1. A 70 year old man presents with back pain. Multiple osteosclerotic lesions involving several vertebral bodies are seen on spine radiographs. What is the most likely diagnosis?
   A. Multiple myeloma
   B. Malignant lymphoma
   C. Metastatic pulmonary adenocarcinoma
   D. Metastatic prostatic adenocarcinoma
   E. Spinal osteomyelitis

2. Most common primary malignant bone tumor is:
   A. Malignant fibrous histiocytoma
   B. Osteosarcoma
   C. Ewing's sarcoma
   D. Metastatic carcinoma
   E. Chondrosarcoma

3. Schwannoma and neurofibroma are examples of benign nerve sheath tumors. Which feature is more characteristic of neurofibroma?
   A. Most common benign soft tissue neoplasm
   B. Forms an eccentric mass with respect to the nerve of origin
   C. Less potential for malignant transformation than schwannoma
   D. 11:22 chromosomal translocation
   E. More likely to be multifocal than schwannoma
4. A 35 year old woman presents with knee pain. Radiographs disclose an osteolytic bone tumor with sharp margins in the distal femur abutting the articular surface. What is the most likely diagnosis?

A. Osteosarcoma
B. Osteochondroma
C. Solitary bone cyst
D. Non-ossifying fibroma
E. Giant cell tumor

5. Collagen fibers are formed through a series of structural biochemical alterations. Which of the following statements is true about this process?

A. Cross-linking is mediated by a zinc-dependant metalloproteinase
B. Collagen fibrils are assemble in the extracellular environment
C. Triple helix formation is initiated by cleavage of N- and C-terminal propeptides
D. Alpha chains have a repetitive molecular structure of PRO-X-Y
E. Cross-linking occurs through a vitamin C-dependant reaction.

6. A 72 year old man complains of tightness in his palm and is unable to fully extend his 4th and 5th digits. What is the most likely diagnosis?

A. Dupuytren's contracture
B. Peyronie's disease
C. Musculoaponeurotic fibromatosis
D. Desmoid tumor
E. Ormond's disease
7. Choose the single best statement about Paget's disease of bone.
   A. Bone resorption outpaces bone formation.
   B. Pagetic bone is denser and sturdier than normal bone
   C. Most patients are symptomatic
   D. There is no known effective therapy
   E. Classic clinical features are due to skeletal enlargement

8. All the following statements about osteoporosis are true EXCEPT:
   A. It is defined by the presence of fragility fractures.
   B. It results from abnormalities in remodeling.
   C. Sites rich in cancellous bone are most affected.
   D. Excess alcohol consumption is a risk factor for developing osteoporotic fragility fractures.
   E. It is more common in women.

9. All the following statements about osteomalacia are true EXCEPT:
   A. Bowing deformity of the lower extremities is a classic clinical feature.
   B. Associated with fragility fractures
   C. Renal failure is the most prevalent cause in this country.
   D. Rare cases are caused by tumors which elaborate a phosphaturic substance.
   E. The skeleton is undermineralized.
10. Choose the single best statement about normal bone and bone remodeling.
   A. Bone resorption is a slower process than bone formation.
   B. 80% of bone mass is contained in cortical bone.
   C. Bone remodeling takes place predominantly on endosteal surfaces.
   D. Bone formation outpaces bone resorption until late adulthood when progressive negative skeletal balance ensues.
   E. Osteoblasts liberate factors which recruit osteoclasts to sites of remodeling.

11. The stratum lucidum is most apparent in epidermis of the:
   A. Face
   B. Scalp
   C. Forearm
   D. Sole
   E. Back

12. Merkel Cell:
   A. Dopa positive
   B. Fibrillar proteins
   C. Membrane-bound granules
   D. Stain with gold chloride

13. Melanocyte:
   A. Dopa positive
   B. Fibrillar proteins
   C. Membrane-bound granules
   D. Stain with gold chloride
14. All the appendages listed below are included in the term "pilar complex" EXCEPT:
   A. Hair follicle
   B. Eccrine gland
   C. Sebaceous gland
   D. Apocrine gland

