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1. Introduction to Station Model

Definition: A *station model* is a standardised symbolic representation of surface weather observations plotted on a synoptic weather chart. Each symbol, number, and code occupies a fixed position relative to a central circle that represents the observation station.

Met stations worldwide make standardised surface observations and encode them using WMO codes. These are then plotted as station models on synoptic charts used by forecasters and pilots. Reading a station model is a core DGCA exam skill.

 **Exam Tip:** The station model is always tested in DGCA exams — usually 3–5 questions per paper. Memorise parameter positions, ww codes, and cloud symbol tables.

2. Station Model Layout & Parameter Positions

Standard Station Model Layout

TT ↗
Temperature °C

Wind

↖ **PPP**
Sea Level Pressure QFF (last 3 digits, tenths)



Station

T_dT_d
Dew Point °C

ww (left) **W₁W₂** (right)

PP
Pressure Change in 3 hr / 10

VV
Visibility code 90–99

N circle
(Total Cloud)

a
Pressure Tendency Symbol

C_L
Low Cloud type

h
Height of base of C_L or C_M

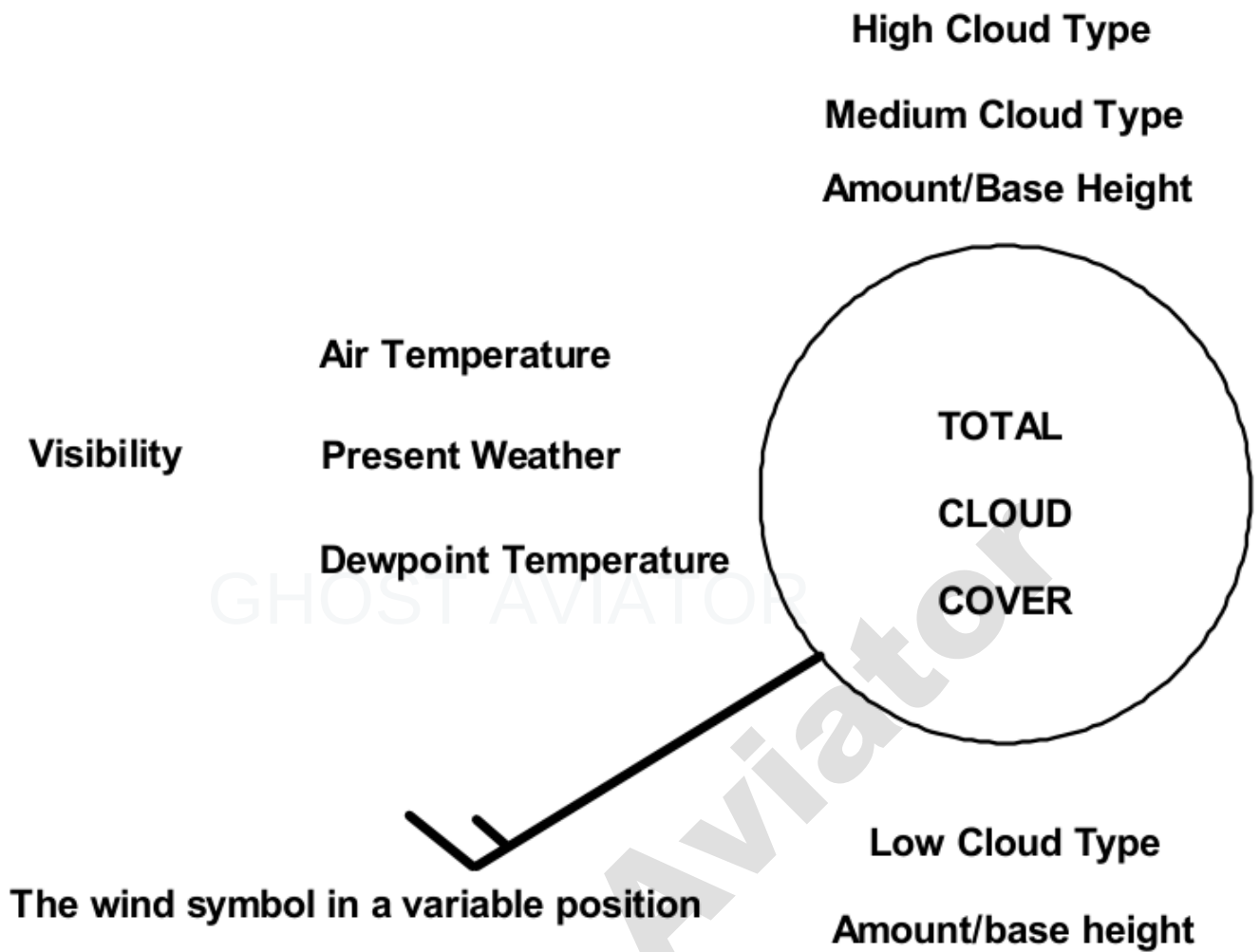
RRR
Rainfall since 01 UTC in code

C_M
Medium Cloud type

N_h
Amount of Low/Medium Clouds

P₁P₂
Pressure Change in 24 hr

C_H — High cloud type | **GG** — Time of observation (full hr UTC) | **t_st_s** — Sea Surface Temp | **H_wH_w** — Wave height | **P_wP_w** — Wave period



Layout of the station model

	Calm		20 kt, further additions up to 45 kt
	1 to 2 kt		50 kt
	5 kt		60 kt
	10 kt		65 kt, further additions as necessary
