CBSE – DEPARTMENT OF SKILL EDUCATION

MEDICAL DIAGNOSTICS (SUBJECT CODE 828)

MARKING SCHEME OF Sample Question Paper

Class XII (Session 2019–2020)

Time: 3 Hours **Max. Marks: 60**

General Instructions:

1. *This Question Paper consists of two parts viz. Part A: Employability Skills and Part B: Subject Skills.*
2. ***Part A: Employability Skills (10 Marks)***
   - ***i.*** *Answer any 4 questions out of the given 6 questions of 1 mark each.*
   - ***ii.*** *Answer any 3 questions out of the given 5 questions of 2 marks each.*
3. ***Part B: Subject Skills (40 Marks):***
   - ***i.*** *Answer any 10 questions out of the given 12 questions of 1 mark each.*
   - ***ii.*** *Answer any 5 questions from the given 7 questions of 2 marks each.*
   - ***iii.*** *Answer any 5 questions from the given 7 questions of 3 marks each.*
   - ***iv.*** *Answer any 3 questions from the given 5 questions of 5 marks each.*
4. ***This question paper contains 42 questions out of which 30 questions are to be answered.***
5. *All questions of a particular part/section must be attempted in the correct order.*
6. *The maximum time allowed is 3 hrs.*

PART A: EMPLOYABILITY SKILLS (10 MARKS)

Answer any 4 questions out of the given 6 questions of 1 mark each:

1.	A _____is one independent clause that has a subject and a verb and expresses a complete thought. **Simple sentence. 1**	**(1)**
2.	_____is defined as the drive required to engage in goal-oriented behavior. **Motivation. 1**	**(1)**
3.	_____is a condition marked by an overreliance on other people to meet one's emotional and physical needs. **Dependent personality disorder. 1**	**(1)**
4.	_____It is located at the top and displays the name of the application and the name of the current document. **Title bar. 1**	**(1)**

5.	_____is a process of developing a business plan, launching and running a business using innovation to meet customer needs and to make a profit. **Entrepreneurship. 1**	**(1)**
6.	The key to environmental protection is to prevent the degradation of the _____ which is important for all living creatures. **Natural environment.1**	**(1)**

Answer any 3 questions out of the given 5 questions of 2 marks each:

7.	Write the differences between Hearing and listening. Ans: **½ x 4=2**	**(2)**
8.	Enumerate any four basic personality traits. Ans: • Extraversion: Gregarious, assertive and sociable. (Opposite reserved, timid, quiet.) • Agreeableness: Cooperative, warm and agreeable. (Opposite cold, disagreeable and antagonistic) • Conscientiousness: Hardworking, organized and dependable (lazy, disorganized and unreliable) • Emotional stability: Calm, self-confident and cool(insecure, anxious and depressed) **½ x 4=2**	**(2)**
9.	Name two software that can be used to create presentation. Ans: MS Powerpoint , **1**	**(2)**

Hearing	Listening
1)Hearing is passive	Listening is active
2)Refers to the act of perceiving a sound through the ear	Refers to the act of making a cocious effort to perceive the sound
3)Does not require a conscious effort	Requires a conscious effort
4)Involuntary	Voluntary

	OpenOffice Impress **1**	
10.	What should you keep in your mind while understanding your competitors in any business field? Ans: • Positioning • Pricing • Offers • Customer Relations **½ x 4=2**	**(2)**
11.	Enlist any four green jobs. Ans: • Construction worker, crew member • Designer • Carpenters • Building Planner and coordinators **½ x 4=2**	**(2)**

PART B: SUBJECT SKILLS (50 MARKS)

Answer any 10 questions out of the given 12 questions:

12.	Which instrument is used to separate solution in supernatant and sediment by using a required speed? Ans: **Centrifuge. 1**	**(1)**
13.	Which chemicals are used to prevent blood clotting?	**(1)**

	Ans: **Anticoagulants. 1**	
14.	Write down the full form of EDTA. Ans: **Ethylenediaminetetra-acetic acid. 1**	**(1)**
15.	Name the instrument used for counting blood cells? Ans: **Hemocytometer. 1**	**(1)**
16.	Name the equipment that is used to sterilize various materials in the laboratory by steam sterilization method. Ans: **Autoclave. 1**	**(1)**
17.	Write down the full form of ELISA. Ans: **Enzyme linked immunosorbent assay (ELISA) 1**	**(1)**
18.	What is the normal pH of blood? Ans: **7.42 1**	**(1)**
19.	Who discovered Rhesus blood group system? Ans: **Land Steiner and Wiener 1**	**(1)**
20.	Name the study of cells that have been shed or removed from the epithelial or mesothelial linings. Ans: **Exfoliative cytology 1**	**(1)**

21.	Write down the full form of FNAC. Ans: **Fine needle aspiration cytology 1**	**(1)**
22.	Name one cytological fixative. Ans: **95% Ethyl Alcohol (Ethanol) 1**	**(1)**
23.	Name one special fixative used for hemorrhagic samples. Ans: **Carnoy's fixative 1**	**(1)**

Answer any 5 questions out of the given 7 questions of 2 marks each:

24.	List a few diseases in which bone marrow examination is indicated. Ans: Thrombocytopenia, Leukumeia, Refractory anaemia, Paraproteinemias**½ x 4=2**	**(2)**
25.	Write down the life span and function of RBC. Ans: Life Span of RBCs is 120 days. **1** Function of RBCs is to carry oxygen and carbon di-oxide. **1**	**(2)**
26.	Enumerate two conditions where increased and decreased osmotic fragility can be seen?	**(2)**

