Q.1 A 38-year-old man has a history of idiopathic membranous nephropathy diagnosed 3 years ago. Proteinuria at diagnosis was 15 g/24 hours, and the serum creatinine level was 1.4 mg/dl. Anti-phospholipase 2 receptor antibodies (PLA2R) on ELISA were 7350 U/ml measured on a stored serum sample 1 year later. He was treated with modified Ponticelli regime His proteinuria declined to 9 g/24 hours and 4 g/24 hours at 6 and 12 months, respectively, but has increased to 5.5 g/24 hours over the last 3 months. He is now asking you about further therapy. Current medications are lisinopril, 20 mg orally each day, and Atorvastatin, 10 mg daily. Pertinent findings on physical examination include BP of 110/75 mmHg, pulse of 72 beats/min, and mild edema of the ankles. Laboratory tests: Hb.12.8 g/dl, serum creatinine 1.3 mg/dl, serum albumin 2.4 g/dl. Urinalysis showing heme 1+, Protein +3, 24 hours urinary protein is 5.4 g/24 hours.

a) Give three differential diagnoses of persistence of proteinuria? Give justification.
b) How will you investigate?
Q.2  A 73-year-old man was admitted in confused state with respiratory distress. Arterial blood gases showing:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>7.05</td>
</tr>
<tr>
<td>PCO₂</td>
<td>16 mm Hg</td>
</tr>
<tr>
<td>HCO₃</td>
<td>5 mEq/L</td>
</tr>
<tr>
<td>Na⁺</td>
<td>132 mEq/L</td>
</tr>
<tr>
<td>K⁺</td>
<td>4 mEq/L</td>
</tr>
<tr>
<td>Cl⁻</td>
<td>101 mEq/L</td>
</tr>
<tr>
<td>Creatinine</td>
<td>1.4 mg/dl</td>
</tr>
<tr>
<td>Urea</td>
<td>45 mg/dl</td>
</tr>
<tr>
<td>Blood sugar</td>
<td>121 mg/dl</td>
</tr>
<tr>
<td>Measured Osmolality</td>
<td>346 mOsm/l</td>
</tr>
</tbody>
</table>

a) What are metabolic derangements?  
b) What are differential diagnoses?  
c) How will you differentiate?
Q.3 A 27-year-old man with ESRD treated with CAPD is being seen in the clinic for his routine monthly visit. He was diagnosed with end stage kidney disease secondary to VUR at age 9 years and initially treated with PD. He received a living donor transplant from his stepfather at 10 years of age, which failed after 10 years and PD restarted. A peritoneal equilibration test done when he restarted PD showed a 4-hour dialysate–plasma creatinine of 0.72 (2.5% dextrose). Currently his automated PD prescription consists of four exchanges over 9 hours nightly with 3 L fill volume using 2.5% dextrose and 3 L last bag fill with 7.5% icodextrin for the 15-hour day dwell. His last measured total weekly Kt/v urea was 1.76. He had only two episode of peritonitis over last 7 years.

He has been doing well but now reports that, for the last 3 months, he is frequently nauseated and occasionally vomits 3–4 hours after meals. His appetite has decreased, and he has lost about 8 pounds over the preceding 3 months. He denies abdominal pain or discomfort, bloating, or change in bowel habits. On examination, BP is 150/85 mmHg. He has bibasilar rales, mild epigastric tenderness, and bilateral lower extremity pitting edema. His most recently measured serum albumin was 3.1 g/dl, and a repeat peritoneal equilibration test (4.25% dextrose), done 1 month before clinic visit, showed a 4-hour drain volume of 2200 ml and 4-hour dialysate-to-plasma creatinine of 0.60.

a) Give four differential diagnoses of his symptom.
b) What is the most likely diagnosis? Give reason.
c) How will you treat him?
Q.4 A 22 years old female with history of Sjogren’s syndrome presents to her primary physician for a routine follow up. There is history of watery diarrhea for three days which has settled two days ago. She complains of weakness. Physical examination is unremarkable. Her labs show:
S.Na: 139 mEq/L  K: 3.0 mEq/L  S. Cl: 110 mEq/L
Her ABGs were done which came out to be as follows:
PH: 7.33  PCO₂: 34  HCO₃: 19

a) What is the acid base disorder?
b) Give two causes of this acid base disorder in this patient.
c) What additional work up would you advise for the acid base disorder?