15. Sebaceous glands are found everywhere on the body EXCEPT:
   A. Buccal mucosa
   B. Scalp
   C. Face
   D. Palms

16. Which of the following is/are NOT associated with infantile atopic eczema?
   A. Erythematous patches on cheeks
   B. Onset 2 or more months after birth
   C. Antecubital and popliteal fossa eczema
   D. Lichenification
   E. Tendency to disappear after two years

17. Which of the following is/are NOT associated with atopic dermatitis?
   A. Dennie-Morgan lines
   B. Scabies
   C. Cataracts
   D. Keratoconus
   E. Hertoghe's sign
18. The differential diagnosis for a vesicular, often itchy, eruption on the palms, soles and sides of fingers may include all of the following, EXCEPT:

A. Pustular psoriasis
B. Nummular eczema
C. Dyshidrosis (pompholyx)
D. Drug eruption
E. Chickenpox

19. Which of the following signs, symptoms, or features is/are characteristic of allergic contact dermatitis?

A. Pustules frequently occur
B. Prevalence of between 1% to 10%, and accounts for 70% to 80% of contact dermatitis.
C. Often produced by soaps
D. patch test is negative at 24 hours
E. May be suppressed by ultra violet light

20. Signs/symptoms of lower extremity venous insufficiency include all of the following EXCEPT:

A. varicosities and an eczematous eruption
B. Round or oval ulcers with a predilection for medial aspect of ankles
C. Presence of venous pulsation and thrills
D. Pruritus and pain (if ulcer is present)
E. Reticulated melanin hyperpigmentation of the skin

21. Renewal time of the human epidermis is about:

A. 1 week
B. 5 weeks
C. 10 weeks
D. 15 weeks
22. Seborrheic keratosis is:
   A. Benign squamous cell growth
   B. Malignant squamous cell growth
   C. Benign basaloid cell growth
   D. Malignant basaloid cell growth

23. Basal cell epithelioma (or carcinoma) may be:
   A. Pigmented
   B. Flesh-colored with pearly border
   C. Ulcerated
   D. All of the above

24. Parakeratosis means:
   A. Incomplete keratinization
   B. Incomplete keratinization with retention of nucleus
   C. Lack of keratinization
   D. Excessive keratinization

25. Squamous cell carcinoma may arise from:
   A. Actinic keratosis
   B. Burn scar
   C. radiodermatitis
   D. All of the above

26. Racial difference of skin color is due to the difference of:
   A. Number of melanocytes/mm² of skin
   B. Different color of melanin
   C. Number and size of melanosome
   D. Depth of melanocyte location in the skin
27. Useful staining(s) for tissue diagnosis of melanoma is(are):
   A. Dopa
   B. HMB45
   C. S-100
   D. All of the above

28. Chromosome locus 9p21 mutation is related to:
   A. Familial nevoid basal cell epithelioma
   B. Non-familial basal cell epithelioma
   C. Familial melanoma
   D. Colon cancer

29. The major portion of a papule:
   A. Is the dermis
   B. Projects above the skin plane
   C. Is greater than 1 cm in diameter
   D. Is always scaly
   E. Is none of the above

30. The classic morphology of a lichen planus lesion is:
   A. A purple polygonal papule
   B. An ill-defined plaque
   C. A tight cluster of papules
   D. A well-defined scaly plaque on an erythematous base
   E. None of the above
31. Gastro-intestinal (GI) involvement in scleroderma is characterized by the following:

A. Usually (>50% of the time) presents as bloody diarrhea
B. Is a major and direct cause of death
C. Usually (>50% of the time) presents with gastro-esophageal reflux symptoms (heartburn)
D. Is an uncommon (<10%) complication of systemic scleroderma
E. Is best treated by a surgical approach with resection of the affected segment

