of same material, one thick and one thin, have the same	cross-sectional area	extension under same load	stress under same load	Young's modulus	○○○●
139. A wire of cross-sectional area 2 mm² carries tension 40 N. Stress is	8×10^7 Pa	20 Pa	2×10^4 Pa	2×10^7 Pa	○○○●
140. The tangent of the angle of a stress–strain line gives	extension	Young's modulus	stress	strain	○●○○
141. Hooke's law was stated for	elastic bodies	liquids	gases	plasma	●○○○
142. The area under a stress–strain curve represents energy per unit	volume	area	mass	length	●○○○
143. Amorphous solids give on breaking	perfect cubes	flat cleavage planes	odd, uneven surfaces	smooth planes	○○●○
144. Crystalline solids give	colour patterns	diffuse patterns	no diffraction	sharp X-ray diffraction patterns	○○○●
145. Amorphous solids give poorly defined patterns in	X-ray diffraction	visible light	heat	sound	●○○○
146. Unit cell contains all the characteristics of the	whole crystal	liquid	polymer chain	gas	●○○○
147. Which lattice has the most atoms per unit cell among SC, BCC, FCC?	all equal	BCC	FCC	SC	○○●○
148. Elongation of a spring is directly proportional to the	applied force	inverse of force	square of force	square root of force	●○○○
149. A stiffer spring has a	zero force constant	negative force constant	smaller force constant	larger force constant	○○○●
150. Stress required to double a wire's length (if still elastic) equals	half of Young's modulus	zero	twice Young's modulus	Young's modulus	○○○●

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