Studybeesofficial
EDUCATIONAL PLATFORM
www.studybeesofficial.com

HSSC-I NATIONAL BOOK FOUNDATION FBISE

PHYSICS TEST - CHAPTER 6: FLUID MECHANICS

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. Upthrust on a body immersed in a fluid acts	horizontally	vertically downward	vertically upward	along the flow	○○●○
2. Upthrust exists because fluid pressure	decreases with depth	is the same everywhere	is zero	increases with depth	○○○●
3. Archimedes' principle: upthrust equals the weight of the	whole object	fluid displaced	container	air above it	○●○○
4. Upthrust on a fully immersed body of volume V in fluid of density ρ is	V/ρg	ρV/g	ρg/V	ρgV	○○○●
5. The SI unit of upthrust is	joule	newton	pascal	watt	○●○○
6. Upthrust on a 20 cm cube fully in water (g = 9.8 m s^{-2}) is	7.84 N	784 N	78.4 N	39.2 N	○○●○
7. A body sinks completely when its average density is	half the fluid's	equal to the fluid's	less than the fluid's	greater than the fluid's	○○○●
8. For a freely floating body, upthrust equals its	weight	density	volume	twice its weight	●○○○
9. A body weighs 50 N in air and 30 N in water. Upthrust is	80 N	50 N	30 N	20 N	○○○●
10. Apparent weight of an immersed body equals	weight ÷ upthrust	weight + upthrust	weight × upthrust	weight − upthrust	○○○●
11. A steel ship floats because its average density is	equal to steel	greater than water	zero	less than water	○○○●
12. A submarine dives by	filling its tanks with seawater	increasing its volume	emptying its tanks	reducing its mass	●○○○
13. A submarine rises to the surface by	stopping its engine	emptying seawater from tanks	adding cargo	filling its tanks	○●○○
14. For a ship to float, the weight of displaced water must be	equal to ship's weight	zero	double ship's weight	less than ship's weight	●○○○

Follow Studybeesofficial on Instagram, YouTube Channel & WhatsApp Channel — Link in Bio

Questions	A	B	C	D	A B C D
15. Ballast tanks help a ship to	stay stable	increase drag	reduce upthrust	reduce volume	●○○○
16. A ship's hull is broad and hollow so that it	has less upthrust	becomes denser	displaces more water	has less volume	○○●○
17. A wooden block of density 600 kg m^{-3} floats in water. Fraction submerged is	0.6	0.4	0.5	1.0	●○○○
18. Upthrust on a 200 cm^3 ball fully in water (g = 9.8 m s^{-2}) is	19.6 N	2.0 N	0.196 N	1.96 N	○○○●
19. Moving a fully immersed block deeper makes upthrust	become zero	remain constant	decrease	increase	○●○○
20. A mug feels lighter under water because	upthrust acts on it	gravity decreases	its mass decreases	its density rises	●○○○
21. Loss in weight of a body in a liquid depends on	body shape only	air temperature	body colour only	body volume and liquid density	○○○●
22. A balloon rises in air when its upthrust is	equal to its volume	greater than its weight	less than its weight	zero	○●○○
23. Weight of displaced liquid is 4 N. Upthrust is	2 N	8 N	0.4 N	4 N	○○○●
24. A body floats with 3/4 of its volume submerged in water. Its density is	1000 kg m^{-3}	750 kg m^{-3}	1333 kg m^{-3}	250 kg m^{-3}	○●○○
25. A floating object moved from fresh water to sea water sinks	slightly less	equally	completely	slightly more	●○○○
26. Ice (900 kg m^{-3}) floats in water with this fraction above the surface	50%	1%	90%	10%	○○○●
27. Iron floats in mercury because iron's density is	less than mercury's	greater than mercury's	zero	equal to mercury's	●○○○
28. Oil floats on water because oil is	colder	more dense	less dense	more viscous	○○●○
29. Another name for upthrust is	buoyant force	tension	friction	normal force	●○○○
30. Pressure at depth h in a liquid of density ρ is	ρgh	gh/ρ	ρh/g	ρg/h	●○○○
31. Force on the bottom face of an immersed cylinder is greater than on top because	gravity is larger	area is larger	pressure is greater at depth	it is heavier	○○●○