	15 kt		

Wind speed symbols

Complete Symbol Key

Symbol	Parameter	Units / Description
TT	Temperature	°C
T _d T _d	Dew Point Temperature	°C
VV	Visibility	Code 90–99 (see Table 24.4)
ww	Present Weather	Code 00–99 (Table 24.5–24.7)
W ₁ W ₂	Past Weather	Symbols
PPP	Sea Level Pressure QFF	Last 3 digits (tenths of hPa); prefix 9 or 10
RRR	Rainfall since 01 UTC	Code (see Table 24.4)
PP	Pressure Change in 3 hr	÷ 10 (tenths of hPa)
a	Pressure Tendency Symbol	Rising/Falling/Steady etc.
t _s t _s	Difference in Sea Surface Temp & TT	°C
H _w H _w	Height of First (swell) Wave	Repeated for subsequent waves
P _w P _w	Period of First Wave	Seconds
C _H	Type of High Clouds	Code figure 0–9
C _M	Type of Medium Clouds	Code figure 0–9
C _L	Type of Low Clouds	Code figure 0–9
N	Total Cloud Amount	Octas 0–9 (circle fill)
N _h	Amount of Low/Medium Clouds	Octas
h	Height of base of C _L or C _M	Code 0–9 (see Table 24.4)
GG	Time of Observation	Full hour UTC
P ₁ P ₂	Average Speed of Ship in 3 hr	Knots

3. Main Symbols — ww Abbreviations

Key present weather symbols used in the simplified symbol table (Table 24.2):

Symbol	Meaning	Symbol	Meaning
RA	Rain	DS	Dust Storm
DZ	Drizzle	FG	Fog
SN	Snow	SH	Shower
TS	Thunderstorm	GR	Hail (Grains)
BR	Mist	HZ	Haze
FU	Smoke	SA	Sand
PO	Dust/Sand Whirl	SS	Sandstorm
IC	Ice Crystals	PE	Ice Pellets
BLSN	Blowing Snow	DRSN	Drifting Snow
FZRA	Freezing Rain	FZDZ	Freezing Drizzle

Past Weather Codes W_1W_2 (simplified):

Code	W_1 or W_2
0	Cloud Cover <4/8
1	Cloud Cover >4/8
2	Cloud Cover throughout
3	DS (Dust Storm)
4	FG (Fog)
5	DZ (Drizzle)
6	RA (Rain)
7	SN (Snow)
8	SH (Shower)
9	TS (Thunderstorm)