Q.5 A 74-year-old man has been on chronic maintenance hemodialysis therapy for 9 yr. Three years ago, he developed paresthesias along the palmar surface of the fourth fingers of the left hand. Two years ago, the symptomatology became bilateral.

a) What is your diagnosis with justification?
b) Name investigations with possible findings to establish the diagnosis.
c) How you will treat the patient?
Q.6 A 45-year-old multiparous woman secondary to unknown cause received a kidney transplant from her 20-year-old son. Her class I and class II flow cytometry panel-reactive antibodies (PRA) were 65 and 80%, respectively. A donor-specific flow cross-match was negative. Her immunosuppressive regimen consisted of ATG induction and maintenance therapy with cyclosporine, Mycophenolate mofetil, and prednisone. Although urine production was noted after the vascular anastomosis was completed, the urine output decreased within the first 12 hours after transplantation and her blood urea nitrogen and creatinine failed to decrease. A renal transplant ultrasound showed adequate blood flow in the renal transplant artery and vein and a resistive index of 1.0. On day 2 after transplantation, the platelet count was noted to fall from 200,000 to 90,000/mm³, and her hemoglobin decreased from 11 to 8.5 g/dl. A repeat flow cytometry cross-match was negative.

a) What are the two differential diagnoses? Give four reasons for each.
b) Give renal biopsy findings of your differential diagnoses.
c) What prevention could have been taken before renal transplant?

Q.7 A 74-year-old man with diabetes, hypertension, with a baseline serum creatinine of 1.7 mg/dl undergoes coronary angiography. Three days after he is readmitted to the hospital with abdominal and lower extremity muscle pains. His serum creatinine is 3.6 mg/dl, amylase 320 U/L and CPK 470 U/L.

a) Give two differential diagnoses.
b) What lab investigations will help to differentiate your diagnosis with justification?
c) How renal biopsy will be helpful to differentiate the diagnosis?
Q.8 A 7 year old girl presented with a history of polydipsia, polyuria, pallor, lethargy and growth retardation. Several members of her family developed ESRD prior to the age of 20 years. Renal ultrasound reveals small kidneys with multiple medullary cysts. Lab investigations show Hb 7 gm/dl (normocytic normochromic), serum creatinine 1.3 mg/dl, and urine osmolality 200 mOsmol/kg.

a) What is the diagnosis?
b) Give five extra renal manifestations.
c) What is the mode of transmission of this disease?
d) What is chance of recurrence in case of transplant?

Q.9 A 66 year old male known hypertensive presents in the E.R with c/o right sided lumbar pain. He has history of passing stones in urine in the last 5 years. His B.P. is well controlled on Amlodipine 10mg/d, Atenolol 50mg/d and thiazide diuretic 25mg/d. He also takes Atorvastatin 10mg and Diclofenac Sodium and Acetaminophen on and off for the joint pains.

Labs shows:
S.Cr: 1.5 mg/dl
Urine D/R:
X-Ray KUB: Normal
U/S KUB: 1.0 cm stone in right renal pelvis and 0.8 cm stone in left renal pelvis

a) What is the most likely composition of stone?
b) Give three major factors influencing particular stone formation.
c) What therapeutic advise would you give in order to prevent recurrent stone formation?
d) What dietary advise would you give to the patient?
Q.10 A 61-year-old man with history of diabetes, coronary artery disease, hypertension, and proteinuria is being treated by a medical specialist with ramipril, losartan and spironolactone alongwith other medications that are appropriate for his medical conditions. His Serum Creatinine has remains around 1.8 mg/dl for the last one year. Now the patient is brought to emergency department with dizziness of one day duration. Clinical examination revealed him to be drowsy with BP 85/50 mmHg, pedal oedema, normal JVP and rest of the examination is unremarkable. ECG is normal. You are called for opinion as his creatinine is found to be 3.8 mg/dl.

a) Which medicine is the cause of his hypotension and acute kidney injury? Justify with reference to clinical trial.
b) What is risk of cardiovascular death with ACEI and ARB combination?

c) What is the effect of ACEI and ARB on rate of renal function progression?