Follow Studybeesofficial on Instagram, YouTube Channel & WhatsApp Channel — Link in Bio

Questions	A	B	C	D	A B C D
32. A 2 kg body of density 4000 kg m⁻³ is fully in water. Upthrust is	9.8 N	4.9 N	2.45 N	19.6 N	○●○○
33. Viscosity of a fluid is its resistance to	being heated	relative motion of its layers	expansion	evaporation	○●○○
34. The coefficient of viscosity is represented by	σ	ε	ρ	η	○○○●
35. SI unit of coefficient of viscosity is	kg m⁻³	N s m	N s m⁻²	N m⁻²	○○●○
36. The unit Pa s is equal to	kg m s⁻²	kg m⁻¹ s⁻¹	kg m⁻² s⁻¹	kg m² s⁻¹	○●○○
37. Which has the highest coefficient of viscosity?	Alcohol	Air	Honey	Water	○○●○
38. Which has the lowest coefficient of viscosity?	Glycerin	Engine oil	Air	Honey	○○●○
39. With rise in temperature, viscosity of most liquids	stays constant	increases	decreases	becomes infinite	○○●○
40. With rise in temperature, viscosity of most gases	increases	becomes zero	stays constant	decreases	●○○○
41. The retarding force on an object moving through a fluid is	drag force	tension	upthrust	thrust	●○○○
42. Drag force on a moving object increases when its	speed decreases	density decreases	speed is zero	speed increases	○○○●
43. Stokes' law gives the viscous drag on a sphere as	4πηrv	6πηrv	6πρrv	6πηr²v	○●○○
44. In Stokes' law, r is the	radius of the container	density of fluid	radius of the sphere	distance moved	○○●○
45. Stokes' law applies to	small spheres moving slowly	vacuum	large bodies at high speed	turbulent flow only	●○○○
46. Terminal velocity is reached when net force on the body is	maximum	infinite	zero	negative	○○●○
47. At terminal velocity, the acceleration of a falling body is	zero	negative	g	greater than g	●○○○
48. A falling raindrop initially accelerates because drag is	upward and large	very small at low speed	equal to weight	very large	○●○○

Questions	A	B	C	D	A B C D
49. Equating 6πηrv = mg gives terminal velocity v =	6πηrmg	6πηr/mg	mg/6πηr	mgr/6πη	○○●○
50. Terminal velocity of a sphere is proportional to	1/r	r^3	r	r^2	○○○●
51. If a droplet's radius doubles, its terminal speed becomes	4 times	2 times	half	8 times	●○○○
52. If viscosity of the medium doubles, terminal speed becomes	unchanged	four times	half	double	○○●○
53. A paratrooper without parachute has terminal speed of about	8 m s^{-1}	50 m s^{-1}	500 m s^{-1}	5 m s^{-1}	○●○○
54. With parachute open, terminal speed is about	50 m s^{-1}	8 m s^{-1}	80 m s^{-1}	0.8 m s^{-1}	○●○○
55. Opening a parachute increases	mass	weight	upthrust only	surface area and drag	○○○●
56. Just after the parachute opens, drag is	zero	equal to weight	less than weight	greater than weight	○○○●
57. Stokes' drag on a 1 cm radius sphere moving at 2 m s^{-1} in glycerin (η = 1 Pa s) is	0.038 N	3.8 N	1.2 N	0.38 N	○○○●
58. Stokes' drag on a sphere is directly proportional to its	speed	mass	volume	speed squared	●○○○
59. Viscous drag always acts	opposite to motion	upward	along motion	perpendicular to motion	●○○○
60. Real fluids are	viscous	irrotational	non-viscous	incompressible	●○○○
61. An ideal fluid has viscosity equal to	infinity	that of water	one	zero	○○○●
62. Fast-moving vehicles are streamlined to	increase upthrust	increase drag	add weight	reduce drag	○○○●
63. A wind tunnel is used to study	sound waves	friction of solids	airflow around a model	heat transfer	○○●○
64. Dolphin's streamlined body helps it to	stay warm	swim with less drag	float easily	breathe faster	○●○○
65. Drag on a vehicle increases significantly with	tyre type	passenger count	speed	colour	○○●○