4. Present Weather (ww) Code Tables

ww Code Ranges:

- **00–19** — No precipitation at station at time of observation
- **20–29** — Weather during last hour but NOT at time of observation
- **30–39** — DS, SS or blowing SN at time of observation
- **40–49** — Fog at time of observation
- **50–59** — Drizzle at time of observation
- **60–69** — Rain at time of observation
- **70–79** — Solid precipitation (Snow etc.) at time of observation
- **80–89** — Shower at time of observation
- **90–99** — Thunderstorm with precipitation at time of observation

flowchart TD

```
A[ww Code] --> B{Range?}
B -->|00-19| C[No precip at station\nSimple weather states]
B -->|20-29| D[Precip last hour\nNOT now]
B -->|30-39| E[Dust/Sand/Blowing Snow\nNOW]
B -->|40-49| F[FOG now]
B -->|50-59| G[DRIZZLE now]
B -->|60-69| H[RAIN now]
B -->|70-79| I[SOLID precip\nSnow/Ice now]
B -->|80-89| J[SHOWER now]
B -->|90-99| K[THUNDERSTORM\nwith precip now]
```

Key ww Codes to Memorise

ww	Present Weather	ww	Present Weather
00	No Cloud	50	Slight intermittent drizzle
01	Clouds decreasing	51	Slight continuous drizzle
02	Clouds unchanged	52	Moderate intermittent drizzle
03	Clouds increasing	53	Moderate continuous drizzle
04	Smoke haze	54	Heavy intermittent drizzle
05	Moist haze	55	Heavy continuous drizzle
06	Dust haze	60	Slight intermittent rain
07	Dust raising winds	61	Slight continuous rain
08	Dust devil	63	Moderate continuous rain
09	Distant sandstorm	65	Heavy continuous rain
10	Mist	80	Slight shower
11	Shallow fog in patches	81	MOD/HVY shower
12	Shallow fog	82	Violent shower
13	Lightning	83	Slight shower with snow
14	Rain not reaching ground	85	Slight snow shower
17	Thunderstorm without rain	89	Slight SH of GR without TS
18	Squall	90	MOD/HVY SH GR after TS ceased
19	Funnel cloud	91	Slight RA after TS ceased
20	Drizzle (last hour)	95	Light TS with RA
21	Rain (last hour)	96	Light TS with GR
22	Snow (last hour)	97	HVY TS with RA/SN
28	Fog (last hour)	98	TS and DS
29	Thunderstorm (last hour)	99	HVY TS with GR

⚠ Critical Distinction: Codes **20–29** mean the weather occurred during the last hour but is **NOT present at the time of observation**. Codes **50–99** mean the weather IS occurring at the time of observation.

5. Cloud Codes — C_L , C_M , C_H

	Small Cumulus		Stratus
	Large Cumulus		Fractus Stratus
	Cumulonimbus without anvil		Cumulus and Stratocumulus with bases at different levels
	Stratocumulus formed by Spreading Cumulus		Cumulonimbus with anvil
	Stratocumulus		

Low cloud symbols

	Altostratus - thin		Altostratus and Altocumulus
	Altostratus dense or Nimbostratus (The Altostratus becomes Nimbostratus if the figure indicated is below 70).		Altostratus and Altocumulus or dense Altocumulus.
	Altocumulus, thin at one level		Altocumulus castellanus

Medium cloud symbols

	Cirrus, not increasing in amount		Cirrostratus, increasing amounts
	Cirrus dense, not from CB anvil		Cirrostratus, covering the sky
	Cirrus dense from CB anvil		Cirrostratus, increasing not
	Cirrus hooked, increasing amounts		Cirrocumulus

High cloud symbols

Low Clouds (C_L)

Code	Kind of Low Cloud
0	No low cloud
1	Fair weather Cumulus (CU)
2	CU of large vertical development
3	CB without anvil
4	Stratocumulus (SC) with CU with bases at same level
5	Stratocumulus (ST of fair weather)
6	ST of fair weather
7	ST of bad weather
8	SC and CU at different levels
9	CB with anvil