32. Diseases which do not have T cell receptor gene rearrangements are:

A. Parapsoriasis
B. Psoriasis
C. Mycosis fungoides
D. Pityriasis lichenoides
E. All of the above

33. Photochemotherapy (PUVA) is beneficial to:

A. Lichen planus
B. Psoriasis
C. Mycosis fungoides
D. Pityriasis lichenoides
E. All of the above
34. The NIH Consensus Conference agreed that all of the following are suggestive of neurofibromatosis-1 EXCEPT:
   A. Axillary freckling
   B. Lisch nodules
   C. First degree relative with these changes
   D. Six or more ash lead spots
   E. Two or more cutaneous neurofibromas or one plexiform neurofibroma

35. Recalcitrant discoid lupus erythematoses are best treated with:
   A. Improved sunscreen preparation
   B. Anti-malarias
   C. Azathioprine
   D. Dapsone
   E. Intraleisonal steroid

36. Concerning infantile atopic dermatitis, all of the following are TRUE EXCEPT it:
   A. Is associated with asthma or hayfever
   B. Has a predilection for the cheeks and extensor surfaces
   C. Is associated with prematurity
   D. Is not relieved by dietary restrictions
   E. Begins after the age of two months
37. Which of the statements below is TRUE?
   
   A. The prevalence of HLA-B27 in the Afro-American Population is 8-14%.
   
   B. The prevalence of Ankylosing Spondylitis in the general population is 10%.
   
   C. The Spondyloarthopathies are more prevalent in females.
   
   D. Populations that have a high frequency of HLA-B27 have a higher prevalence of Ankylosing Spondylitis.
   
   E. The pain of Ankylosing Spondylitis is relieved by rest.

38. Clinical abnormalities seen in Ehlers-Danlos Syndromes include all the following EXCEPT:
   
   A. Osteopenia
   
   B. Coarse scarring
   
   C. Large arterial ruptures
   
   D. Mitral valve prolapse
   
   E. Kyphoscoliosis

39. Which one of the following BEST describes a possible basal cell carcinoma?
   
   A. A yellow scar
   
   B. A black or brown mole
   
   C. Eczema with scale
   
   D. Pearly papule with prominent telangiectasia
   
   E. Ulceration

40. Which of the following statements about sarcoidosis is TRUE?
   
   A. It is a disease of the elderly
   
   B. It is more prevalent in Asians than Africans
   
   C. Skin lesions can be treated with intralesional steroids
   
   D. It can be diagnosed on the basis of the clinical presentation and laboratory values
41. Psoriasis can involve which of the following sites?
   A. Nasal mucosa
   B. Oral mucosa
   C. Abdominal lining
   D. Teeth
   E. Nails

42. A red flat lesion is pressed hard and still erythematous. One would describe this as:
   A. Non-blanching macule
   B. Non-blanching plaque
   C. Blanching plaque
   D. Red bumps
   E. Blanching papules

43. All these diseases are associated with HLA-B27 antigen **EXCEPT**:
   A. Ankylosing Spondylitis
   B. Reactive Arthritis
   C. Arthritis Associated with Inflammatory Bowel Disease
   D. Uvclitis
   E. Juvenile Rheumatoid Arthritis

44. All these cell types have a prominent role in the pathogenesis of the Spondyloarthopathics **EXCEPT**:
   A. Polymorphonuclear Leukocytes
   B. Monocytes
   C. CD4⁺ T cells
   D. CD8⁺ T cells
45. The following statement regarding joint terminology is TRUE:
   A. A symphysis is a slightly movable joint typified by skull sutures in the adult.
   B. Condyloid joints permit movement in one axis.
   C. Active range of motion is the motion obtained when the examiner moves the patient's body.
   D. A valgus deformity is present when the distal portion of the bone is displaced away from the midline.
   E. Synonymous terms for the sole of the foot are plantar and dorsal.