Follow Studybeesofficial on Instagram, YouTube Channel & WhatsApp Channel — Link in Bio

Questions	A	B	C	D	A B C D
66. In streamline flow, particles follow	the same smooth path	random paths	zig-zag paths	circular paths only	●○○○
67. Streamlines in steady flow	are always closed	cross each other	are always straight	never cross each other	○○○●
68. Streamline flow becomes turbulent above a certain	critical speed	sound speed	terminal speed	light speed	●○○○
69. Turbulent flow is marked by	zero speed	constant velocity everywhere	small whirlpool-like regions	smooth layers	○○●○
70. In laminar flow in a tube, the fastest-moving layer is the	outermost layer	middle layer	layer at the wall	bottom layer	○●○○
71. An ideal fluid is assumed to be	viscous, incompressible, rotational	compressible, non-viscous, turbulent	non-viscous, incompressible, steady	viscous, compressible, turbulent	○○●○
72. Liquids are generally	compressible	irrotational	incompressible	gaseous	○○●○
73. In irrotational flow, the fluid has	no whirlpools	many eddies	zero density	zero speed	●○○○
74. Volume flow rate is volume passing a point per	unit time	unit mass	unit length	unit area	●○○○
75. SI unit of volume flow rate is	kg s^{-1}	$m^3 s^{-1}$	m s^{-1}	$m^2 s^{-1}$	○●○○
76. Volume flow rate in a pipe of area A at speed v is	v/A	A/v	Av	Av^2	○○●○
77. Mass flow rate of a fluid of density ρ is	ρAv	Av/ρ	ρA/v	ρv/A	●○○○
78. Water at 3 m s^{-1} in a pipe of area 0.02 m^2 has flow rate	6 $m^3 s^{-1}$	0.6 $m^3 s^{-1}$	0.006 $m^3 s^{-1}$	0.06 $m^3 s^{-1}$	○○○●
79. Equation of continuity expresses conservation of	momentum	charge	mass	energy	○○●○
80. For incompressible flow, equation of continuity is	$A_1v_2 = A_2v_1$	$A_1/v_1 = A_2/v_2$	$A_1 + v_1 = A_2 + v_2$	$A_1v_1 = A_2v_2$	○○○●
81. If a pipe's cross-section halves, fluid speed	stays same	doubles	halves	becomes four times	○●○○
82. If a pipe's diameter halves, fluid speed becomes	half	2 times	one quarter	4 times	○○○●

Follow Studybeesofficial on Instagram, YouTube Channel & WhatsApp Channel — Link in Bio

Questions	A	B	C	D	A B C D
83. Squeezing the end of a rubber pipe increases water	speed	density	mass	viscosity	●○○○
84. A freely falling stream of tap water becomes	wider	hollow	unchanged	narrower	○○○●
85. Rivers flow slowly where they are	shallow and narrow	narrow	steep	wide and deep	○○○●
86. Water at 2 m s^{-1} in 50 cm^2 pipe enters 10 cm^2 nozzle. Exit speed is	100 m s^{-1}	10 m s^{-1}	5 m s^{-1}	0.4 m s^{-1}	○●○○
87. Blood flows slowly in capillaries because their total cross-section is	zero	very small	equal to aorta's	very large	○○○●
88. Density is taken constant in continuity equation because fluid is	turbulent	viscous	rotational	incompressible	○○○●
89. Bernoulli's equation is based on conservation of	mass	charge	energy	momentum	○○●○
90. Bernoulli's equation states	$P + \frac{1}{2}\rho v^2 - \rho gh =$ constant	$P + \rho v^2 + \rho gh =$ constant	$P + \frac{1}{2}\rho v^2 + \rho gh =$ constant	$P - \frac{1}{2}\rho v^2 + \rho gh =$ constant	○○●○
91. The term $\frac{1}{2}\rho v^2$ in Bernoulli's equation is	potential energy per unit volume	kinetic energy per unit volume	power per unit volume	force per unit area	○●○○
92. The term ρgh in Bernoulli's equation is	potential energy per unit volume	power	force	kinetic energy per unit volume	●○○○
93. In Bernoulli's equation, P represents	kinetic energy per unit mass	power	momentum	pressure energy per unit volume	○○○●
94. Bernoulli's equation applies to	rigid solids	viscous turbulent flow	vacuum only	ideal fluid in steady flow	○○○●
95. For horizontal flow, Bernoulli's equation reduces to	$\frac{1}{2}\rho v^2 =$ constant	$P + \rho gh =$ constant	$P + \frac{1}{2}\rho v^2 =$ constant	P = constant	○○●○
96. In horizontal flow, where speed is high, pressure is	low	infinite	the same	high	●○○○
97. A pressure difference in a fluid can arise from different	temperatures only	masses	rates of flow	colours	○○●○
98. The unit of $\frac{1}{2}\rho v^2$ is	watt	joule	pascal	newton	○○●○
99. Pressure has the same dimensions as energy per unit	mass	volume	time	area	○●○○