Medium Clouds (C_M)

Code	Kind of Medium Cloud
0	No medium cloud
1	Thin AS
2	Thick AS or NS
3	AC at single level
4	AC at different level
5	AC in bands; Thickening and Spreading
6	AC resulting from spreading of CU
7	AC with AS or NS
8	AC with turreted structure
9	AC in chaotic sky

High Clouds (C_H)

Code	Kind of High Cloud
0	No high cloud
1	Cirrus in filaments
2	Dense Cirrus
3	Dense CI remnant of dissipated CB
4	CI becoming denser
5	CI and CS and progressively increasing
6	CI and CS progressively increasing covering most of the sky
7	CS covering entire sky
8	CS not covering entire sky
9	CC predominate

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Mnemonic — Cloud Codes:

C_L: "No Fair Big CB Strato-Strato Bad Mixed Anvil" (0→9)

C_M: "No Thin Thick Single Different Bands Spread+NS Turret Chaotic" (0→9)

C_H: "No Fil Dense CBremnant Denser Cl+CS Most All NotAll CC" (0→9)

6. Codes for h, RRR, and VV (Table 24.4)

h code	Cloud Base (m)	RRR code	Rain Amount (mm)	VV code	Visibility (m)
0	0–49	0	Nil	90	< 50 (Very Thick FOG)
1	50–99	...	Trace	91	50 to <200 (THICK FOG)
2	100–199	—	Trace	92	200 to <500 (MOD FOG)
3	200–299	1	1–1.5	93	500 to <1000 (FOG)
4	300–599	2	1.6–2.4	94	1000 to <2000 (THICK MIST)
5	600–999	3	2.5–3.5	95	2000 to <4000 (SLIGHT MIST)
6	1000–1499	4	3.6–4.4	96	4000 to <10000
7	1500–1999	5	4.5–5.5	97	10000 to <20000
8	2000–2500	6	5.6–6.4	98	20000 to <50000
9	No Cloud below 2500	7	6.5–7.5	99	50000 or more
/	Base not known / Or below hill Stn.	8	7.6–8.4	—	—
—	—	9	further extrapolate values	—	—

⚠ **Note on VV Codes:** VV code **90** = visibility <50 m (very thick fog). VV code **99** = 50 km or more. The scale is NOT linear — memorise the breakpoints.

⚠ **Note on h code:** h code **/** (slash) means cloud base is either not known, or station is below cloud base on a hill.

7. Total Cloud Amount (N) Coding

N is coded in Octas (eighths of sky covered) and plotted by filling the central station circle:

Octas (N)	Sky Cover	Symbol
0	Clear	Open circle ○
1	1/8	Circle with small wedge
2	2/8 (1/4)	Circle, quarter filled
3	3/8	Circle, 3/8 filled
4	4/8 (1/2)	Half-filled circle
5	5/8	5/8 filled
6	6/8 (3/4)	3/4 filled
7	7/8	Almost full
8	Overcast	Fully filled ●
9	Sky obscured	× symbol
/	Data not available	Diagonal slash

	Sky clear		5/8ths
	1/8th		6/8ths
	2/8ths		7/8ths
	3/8ths		8/8ths
	4/8ths		Indicates obscured sky— usually by fog, smoke or sand/dust

Total cloud amount symbols

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Exam Tip: N = 9 means sky is obscured (fog, smoke etc.) — not overcast! N = 8 is overcast. The / symbol means data not available.

8. Worked Example — Decoding a Station Model

Given Station Plot (from textbook Example):

Wind: 330/15 kt (barb NNW, 15 kt)

34 ↗ 998

93 • 15

27 3/2 ...