d) What was the rationale of given spironolactone in this patient from renal point of view? What are the chances to develop hyperkalemia?
Q.11 A 35-year-old woman is admitted with left flank pain and fever for 2 days. Physical examination shows a toxic-appearing thin woman. She is pyrexial with temperature of 38.5°C, BP 100/68 mmHg. Right-sided costovertebral tenderness is present. An ultrasound of the abdomen shows normal-sized kidneys and no evidence of hydronephrosis. Renal function and serum electrolytes were normal. Right-sided pyelonephritis is diagnosed. The patient is treated with intravenous Tazobactam and gentamicin. Her clinical condition gradually improves over the next several days. After a 2-week course of parenteral antibiotics, she is discharged on no medications.

One week later, the patient presents with the complaint of weakness and paresthesias. Physical examination shows downward beat nystagmus, and carpopedal spasm. An electrocardiogram showed prominent U waves and Q-T prolongation. Laboratory data are given below:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creatinine</td>
<td>0.9 mg/dl</td>
</tr>
<tr>
<td>BUN</td>
<td>14 mg/dl</td>
</tr>
<tr>
<td>Na</td>
<td>139 mEq/L</td>
</tr>
<tr>
<td>K</td>
<td>2.3 mEq/l</td>
</tr>
<tr>
<td>Chloride</td>
<td>92 mEq/L</td>
</tr>
<tr>
<td>HCO₃⁻</td>
<td>34 mEq/l</td>
</tr>
<tr>
<td>Serum magnesium</td>
<td>0.9 mg/dl</td>
</tr>
<tr>
<td>Plasma renin activity</td>
<td>2.4 ng/ml per h (0.8 to 2.5)</td>
</tr>
<tr>
<td>Serum aldosterone</td>
<td>235 ng/dl (35 to 240)</td>
</tr>
</tbody>
</table>

Urine electrolytes:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Na</td>
<td>110 mEq/L</td>
</tr>
<tr>
<td>K</td>
<td>35 mEq/L</td>
</tr>
<tr>
<td>Chloride</td>
<td>110 mEq/L</td>
</tr>
<tr>
<td>Spot urine Ca/creatinine</td>
<td>0.53mg/mg normal (&lt; 0.2 mg/mg)</td>
</tr>
</tbody>
</table>

a) What is the acid base and electrolyte abnormality?
b) Give two differential diagnoses of the electrolyte and acid base disorder with reasoning.
c) What is the mechanism of hypokalemia in hypomagnesemia?
Q.12 A middle aged man on hemodialysis twice a week for last 3 years, resident of remote area of the southern Punjab, presented with body aches, easy fatigability and shortness of breath on light exertion. He is also getting Injection Erythropoietin 4000 units twice a week after hemodialysis. On examination he was euvalmic, B/P 130/80 mmHg and pale. On investigation:

Hb 7.0gm/dl
MCH concentration 30gm/l (Normal 32-36 gm/l)
MCH 27pg (Normal 28-32pg)
S. Calcium 9.2 mg/dl Phosphate 5.3 mg/dl
S. Albumen 2.3 gm/dl PTH 60 pg/ml
Dialysate calcium 2.5 mmol/L

a) What are two differential diagnoses with justification?
b) What further investigations you would like to do?
c) How will you treat this patient?
Q.13 A 46 years old man had renal transplant 3 years ago. He had acute vascular rejection in the early period of transplant treated with Methylprednisolone and ATG. His maintenance immunosuppression was Cyclosporine, MMF and prednisolone. He was maintaining serum creatinine at 2.5 mg/dl. Co level was 180 ngm/dl.

He had acute flare up of gout and was prescribed allopurinol, 100 mg daily; and colchicine, 0.6 mg three times daily, for the first 2 days and then colchicine, 0.6 mg twice daily thereafter.

After 48 hours of taking the allopurinol and colchicine, the patient developed nausea, intermittent vomiting, and profuse diarrhea, which continued over the next 2 days. He was admitted in hospital. On arrival he was hypotensive with BP of 84/40, pulse 120/min. He was resuscitated with I/V fluid.