46. What are the factors affecting back strength?
   A. Body position
   B. Gender
   C. Duration of sustaining the force
   D. Age
   E. All the above

47. Each of the following is a roentgenographic feature of chondrocalcinosis EXCEPT:
   A. Linear calcification of the symphysis pubis
   B. Narrowing of the radiocarpal joint
   C. Stippled calcification in the knee joint space
   D. Knee involvement restricted to the patellofemoral compartment
   E. Osteophytosis
48. Rheumatoid factor (IgM) may be present in the following disease:
   A. Gout
   B. Reiter's syndrome
   C. Chondrocalcinosis
   D. Ankylosing spondylitis
   E. Bacterial endocarditis

49. The diagnosis of scleroderma is made on the basis of:
   A. A laboratory test (the ANA)
   B. A positive family history
   C. Presence of Raynaud's phenomenon
   D. A skin biopsy
   E. A combination of signs, symptoms and lab values

50. Systemic Scleroderma:
   A. Has a benign, self-limiting course
   B. Is universally fatal
   C. Is a skin disease more frequently seen in children than in adults
   D. Is a chronic disease with a variable course in terms of severity and distribution of internal organ system involvement
   E. Skin involvement starts on the trunk and progresses outward toward the extremities
51. The most characteristic feature of Polymyositis is:
   A. Muscle pain
   B. Positive family history of similar muscle problems
   C. Muscle weakness
   D. Paresthesias (numbness/tingling) of the distal extremities
   E. Constitutional symptoms – fever/lethargy/anorexia

52. Which of the following statements is TRUE of vasculitis?
   A. Vasculitis, although uncommon, presents in a typical and predictable fashion
   B. Vasculitis can affect blood vessels of any size
   C. Vasculitis is a separate entity from the defined connective tissue diseases (SLE, scleroderma, polymyositis), and is not seen with these syndromes
   D. Vasculitis affects multiple organ systems but spares the brain
   E. Vasculitis is a disease primarily of children

53. All of the following factors/agents activate bone remodeling EXCEPT?
   A. Excess vitamin D
   B. Excess parathyroid hormone
   C. Excess thyroid hormone
   D. Corticosteroids
   E. Alcohol
54. One half of adult height is achieved in most girls by age:
   A. One year
   B. Two years
   C. Five years
   D. Seven years
   E. None of the above

55. The musculoskeletal system is mostly derived from:
   A. Ectoderm
   B. Endoderm
   C. Mesoderm
   D. None of the above
   E. All of the above

56. The onset of most non-genetic congenital malformations occur:
   A. In the 1st trimester
   B. In the 2nd trimester
   C. In the 3rd trimester
   D. Throughout the pregnancy

57. Bone remodeling occurs through the action of:
   A. Osteoblasts
   B. Osteoclasts
   C. Osteoblasts and osteoclasts
   D. Collagen cross-linking
58. Bone remodeling processes of funnelization and cylinderization takes place in the:
   A. Epiphysis
   B. Physis
   C. Metaphysis
   D. Diaphysis
   E. Sysyphis

59. Peak height velocity occurs between Tanner Stages:
   A. O - I
   B. I - II
   C. II - III
   D. III - IV
   E. IV - V

60. A fracture containing multiple fragments is termed:
   A. Compression
   B. Compound
   C. Complicated
   D. Torus
   E. Comminuted
61. A fracture pattern caused by rotational forces is termed:
   A. Oblique
   B. Torus
   C. Comminuted
   D. Transverse
   E. Spiral

62. Factors associated with avascular necrosis of bone include all the following EXCEPT:
   A. Corticosteroid medication
   B. Trauma
   C. Sickle cell disease
   D. Autoimmune disease
   E. Alcohol abuse

63. "Sprains" are injuries to:
   A. Tendons
   B. Muscles
   C. Joints
   D. Ligaments
   E. Epiphyses

64. A shoulder "separation" involves the:
   A. Glenohumeral joint
   B. Sternoclavicular joint
   C. Acromio-clavicular joint
   D. Gleno-acromial space
   E. Scapulo-thoracic space
65. The following statement about stress fractures are TRUE EXCEPT they:
   A. Are often radiographically "silent" initially
   B. May be diagnosed by bone scan techniques
   C. May be confused with a malignant process
   D. Are difficult to clinically diagnose
   E. May have prolonged healing times

66. Osteochondritis dissecans is MOST COMMON in the:
   A. Lateral talus
   B. Medial talus
   C. Medial femur
   D. Lateral femur
   E. Patella

67. Ankylosing spondylitis is associated with:
   A. Progressive scoliosis
   B. Isolated spine disease
   C. HLA – D4 antigen
   D. HLA – B27 antigen
   E. Shorts arm deletion of "Y" chromosome

68. Idiopathic scoliosis accounts for what percentage of all types of scoliosis?
   A. 10%
   B. 25%
   C. 33%
   D. 50%
   E. 70%
69. Batson's plexus is commonly involved with metastatic disease of which primary malignancy?