Reading	Parameter	Decoded Value
Wind barb direction + speed	Wind Direction & Speed	330°/15 kt
34 (top left)	Temperature (TT)	34°C
93 (middle left)	Visibility (VV code)	Code 93 → 500 to <1000 m (FOG)
27 (bottom left)	Dew Point ($T_d T_d$)	27°C
998 (top right)	Sea Level Pressure QFF	999.8 hPa (prefix 9 as >950)
15 (middle right, small)	Pressure change in 3 hr	+1.5 hPa
• (filled circle)	Total Cloud Amount (N)	8/8 Overcast
3/2 (below circle)	h / N_h	$h=3 \rightarrow$ cloud base 200–299 m ; $N_h=2$
ww symbol (•) left	Present Weather	Fog at observation
Past Weather (right)	$W_1 W_2$	Fog in past

Complete Decoding of Worked Example:

Wind Direction & Speed: **330°/15 kt** | Temperature: **34°C** | Type of Low Clouds: **Fracto Stratus** |
Visibility: **500m but not 1000m** | Amount of Low Clouds: **3/8** | Present Weather: **Weather Fog** | Height
of base of Low Clouds: **100–199 m** | Dew Point: **27°C** | Sea Level Pressure QFF: **999.8 hPa** | Pressure
Change in 3 hr: **+1.5 hPa** | Past Weather: **Fog** | Total Cloud Amount: **8/8** | Type of High Clouds: **AS/NS**
| Rainfall since 01 UTC: **1.5 hPa pressure change**

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Pressure Decoding Rule

PPP = Last 3 digits of pressure in tenths of hPa

Rule: If $PPP > 500 \rightarrow$ prefix 9 (e.g., 996 $\rightarrow$ 999.6 hPa)

If $PPP \leq 500 \rightarrow$ prefix 10 (e.g., 024 $\rightarrow$ 1002.4 hPa)

Example: PPP = 962 $\rightarrow$ 996.2 hPa (prefix 9)

Example: PPP = 024 $\rightarrow$ 1002.4 hPa (prefix 10)

Quick Rule: $PPP > 500 \rightarrow$ add 9 in front; $PPP \leq 500 \rightarrow$ add 10 in front. Then divide the full 4-digit number by 10 to get hPa.

Based on the example station model: Wind 090/ ω ; TT=34, VV=●, T_d =93, Nh=27, [circle=●], $h/Nh=3/2$, PPP=962, PP=15, ww=●, $W_1W_2=...$, 5×