Laboratory results at the time of admission are shown:

<table>
<thead>
<tr>
<th>Sodium</th>
<th>130 mEq/L</th>
<th>Potassium</th>
<th>2.5 mEq/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chloride</td>
<td>108 mEq/L</td>
<td>Bicarbonate</td>
<td>6 mEq/L</td>
</tr>
<tr>
<td>BUN</td>
<td>101 mg/dl</td>
<td>Creatinine</td>
<td>4.9 mg/dl</td>
</tr>
<tr>
<td>Glucose</td>
<td>101 mg/dl</td>
<td>CPK</td>
<td>1200 IU/L</td>
</tr>
<tr>
<td>Troponin</td>
<td>0.2 ng/ml</td>
<td>AST</td>
<td>198 IU/L</td>
</tr>
<tr>
<td>ALT</td>
<td>100 IU/L</td>
<td>Albumin</td>
<td>3.7 g/dl</td>
</tr>
<tr>
<td>Cyclosporine trough level</td>
<td>250 ng/dl</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hb</td>
<td>11 gm/dl</td>
<td>WBC</td>
<td>1200 cells/mm³</td>
</tr>
</tbody>
</table>

Arterial blood gases:

| pH  | 6.91 | $\text{PCO}_2$ | 28 mmHg | $\text{PO}_2$ | 75 mmHg |

a) What is the acid base disorder?
b) Give the most likely cause of diarrhea in this patient with justification. Give two other possible causes with reasons.
c) What is the cause of increase in Cyclosporine level?
Q.14 A previously healthy with no known co-morbid 50 year old male, presents to the ER department with c/o hemoptysis and anuria for 2 days. On examination he is afebrile, his pulse rate is 102/min, BP is 140/90 mmHg. He has periorbital puffiness. Chest auscultation revealed bilateral crackles up to mid zone. Lab studies:

\[
\begin{align*}
\text{Hb} & \quad 8.0 \text{ g/dl} \\
\text{TLC} & \quad 5 \times 10^3/\text{cmm} \\
\text{Platelets} & \quad 210000/\text{cmm} \\
\text{S. Cr.} & \quad 4.8 \text{mg/dl} \\
\text{S. Na} & \quad 146 \text{meq/l} \\
\text{S. Cl} & \quad 106 \text{ meq/l} \\
\text{S. HCO}_3 & \quad 14 \text{meq/l} \\
\text{S. K} & \quad 5.9 \text{ meq/l} \\
\text{HBs Ag} & \quad \text{negative} \\
\text{Anti HCV} & \quad \text{negative} \\
\text{Urine D/R:} & \\
\text{Proteins: 3+} & \quad \text{Haem 2+} & \quad \text{Several dysmorphic erythrocytes/hpf}
\end{align*}
\]

Chest X ray shows bilateral fluffy shadows. Ultrasound shows bilateral normal sized kidneys. His complement levels were sent.

a) Give three differential diagnoses.
b) What blood immunological tests will you advise?
c) How can renal biopsy be helpful?

Q.15 A young female, 30 years of age newly diagnosed hypertensive (BP 180/110 mmHg) having following investigations, reports to your clinic.

\[
\begin{align*}
\text{BUN} & \quad 13 \text{mg/dl} \\
\text{S. creatinine} & \quad 0.9 \text{mg/dl} \\
\text{S. Potassium} & \quad 3.2 \text{meq/l}
\end{align*}
\]

a) What are your differential diagnoses?
b) What further investigations you would like to do?
Q.16 A 12 years old boy was diagnosed as Nephrotic syndrome. He responded to steroid but was steroid dependent. He presented with relapse on decreasing the dose of prednisolone. Prednisolone was increased to 2mg/kg, diuretics and cyclosporine were added to treatment. He presented with headache over last few days, not responding to paracetamol, blurring of vision. He had seizure at home. Blood pressure was 150/110 mmHg at this stage. CT scan showed diffuse subcortical edema over the bilateral frontal and posterior parietal lobes with obliteration of cortical sulci. Investigations:

Hb 12.8 gm/l     WBC 5600/cumm     Platelets 186000 /cumm
Urea 25 mg/dl    Creatinine 1.0 mg/dl     Na 138 mEq/l
Cyclosporine trough level  186/ ng/ml     K 4.5 mEq/l

a) Give 3 differential diagnoses with justification.
b) Give 4 principles of management.

