Complete Blood Count (CBC)

WBC (White Blood Cells)	**5,000–10,000 /µL**	Crit: <2,000 (infection risk) or >30,000
RBC (Red Blood Cells)	**M 4.7–6.1, F 4.2–5.4 M/µL**	Low = anemia; High = polycythemia
Hemoglobin (Hgb)	**M 14–18, F 12–16 g/dL**	Crit: <7 g/dL (transfusion threshold)
Hematocrit (Hct)	**M 42–52%, F 37–47%**	~3× the hemoglobin value
Platelets	**150,000–400,000 /µL**	Crit: <50,000 bleed risk; <20,000 spontaneous
MCV	**80–100 fL**	Low=microcytic, High=macrocytic anemia
MCH	**27–31 pg/cell**	Average Hgb per RBC
MCHC	**32–36 g/dL**	Hgb concentration per RBC
RDW	**11.5–14.5%**	RBC size variation
Neutrophils	**2,500–8,000 /µL (50–70%)**	First responders to bacterial infection
Lymphocytes	**1,000–4,000 /µL (20–40%)**	Viral infections, immunity
Eosinophils	**50–500 /µL (1–4%)**	Allergy, parasites
Reticulocytes	**0.5–2.5%**	Bone-marrow RBC production

Coagulation

PT	**11–13.5 sec**	Monitors warfarin (extrinsic pathway)
INR	**0.8–1.1 (therapeutic 2–3 on warfarin)**	Crit: >5 high bleed risk
aPTT	**30–40 sec**	Monitors heparin (therapeutic 1.5–2.5× normal)
Fibrinogen	**200–400 mg/dL**	Low in DIC
D-dimer	**<0.5 µg/mL**	Elevated in DVT/PE, DIC

Electrolytes

Sodium (Na)	**135–145 mEq/L**	Crit: <120 or >160 (seizure risk)
Potassium (K)	**3.5–5.0 mEq/L**	Crit: <2.5 or >6.5 (cardiac arrest)
Chloride (Cl)	**98–106 mEq/L**	Follows sodium
Bicarbonate (HCO3)	**22–26 mEq/L**	Metabolic acid–base status
Calcium (Ca, total)	**9.0–10.5 mg/dL**	Crit: <6 or >13 (tetany / arrhythmia)
Magnesium (Mg)	**1.5–2.5 mEq/L**	Low → torsades; checked with K replacement
Phosphate	**3.0–4.5 mg/dL**	Inverse to calcium

Renal Function

BUN	**10–20 mg/dL**	Elevated in dehydration, renal failure
Creatinine	**M 0.6–1.2, F 0.5–1.1 mg/dL**	Best marker of kidney function
eGFR	**>90 mL/min/1.73m²**	<60 for ≥3 mo = chronic kidney disease
BUN/Creatinine ratio	**10:1–20:1**	High ratio = dehydration / prerenal

Glucose & Metabolic

Fasting glucose	**70–99 mg/dL**	Crit: <50 or >400; ≥126 = diabetes
Random glucose	**<140 mg/dL**	≥200 with symptoms = diabetes
HbA1c	**<5.7% (goal <7% diabetic)**	3-month average glucose

Liver Function

ALT	**7–56 U/L**	Most liver-specific enzyme
AST	**10–40 U/L**	Liver + cardiac/muscle
ALP	**44–147 U/L**	Liver + bone
Total bilirubin	**0.3–1.0 mg/dL**	Elevated = jaundice (>2.5 visible)
Direct bilirubin	**0.1–0.3 mg/dL**	Conjugated fraction
Albumin	**3.5–5.0 g/dL**	Low = malnutrition, liver/renal disease
Total protein	**6.4–8.3 g/dL**	Albumin + globulins
Ammonia	**15–45 µg/dL**	Elevated in hepatic encephalopathy

Cardiac Markers

Troponin I	**<0.04 ng/mL**	Gold standard for MI; rises 3–4 h
CK-MB	**0–3 ng/mL**	Cardiac-specific CK fraction
BNP	**<100 pg/mL**	>400 strongly suggests heart failure
Myoglobin	**<90 µg/L**	Earliest MI marker (1–3 h)

Lipid Panel

Total cholesterol	**<200 mg/dL**	Desirable
LDL	**<100 mg/dL**	"Bad" cholesterol — lower is better
HDL	**M >40, F >50 mg/dL**	"Good" — higher is protective
Triglycerides	**<150 mg/dL**	Fasting required

Arterial Blood Gas (ABG)

pH	**7.35–7.45**	Crit: <7.20 or >7.55
PaCO2	**35–45 mmHg**	Respiratory component
PaO2	**80–100 mmHg**	Crit: <60 (hypoxemia)
HCO3	**22–26 mEq/L**	Metabolic component
SaO2	**95–100%**	O2 saturation
Base excess	**-2 to +2 mEq/L**	Metabolic acid–base balance

Thyroid

TSH	**0.4–4.0 mIU/L**	High=hypothyroid, Low=hyperthyroid
Free T4	**0.8–1.8 ng/dL**	Active thyroid hormone
Total T3	**80–200 ng/dL**	Triiodothyronine

Inflammation & Others

CRP	**<1.0 mg/dL**	Acute inflammation marker
ESR	**M <15, F <20 mm/hr**	Nonspecific inflammation
Procalcitonin	**<0.5 ng/mL**	Bacterial sepsis marker
Lactate (Lactic acid)	**0.5–2.2 mmol/L**	>4 = sepsis/shock, poor perfusion
Uric acid	**M 3.4–7.0, F 2.4–6.0 mg/dL**	Elevated in gout
Amylase	**30–110 U/L**	Elevated in pancreatitis
Lipase	**0–160 U/L**	More specific for pancreatitis
Ferritin	**M 12–300, F 12–150 ng/mL**	Iron stores; low = iron-deficiency
Serum iron	**60–170 µg/dL**	Low in iron-deficiency anemia
TIBC	**240–450 µg/dL**	High in iron deficiency
Vitamin B12	**160–950 pg/mL**	Low → megaloblastic anemia, neuro
Folate	**2.7–17 ng/mL**	Low → megaloblastic anemia
Vitamin D	**30–100 ng/mL**	Deficiency common

Urinalysis

Urine specific gravity	**1.005–1.030**	Low=overhydration, High=dehydration
Urine pH	**4.6–8.0**	Diet & acid–base dependent
Urine protein	**Negative**	Proteinuria → renal disease
Urine ketones	**Negative**	Positive in DKA, starvation

Therapeutic Drug Levels (high-yield!)

Digoxin	**0.5–2.0 ng/mL**	Crit: >2.4 (toxicity: N/V, vision, arrhythmia)
Lithium	**0.6–1.2 mEq/L**	Crit: >1.5 (tremor, confusion, seizures)
Phenytoin (Dilantin)	**10–20 µg/mL**	Toxic >20 (nystagmus, ataxia)
Vancomycin (trough)	**10–20 µg/mL**	Nephro/ototoxic if high
Theophylline	**10–20 µg/mL**	Toxic >20 (tachycardia, seizures)
Carbamazepine	**4–12 µg/mL**	Anticonvulsant
Valproic acid	**50–100 µg/mL**	Anticonvulsant / mood
Acetaminophen	**10–30 µg/mL**	Toxic >150 at 4h → liver failure
Salicylate (ASA)	**10–30 mg/dL**	Toxic >40 (tinnitus, acidosis)
Gentamicin (trough)	**<2 µg/mL**	Nephro/ototoxic
Magnesium (OB, on Mg drip)	**4–7 mg/dL therapeutic**	Loss of DTRs = toxicity → stop drip