A. Colonic  
B. Pancreatic  
C. Hepatic  
D. Lymphoma  
E. Prostatic

70. Knee meniscal repairs are recommended in all the following zones **EXCEPT**:

A. Red-red  
B. Red-white  
C. White-red  
D. White-white

71. Lung cancer often metastasizes to the skeleton. All the following statements about this disease process are true **EXCEPT**:

A. Associated with relatively shorter survival time than metastatic breast carcinoma  
B. Spinal cord compression may occur  
C. Patients can become hypocalcemic due to paraneoplastic PTHrP production  
D. Metastases are usually osteolytic  
E. Pattern of skeletal dissemination is related to anatomic location of the primary tumor
72. Choose the BEST statement regarding desmoid tumor:
   A. Intra-abdominal tumors typically encases the ureters and cause hydronephrosis
   B. Disseminates primarily via the hematogenous route, especially to lungs
   C. Associated with fibrosing conditions in other organs/sites
   D. Associated with a family cancer syndrome
   E. Most tumors arise in scars

73. Choose the BEST statement regarding the etiology of osteogenesis imperfecta.
   A. genetic abnormality mapped to chromosome 15q
   B. Autosomal recessive inheritance
   C. Defect in conversion of type I procollagen to collagen
   D. Etiology unknown in most cases
   E. Genetic defect in type I collagen gene

74. There is great clinical heterogeneity among patients with Marfan Syndrome. Which statement best describes the etiology of this disease?
   A. The abnormality resides in the microfibrillar system
   B. The precise biochemical and molecular defects are not known in most types
   C. Mutations have been mapped to chromosome 5q
   D. Mutations have been mapped to the type I collagen gene
   E. The abnormality resides in the elastin molecule
75. An adult gait pattern is achieved by:
   A. 2 years
   B. 3 years
   C. 5 years
   D. 7 years
   E. 8 years

76. Contiguous osteomyelitis is commonly associated with septic arthritis in the:
   A. Wrist
   B. Elbow
   C. Hip
   D. Knee
   E. Ankle

77. Raynaud's phenomenon is characterized by the following:
   A. Persistently cold hands regardless of the ambient temperature
   B. More common in men than in women
   C. Is rare in the general population (rare = < 0.1%)
   D. The best approach is to move to a warmer climate
   E. May be the first sign of connective tissue or autoimmune disease, or it may occur alone in the absence of any disease process

78. Avascular necrosis of the bone is common in:
   A. Diabetes mellitus - Type II
   B. Renal osteodystrophy
   C. Alcoholism
   D. Achondroplasia
   E. Hypertension
79. The source of osteomyelitis in a 5-year-old is most likely:
   A. An open fracture
   B. Post operative infection
   C. Direct puncture wound
   D. A bacteremia
   E. A viremia

80. The primary collagenous component of bone is:
   A. Type I
   B. Type II
   C. Type III
   D. Type V
   E. Type X

81. The term used to designate surgical fusion of a joint:
   A. Arthroplasty
   B. Arthrodesis
   C. Arthrocentesis
   D. Arthrosis
   E. Arthrogryposis

82. Bone metastatic sites from which primary tumor are characteristically blastic-type?
   A. Thyroid
   B. Colon
   C. Lung
   D. Renal
   E. Prostate
83. "SCIWORA" refers to:
   A. Septic cartilage inflammation
   B. Surgical closed instrumentation
   C. Sequential cerebral integration
   D. Spinal cord injury
   E. Subchondral injury

84. Scheuermann's disease is:
   A. thoracic kyphosis 2 vertebral osteomyelitis
   B. thoracic kyphosis 2 infectious discitis
   C. thoracic kyphosis 2 unknown causes
   D. thoracic kyphosis 2 vertebral osteomyelitis
   E. thoracic kyphosis 2 acute trauma