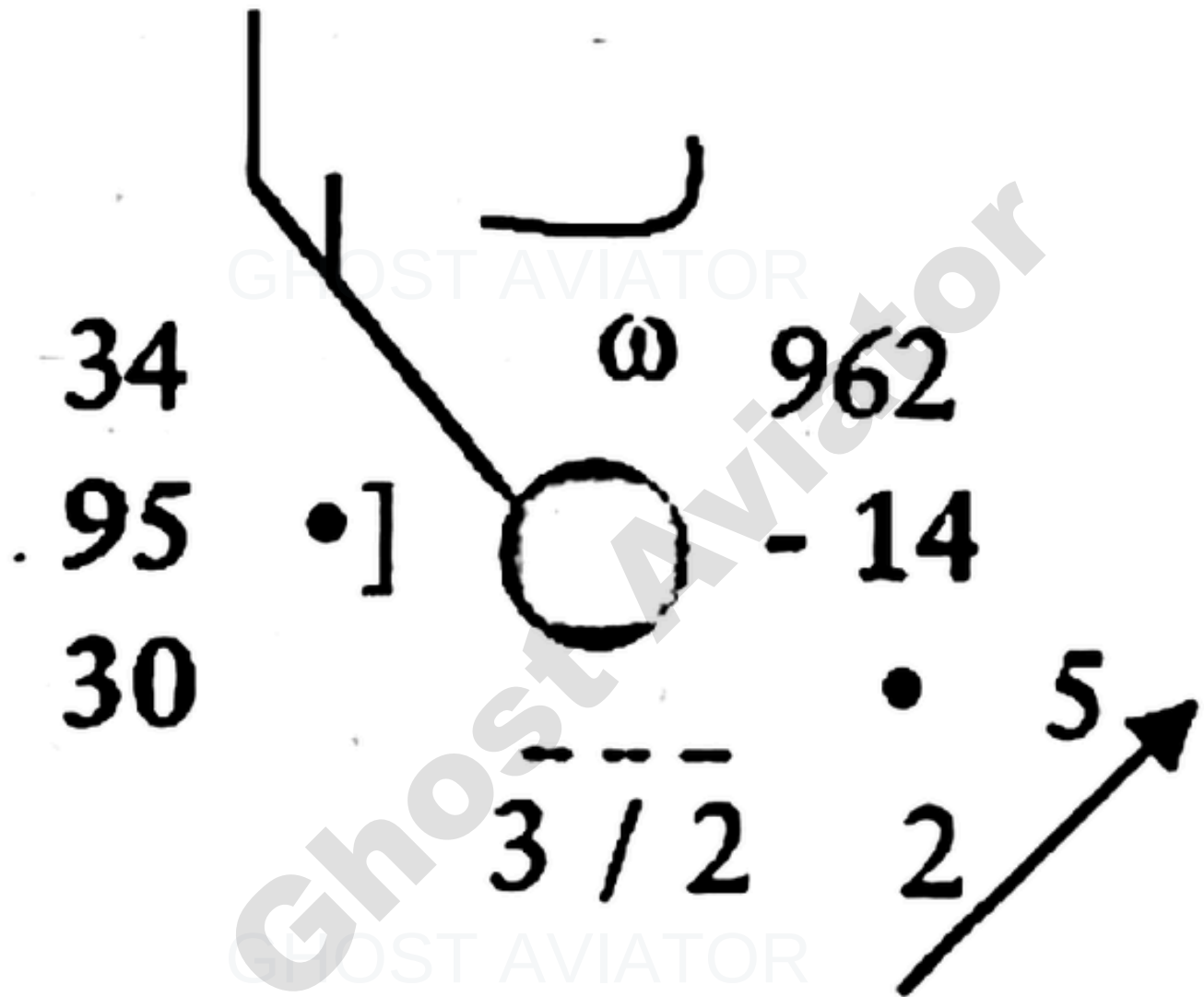


Figure 24.A Station model for Questions 1–20

✅ Answer: (a) NW — The wind staff is drawn from the north-west of the circle: the wind blows FROM the north-west.

✗ (b) NE and (c) SE point to the wrong side of the circle. The staff always points to the direction the wind comes FROM.

💡 Staff = where the wind comes FROM. The barbs give the speed.

Q2. The range of wind speed is: (a) 20–25 kt (b) 16–22 kt (c) 18–22 kt

✅ Answer: (c) 18–22 kt — The staff carries barbs that add up to 20 kt. A plotted wind speed is read as a band of about ± 2 kt, so the speed lies in 18–22 kt.

✗ (a) 20–25 kt and (b) 16–22 kt are not centred on the plotted 20 kt.

💡 Count the barbs, then give the band around that speed.

Q3. The type of medium cloud is: (a) AC (b) AS (c) AC & AS

✅ Answer: (a) AC — The curved symbol above the circle is the altocumulus symbol for the medium cloud (CM) group.

✗ (b) AS and (c) AC & AS have different symbols in the CM table.

💡 Read the symbol, then find it in the CM table.

Q4. Low clouds are: (a) CU (b) SC (c) ST

✅ Answer: (c) ST — The dashed line under the circle is the stratus (ST) symbol for the low cloud (CL) group.

✗ (a) CU and (b) SC have their own symbols (a dome and a bar with scallops).

💡 Dashed line = stratus.

Q5. High clouds are: (a) CC (b) CI (c) CS

✅ Answer: (b) CI — The hooked curved line above the circle is the symbol for cirrus (CI) filaments, a high cloud (CH).

❌ (a) CC and (c) CS have different symbols in the high-cloud (CH) table.