Follow Studybeesofficial on Instagram, YouTube Channel & WhatsApp Channel — Link in Bio

Questions	A	B	C	D	A B C D
100. Water speeds up from 2 to 4 m s⁻¹ in a horizontal pipe. Pressure drops by	12 000 Pa	6000 Pa	2000 Pa	3000 Pa	○●○○
101. Fluid in a uniform pipe moves upward to a higher level. Its pressure	increases	doubles	decreases	stays same	○○●○
102. Pressure difference between two points 5 m apart vertically in static water is	4900 Pa	49 000 Pa	98 000 Pa	490 Pa	○●○○
103. A perfume atomizer works because fast air over the tube creates	a vacuum	high pressure	low pressure	heat	○○●○
104. In a filter pump, a fast water jet produces	high pressure	low pressure	heat	no pressure change	○●○○
105. Torricelli's theorem gives efflux speed v =	√(gh)	gh/2	2gh	√(2gh)	○○○●
106. Efflux speed from a hole depends on	area of hole	depth of hole below surface	liquid viscosity	liquid density	○●○○
107. Efflux speed from a hole 5 m below the surface (g = 9.8 m s⁻²) is	49 m s⁻¹	9.9 m s⁻¹	25 m s⁻¹	4.9 m s⁻¹	○●○○
108. Efflux speed from a hole 20 cm below the surface (g = 9.8 m s⁻²) is	3.96 m s⁻¹	19.8 m s⁻¹	1.98 m s⁻¹	1.4 m s⁻¹	○○●○
109. If the depth of the hole becomes 4 times, efflux speed becomes	double	unchanged	half	four times	●○○○
110. Torricelli's theorem is a special case of	Pascal's law	Hooke's law	Boyle's law	Bernoulli's equation	○○○●
111. A Venturi meter is used to measure	temperature	flow speed of a fluid	density	viscosity	○●○○
112. In a Venturi meter, pressure is lowest at the	outlet	narrow section	inlet	wide section	○●○○
113. In a Venturi tube, the narrow section has the	lowest speed	same speed as wide part	highest speed	zero speed	○○●○
114. An aerofoil produces lift because air above the wing moves	faster, giving lower pressure	faster, giving higher pressure	slower, giving lower pressure	at equal speed	●○○○
115. Lift on an aeroplane wing arises from	pressure difference above and below	drag	engine thrust only	its weight	●○○○
116. Air at 60 m s⁻¹ above and 50 m s⁻¹ below a wing (ρ = 1.2 kg m⁻³). Pressure difference is	1320 Pa	6600 Pa	66 Pa	660 Pa	○○○●

Follow Studybeesofficial on Instagram, YouTube Channel & WhatsApp Channel — Link in Bio