85. Biomechanically, which is "heavier" on the spine?
   A. 50 pounds of lead
   B. 50 pounds of wood
   C. 50 pounds of feathers
   D. 50 pounds of water
   E. They are all the same

86. All of the following causes articular injury in septic arthritis **EXCEPT**:
   A. Bacterial toxins
   B. Enzymatic action of bacteria
   C. Joint passive motion
   D. Increased intraarticular pressure
   E. Secondary products of bacterial cell necrosis
87. A surgical emergency requiring incision and drainage exists in septic arthritis of the:
   A. Ankle
   B. Knee
   C. Hip
   D. Wrist
   E. Elbow

88. All of the following malignant primary tumors have a propensity to metastasize to bone EXCEPT:
   A. Thyroid
   B. Breast
   C. Lung
   D. Renal
   E. Pancreatic

89. The most common risk factor producing overuse injuries is:
   A. Sport technique
   B. Training error
   C. Sports equipment
   D. Athlete size

90. The most common organism which causes osteomyelitis is:
   A. Staph. aureus
   B. Strep. pyogenese
   C. H. influenza
   D. Salmonella
   E. N. Gonorrhea
91. The most common type of scoliosis is:
   A. Congenital
   B. Degenerative
   C. Neuro-muscular
   D. Traumatic
   E. Idiopathic

92. All the following statements about rickets are TRUE EXCEPT:
   A. Nutritional rickets can be cured completely and quickly with adequate vitamin D replacement
   B. More common in underdeveloped countries
   C. May occur due to limited exposure to ultraviolet irradiation
   D. Characterized by depletion of bone matrix
   E. The skeleton is undermineralized

93. All of the following are the result of UVB EXCEPT:
   A. Increased DNA synthesis
   B. Dark repair
   C. Burn
   D. IL 10 production
   E. Delayed tanning
QUESTIONS 94 – 100 ARE RELATED TO THE PHOTOGRAPHS PROVIDED.

94. Radiograph (A1) and photomicrograph (A2) are of the fifth finger of a 13 year old girl. What is the diagnosis?
   A. Solitary (unicameral) bone cyst
   B. Aneurysmal bone cyst
   C. Enchondroma
   D. Osteochondroma
   E. Giant cell tumor

95. MRI (B1) and photomicrograph (B2) are from a fibular tumor in an 11 year old girl. Choose the single best statement about this lesion.
   A. *Staphylococcus aureus* is the most likely causative organism
   B. Most common primary malignant bone tumor
   C. This is a stage IIB tumor in the Enneking staging system
   D. This is most likely a benign tumor
   E. Patient may show a monoclonal serum immunoglobulin spike

96. The picture (Figure C) shows a:
   A. Plaque
   B. Lichenification
   C. Fissure
   D. Patch
   E. Nodule
97. The above condition most likely results from:
   A. Active UVA exposure
   B. Long term UVA and UVB exposure
   C. Self-picking
   D. Drug reaction
   E. Eczema

98. The most likely diagnosis for the lesion depicted in Figure D is:
   A. Atopic dermatitis
   B. Porphyria cutanea tarda
   C. Drug reaction
   D. Psoriasis
   E. Melanoma

99. Choose the single best statement regarding the radiograph depicted in figure E.
   A. Most likely primary tumor is prostatic carcinoma
   B. Autoimmunity plays an important role in the pathogenesis of this disease.
   C. Patients with this disease have a high risk of fracture.
   D. There is marked joint space narrowing.
   E. This patient would probably be asymptomatic.
100. This radiograph (Figure F) is taken of the left and right legs of a 14 year old boy who presents with knee pain. Choose the single best statement about the lesion depicted.

A. This lesion should be followed with repeat radiographs to see if it progresses.
B. The lesion is probably benign.
C. Chemotherapy is an effective modality in the management of this type of tumor.
D. Staphylococcus aureus is the most likely pathogen.
E. The histology would be "small blue cell tumor."