💡 High cloud symbols are drawn above the circle; medium and low below it.

Q6. Height of base of low clouds is: (a) 200 m (b) 250 m (c) 100 to 199 m

✅ Correct Answer: (c) 100 to 199 m — h code 2 = 100–199 m

❌ h code 2 gives a RANGE, not a single value. (a) and (b) are specific values, not ranges.

💡 Always express h as a range per Table 24.4. Code 2 = 100–199 m.

Q7. Amount of lowest cloud is: (a) 2/8 (b) 4/8 (c) 3/8

✅ Answer: (c) 3/8 — The group under the circle reads 3/2: 3 is the amount of the lowest cloud in eighths (3/8) and 2 is its height code.

❌ (a) 2/8 uses the height code as the amount. (b) 4/8 is not plotted.

💡 Nh/h: amount first, then height code.

Q8. Dew Point temperature range is: (a) 29.5 to 30.4°C (b) 29.1 to 30.4°C (c) 30.6 to 30.4°C

✅ Answer: (a) 29.5 to 30.4°C — The dew point is plotted as 30. A plotted whole degree stands for the range from half a degree below to just under half a degree above: 29.5 to 30.4 °C.

❌ (b) 29.1 to 30.4 and (c) 30.6 to 30.4 are not valid rounding ranges.

💡 A reported whole degree covers -0.5 to $+0.4$.

Q9. Temperature 34°C is: (a) Dry (b) Wet (c) Dew Point

✅ Correct Answer: (a) Dry — TT (top left) is the dry bulb temperature

❌ (b) Wet bulb is not plotted on standard station model; (c) Dew Point is bottom left (T_d).

💡 Station model convention: TOP LEFT = Dry temp; BOTTOM LEFT = Dew Point.

Q10. 962 represents: (a) QFE (b) QFF (c) QNH

✅ Correct Answer: (b) QFF — PPP on station model is always Sea Level Pressure = QFF

❌ QFE = aerodrome pressure; QNH = altimeter setting. Station model plots QFF (Mean Sea Level Pressure).

💡 Station model ALWAYS shows QFF (MSL pressure). PPP=962 → 996.2 hPa QFF.

Q11. Pressure value in hPa is: (a) 996 (b) 996.2 (c) 1096.2

✅ Correct Answer: (b) 996.2 hPa — PPP=962 → 9 prefix (since >500) → 9962 → $\div 10$ = 996.2

✗ (a) 996 misses the tenth; (c) 1096.2 uses wrong prefix.

💡 Rule: $PPP > 500 \rightarrow$ prefix 9. $962 > 500 \rightarrow 9962 \rightarrow 996.2 \text{ hPa}$.

Q12. Pressure change of 1.4 hPa is in: (a) 6 hr (b) 3 hr (c) 24 hr

✓ Correct Answer: (b) 3 hr — PP on station model = pressure change in 3 hours ($\div 10$)

✗ The 24hr pressure change uses P_1P_2 field. PP field = 3hr change.

💡 PP = 3hr pressure change. Value plotted $\div 10$ = actual change. Here $PP=15 \rightarrow 1.5 \text{ hPa/3hr}$.

Q13. Past weather is: (a) Moderate Light Rain (b) Continuous Rain (c) Heavy Rain

✓ Correct Answer: (a) Moderate Light Rain — W_1W_2 symbols indicate past weather

💡 Past weather W_1W_2 appears to the RIGHT of the circle on the station model.

Q14. Rainfall amount is: (a) 2 mm (b) 1.5 mm (c) 1.6 to 2.4 mm

✓ Answer: (c) 1.6 to 2.4 mm — The rainfall is plotted as 2 mm, which stands for the band 1.6 to 2.4 mm.

✗ (a) a single value of 2 mm and (b) 1.5 mm are not the reported band.

💡 Plotted values stand for a band, not an exact figure.

