Q.1 Assertion: Thin film such as soap bubbles or a thin layer of oil on water shows beautiful colors when illuminated by white light.
Reason: It happens due to the interference of light reflected from the upper surface of the thin film.
(A) Both Assertion and Reason are correct, and Reason is the correct explanation for Assertion
(B) Both Assertion and Reason are correct, but Reason is not the correct explanation for Assertion
(C) Assertion is correct, but Reason is incorrect
(D) Assertion is incorrect, but Reason is correct

Q.2 A very thin film, in reflected white light appears-
(A) Violet **(B)**white **(C)**black **(D)**red

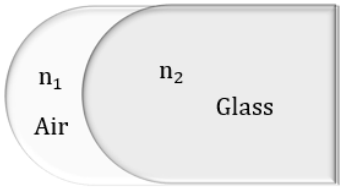
Q.3 In thin film interference, at any surface -
(A)all the light gets reflected.
(B)part of the light gets reflected and remaining get transmitted
(C)all the light gets transmitted.
(D) None of these

Q.4 Calculate the smallest thickness of the soap bubble which produces a constructive interference for a red light of the wavelength 650 nm.
Take refractive index to be 1.33.
(A)122.2 nm **(B)**102.2 nm **(C)**112.2 nm **(D)**132.2 nm

Q.5 A soap film of thickness 0.0011 mm appears dark when seen by the reflected light of wavelength 580 nm. What is the index of refraction of the soap solution, if it is known to be between 1.2 and 1.5?
(A)1.32 **(B)**1.46 **(C)**1.38 **(D)**1.22

Q.6 A parallel beam of white light is incident normally on a water film of thickness 1.0×10^{-4} cm. Find the wavelength in the visible range (400 nm − 700 nm) which are strongly transmitted by the film. Refractive index of water, $\mu = 1.33$
(A)400 nm, 550 nm, 700 nm **(B)**443 nm, 532 nm, 665 nm
(C)500 nm, 600 nm, 700 nm **(D)**490 nm, 560 nm, 630 nm

Q.7 A transparent thin film of uniform thickness and refractive index, $n_1 = 1.4$ is coated on the convex spherical surface of radius R at one end of a long solid glass cylinder of refractive index, $n_2 = 1.5$, as shown in the figure. Rays of light parallel to the axis of the cylinder traversing through the film from air to glass get focused at a distance f_1 from the film, while rays of light traversing from glass to air get focused at a distance f_2 from the film. Then –



(A)$|f_1| = 3R$ and $|f_2| = 2R$ **(B)**$|f_1| = 2R$ and $|f_2| = 3R$
(C)$|f_1| = 4R$ and $|f_2| = 5R$ **(D)**$|f_1| = 5R$ and $|f_2| = 4R$

Q.8 A parallel beam of sodium light of wavelength 6000 Å is incident on a thin glass plate of $\mu = 1.5$, such that the angle of refraction in the plate is 60°. The smallest thickness of the plate which will make it appear dark by reflected light is
(A)40 Å **(B)**4 Å **(C)**400 Å **(D)**4000 Å

Q.9 If wavelengths 4500 Å and 6000 Å are found to be missing in the reflected spectrum in thin air film interference, the thickness of the film for normal incidence is nearly

(A)9000 Å **(B)**10500 Å **(C)**5250 Å **(D)**4240 Å

Q.10 A thin film of soap solution ($\mu_s = 1.4$) lies on the top of a glass plate $(\mu_g = 1.5)$. When visible light is incident almost normal to the plate, two adjacent reflection maxima are observed at two wavelengths 420 nm and 630 nm. The minimum thickness of the soap solution is

(A)420 nm **(B)**450 nm **(C)**630 nm **(D)**1260 nm

ANSWER KEY

Q.	1	2	3	4	5	6	7	8	9	10
Sol.	(C)	(C)	(B)	(A)	(A)	(B)	(A)	(D)	(A)	(B)