Questions	A	B	C	D	A B C D
117. With that pressure difference, a 20 m² wing gives lift of	33 N	26 400 N	13 200 N	1320 N	○○●○
118. The Magnus effect is the	fall of raindrops	bending of light	deflection of a spinning ball in air	rise of hot air	○○●○
119. The Magnus effect explains the	formation of rainbows	echo of sound	tides	swing of a spinning cricket ball	○○○●
120. Backspin on a golf ball produces	upward lift	no force	zero drag	extra weight	●○○○
121. Standing near a fast train is dangerous because pressure near it is	zero	higher than behind you	same as behind you	lower than behind you	○○○●
122. Two boats moving close and parallel tend to	move apart	come closer	spin	stop	○●○○
123. A plastic bag flies out of a lowered car window due to	lower pressure outside	higher pressure outside	heat	gravity	●○○○
124. A ball stays suspended in a vertical air jet because pressure in the jet is	lower than outside	zero	higher than outside	infinite	●○○○
125. Wind lifts a roof in a storm because pressure above the roof is	infinite	higher	lower	equal	○○●○
126. Dimensions of coefficient of viscosity are	MLT^{-1}	$ML^{-1}T^{-1}$	$ML^{-2}T^{-1}$	$ML^{2}T^{-2}$	○●○○
127. Equation of continuity follows from conservation of	energy	mass	momentum	angular momentum	○●○○
128. A superfluid has viscosity equal to	infinity	zero	that of honey	that of water	○●○○
129. Superfluidity is observed in liquid helium at very	high speed	high pressure	low temperature	high temperature	○○●○
130. A superfluid can creep over container walls and	freeze	empty itself	boil	solidify	○●○○
131. Vortices in a stirred superfluid	never form	stop quickly	grow slowly	spin indefinitely	○○○●
132. A superfluid flows without	internal friction	pressure	mass	density	●○○○
133. Which of these is not a fluid?	Water	Air	Iron rod	Oil	○○●○

Follow Studybeesofficial on Instagram, YouTube Channel & WhatsApp Channel — Link in Bio

Questions	A	B	C	D	A B C D
134. Fluid dynamics studies fluids	in motion	when frozen	at rest	in vacuum	●○○○
135. Fluid mechanics deals with fluids that are	only gaseous	static or moving	only moving	only static	○●○○
136. Two conservation laws used in fluid dynamics are those of	charge and momentum	mass and charge	spin and charge	mass and energy	○○○●
137. Velocity of a fluid particle on a streamline is	always random	along the tangent	always zero	perpendicular to it	○●○○
138. Closely spaced streamlines indicate	low speed	high speed	zero speed	high temperature	○●○○
139. Viscous force in a fluid arises due to	gravity	friction between layers	magnetism	surface tension	○●○○
140. A steel ball falls slower in oil than in water because oil has greater	viscosity	speed	volume	temperature	●○○○
141. The gas-tank carburettor of a car engine uses	a barometer	a manometer	a hydrometer	a Venturi duct	○○○●
142. In a river the speed of water is greatest where the channel is	narrowest	widest	oldest	deepest	●○○○
143. Which quantity is the same at all points along a steady pipe flow of incompressible fluid?	Pressure	Cross-sectional area	Volume flow rate	Fluid speed	○○●○
144. Pressure inside a fast-moving fluid is lower than in a slow one, according to	Bernoulli's principle	Hooke's law	Newton's law	Pascal's law	●○○○
145. Fluid pressure acts on a submerged surface	parallel to the surface	perpendicular to the surface	only vertically up	only vertically down	○●○○
146. A hydrometer floats higher in a liquid of	greater density	lower viscosity	greater volume	lower density	●○○○
147. In a steady flow, the velocity at a given point	changes randomly	keeps increasing	does not change with time	is always zero	○○●○
148. A raindrop reaches terminal speed sooner if its radius is	larger	irrelevant	smaller	doubled	○○●○
149. Flow rate of blood leaving the heart equals the total flow into the	veins only	lungs only	skin only	arteries	○○○●
150. Stirring a superfluid compared with an ordinary fluid, its motion shows	heating	no viscous slowing	faster slowing	freezing	○●○○

Follow Studybeesofficial on Instagram, YouTube Channel & WhatsApp Channel — Link in Bio