Q15. Rainfall reported is from: (a) 0300Z yesterday to 0300Z today (b) 0100 to 2400Z today (c)

0530 to 0830 IST

✅ Correct Answer: (a) 0300Z yesterday to 0300Z today — RRR is "Rainfall since 01 UTC" but in some codes = 03Z previous day to 03Z current

💡 The tracker says "since 01 UTC" but the Q&A answer specifies 0300Z yesterday to 0300Z today — this reflects a 24hr accumulation period ending at 03Z.

Q16. Speed of Ship is: (a) 5 KMH (b) 5 MPS (c) 5 KT

✅ Correct Answer: (c) 5 KT — Ship speed on station model is in knots

❌ (a) KMH and (b) MPS are not used for ship speed on synoptic charts.

💡 All speeds on station model (wind + ship) are in KNOTS.

Q17. Direction of movement of Ship: (a) NW (b) SW (c) NE

✅ Answer: (c) NE — The arrow shows the direction in which the ship is moving, drawn towards the north-east.

❌ (a) NW and (b) SW do not match the arrow.

💡 The ship arrow points where the ship is going; the wind staff points where the wind comes from.

Q18. Speed of Ship reported is averaged for: (a) 3 hr (b) 6 hr (c) 12 hr

✅ Answer: (a) 3 hr — The ship's speed is the average over the last 3 hours.

❌ (b) 6 hr and (c) 12 hr are not the averaging period.

💡 Ship speed: 3-hour average.

Q19. Surface visibility is: (a) 500 to <1000 m (b) 1000 to 2000 m (c) 2000 to <4000 m

✅ Answer: (c) 2000 to <4000 m — The visibility code 95 stands for 2000 m to under 4000 m (code 94 is 1000–2000 m, 96 is 4000–10,000 m).

❌ (a) and (b) belong to codes 93 and 94.

💡 VV: 90 <50 m · 91 50–200 · 92 200–500 · 93 500–1000 · 94 1–2 km · 95 2–4 km · 96 4–10 km.

Q20. Weather reported is: (a) Rain at time of observation (b) Rain during last one hour (c) Rain not at station but within 5 km

✅ Correct Answer: (b) Rain during last one hour — ww code 21 = Rain last hour but NOT at time of observation

❌ (a) Rain at time of obs = ww 60–69; (c) Rain within 5km = not a standard station model category.

💡 ww 20–29 = weather in the PAST hour, not NOW. ww=21 specifically = Rain last hour.

10. Master Reference Tables

Quick Numerical Reference

Parameter	Key Values
Pressure prefix rule	PPP > 500 → prefix 9; PPP ≤ 500 → prefix 10
VV code 90	< 50 m (Very Thick FOG)
VV code 93	500 to <1000 m (FOG)
VV code 95	2000 to <4000 m (Slight Mist)
VV code 99	≥50 km
h code 0	0–49 m
h code 2	100–199 m
h code 9	No cloud below 2500 m
N = 9 (octas)	Sky obscured (not overcast)
N = 8 (octas)	Overcast
ww 20–29	Weather in last hour only — NOT now
ww 50–59	Drizzle now
ww 60–69	Rain now
ww 90–99	TS with precip now
PP (3hr change)	Divide plotted value by 10 to get hPa
Ship speed in this plotted model	In knots, averaged over 3 hours

Mnemonic Sheet

STATION MODEL POSITION MNEMONIC: "TV → Wind → Press → Change"

Top-Left = **T**emperature (TT)

Bottom-Left = **T**d (Dew Point)

Left of circle = **V**isibility (VV) code

Left of circle (ww) = **P**resent Weather

Right of circle = **P**ast Weather (W₁W₂)

Top-Right = **P**ressure (PPP)

Middle-Right = **P**ressure change 3hr (PP)

Below circle = h / N_h

PPP RULE: ">500 → Nine; ≤500 → Ten" then ÷10 → hPa

ww RANGES: "No Fog Last-Hour Dusty Foggy Drizzly Rainy Snowy Showery Stormy" = 00 10 20 30 40 50
60 70 80 90