Q.17 A 30-year-old woman presented with oliguria, edema, and breathlessness for the previous 10 days. She was gravida 2, para 2 and had undergone lower segment caesarean section at term 2 weeks ago. Her pregnancy was uncomplicated: she had normal kidney function and no pre-eclampsia. On examination, blood pressure was high at 150/90 mmHg and urinalysis showed proteinuria and hematuria. Fundi did not reveal hypertensive changes and there was no papilloedema. Investigations reveal:

Serum creatinine 13.2 mg/dL     Hb 6.4g/dL
Platelet count 27000/cumm
Peripheral smear showed occasional shistocyte. Liver function and coagulation profile results were normal, and lactate dehydrogenase level was mildly elevated at 730 U/L (normal 240-480 U/L). A kidney ultrasound showed normal-sized kidneys with grade 1 increased echogenicity.

a) Give 3 likely cause of acute kidney injury. Give reasons
b) What will be the most likely diagnosis?
c) How will you treat this patient?
d) Her renal functions returned to normal and she comes to you after 2 years for another pregnancy. What will you advise?
Q. 18 A 50 years old gentleman, who was diagnosed to have membranous nephropathy 3 months ago, was maintained on conservative management. He was admitted through ER with generalized body swelling. Examination revealed BP 160/100mmHg, bilateral pitting edema (+3) of lower limbs and chest examination revealed bilateral pleural effusions. His labs revealed:

- Hemoglobin 10.5 g/dl
- Urea 35 mg/dl
- Creatinine 1.0 mg/dl
- S. Albumin 2.5 g/dl
- Cholesterol 210 mg/dl
- LDL 100 mg/dl

Patient was started on diuretics (high dose furosemide + spironolactone) swelling subsided in few days. He was discharged on cyclosporine (100mg BD), Deltacortil (10mg on alternate day), high dose of furosemide and captopril with normal renal functions. One week later the patient again presented with weakness, lethargy, nausea and BP 150/90 mmHg. On examination he is euvoletic. Relevant labs showed:

- Urea 130 mg/dl
- Creatinine 6.0 mg/dl
- Cyclosporine trough levels 80 ng/ml
- Ultrasound KUB Normal study
- Urine RE: Proteins ++ RBCs NIL

a) Give 3 differential diagnoses of acute rise in serum creatinine.
b) What investigation will you perform to reach diagnosis?
c) How will you treat this patient?
Q.19 A 68-year-old man, known diabetic presents with shortness of breath, severe body aches, weight loss and polyuria. He is found to have a BP of 110/60 mmHg, a pulse of 68 bpm, an S4 gallop on cardiac examination and rales at the lung bases, hepatosplenomegaly, and bilateral pitting ankle and pretibial edema. On investigations:

Hb 9.1 gm/dl TLC 8000/mm$^3$, Platelets 150000; BUN is 62 mg/dl, serum creatinine is 1.8 mg/dl. Serum Albumen is 2.8gm/dl, Calcium 9.8mg/dl, Uric acid 7.5mg/dl and phosphate is 4.5 mg/dl, RBS 110 mg/dl and HbA$\text{C}_1$ 7.0. Urinalysis shows 1+ protein and several erythrocytes per high-power field and 24-h urinary protein 4.6 g/d. Echocardiogram shows a thickened, stiff left ventricle.

a) What is the most likely diagnosis?
b) How will you investigate?
c) What is the cause of polyuria
d) Give 5 steps to manage this patient.

Q.20 A 50 years old female who is diabetic for the last 20 years and on oral hypoglycaemic agents having blood sugar level well controlled, presented with haematuria, right side lumbar pain and decreased urine output for three days. On inquiry she has been suffering from Gastroenteritis one week back, for which she took antibiotics and analgesic for body pain. On examination pulse is 120/min, BP 90/60 mmHg. She is febrile, volume depleted. On examination of abdomen, mild tenderness in right lumbar region. Rest of the examination is unremarkable. On investigation Hb 9gm/dl, TLC 14000/cumm, Platelets 150000/cumm, BUN 22mg/dl, Serum Creatinine 2mg/dl and normal serum electrolytes. There is a mild hydronephrosis on the right side, no stone was visible

a) Give 3 differential diagnoses?
b) How will you investigate?
c) How will you manage?

The End