	Ans: Increased Osmotic fragility is seen in conditions such as hereditary spherocytosis. **1** Decreased Osmotic fragility is seen in conditions seen as iron deficiency and thalassemia.**1**	
27.	Enumerate two types of process that can be done by using cell separator in blood bank. Ans: Continuous flow: It is a two arm procedure where in blood is drawn from one arm. The components are separated in a cart rid & the remaining cells & plasma flow back to the donor through the other area. Here the volume of blood which is outside the body is very small. **1** Interrupted flow: This is a one arm process. One line is connected to the donor the blood will be coming out after processing components will be separator, remaining required plasma & RBC's will be reinfused back to the donor with same line and this process will take little longer time than the continuous flow.**1**	**(2)**
28.	Write down the uses of incubator in blood bank. Ans: Incubators are mainly used for 1. Determination of enzyme's in the specimen by end point reaction methods. 2. Determination of glucose, urea, uric acid etc., by enzymatic methods. 3. Growing microorganisms on various culture media. 4. Right temperature for immune antigen reaction.**½ x 4=2**	**(2)**
29.	Write down the properties of good cytological fixatives. Ans: • It should not excessively shrink or swell cells. • It should not distort or dissolve cellular components. • It should help preserve nuclear details. • It should improve optical differentiation and enhance staining properties of the tissues and cell components.	**(2)**

	½ x 4=2	
30.	Enumerate the procedure for disinfection of plastic reusable cytospin cuvettes. Ans: Cuvettes are immersed in 4% hypochlorite solution for 1 hour. **1** Latter washed with soap water and after washing, dried and reused.**1**	**(2)**

Answer any 5 questions out of the given 7 questions of 3 marks each:

31.	In which conditions prolonged bleeding time is seen? Ans: Prolonged Bleeding time if seen in following condition 1. Low Platelet Count- in conditions like ITP (Idiopathic Thrombocytopenic Purpura)**1** 2. Platelet functional disorders like thrombasthenia, uraemia, and myeloproliferative disorders. **1** 3. Vascular Abnormalities like Ehler-Danlos Syndrome.**1**	**(3)**
32.	How the disease anemia can be classified based on the absolute value? Ans: In **microcytic anemia**, MCV < 80 fl. It may be accompanied by low MCH and MCHC and then is called microcytic hypochromic anemia. If one examines the peripheral blood film, microcytic cells are seen. Common clinical conditions where this is seen are Iron deficiency anemia and thalassemia. In macrocytic anemia on the other hand, MCV > 100fl. There is usually an increased MCH with a normal MCHC. Peripheral blood examination in such cases shows macrocytes. **1** **Macrocytic anemia** could be because of vitamin B12 and/or folic acid deficiency (then it is labelled as megaloblastic anemia) Or it could be due to other causes like liver disease, alcohol intake, hypothyroidism, aplastic anemia and accelerated erythropoiesis. Some drugs such as cytotoxic drugs, immunosuppressant and anticonvulsants can also cause macrocytic anemia. **1** In **Normocytic anemia,** the MCV is normal. These are usually accompanied by normal MCH and MCHC. There may be however a reduction in RBC Count. Peripheral blood film reveals relatively normal appearing red cells. Such anemia is found in chronic diseases and after	**(3)**

	acute blood loss. **1**	
33.	Enumerate the records that can be kept in blood bank. Ans: 1. Blood donor record. 2. Master record for blood and components. 3. Issue register: serial number, date and time of issue, bag serial number, ABO, Rh, total quantity in ml, name and address of the recipient, group of recipient, unit/institution, details of cross matching report, indication for transfusion, components issued, quantity issued, signature of the issuing person. 4. Records of the ACD, CPD, CPD-A, SAGM bags having details of the manufacturer, batch number, date of supply, results of testing. 5. Register for diagnostic kits and reagents used. 6. Transfusion adverse reaction reports. 7. Records of purchase, use and stock in hand of disposable needles, syringes, blood bags, all the records must be maintained for a minimum of 5 years.**½ x 6=3**	**(3)**
34.	Write down the uses and working principle of hot air oven. Ans: Use : Hot air oven is mainly used for the following purposes. 1. Dry sterilization of syringes & needles. 2. Preparation of anticoagulated bulbs. 3. Drying of glass ware. 4. Heating of chemicals used for the preparation of primary standards. **½ x 4=2** Principle: When electricity is passed through the heating coils, electrical energy is converted to heat energy.**1**	**(3)**

35.	Write down the functions of parts of microscope. Ans: 1. The support system consists of the base or foot rest which also holds the light source 2. The tube or the arm holds the optical system and also the coarse/fine adjustments. 3. The objectives are at the lower end of the tube and the eye pieces are at the upper end. 4. The objectives are attached to the revolving nose piece and can be shifted. The objectives are 10x (low power) 40x (high power) and 100x (oil immersion). 5. Below the objectives is the stage which holds the object/slide. The stage has a central hole through which the light passes. The stage may be fixed or movable. Below the stage is the iris/diaphragm which focuses the light. 6. The eye pieces are also of varying magnification; the commonly used one is 10 X. The eye pieces are situated in the binocular tube.**½ x 6=3**	**(3)**
36.	Write down the procedures of Giemsa staining. Ans: Procedure: • This stain is performed on air dried smears. • The smears are appropriately assigned a cytology number using a diamond pencil. • Air – dried smears are fixed in methanol for 10 min. • Smears are placed on the staining rack and flooded with the working solution for 25 min. • Wash in running tap water • Allow to dry at room temperature **½ x 6=3**	**(3)**
37.	How can you prepare a cell block? Ans: • Cell blocks are made from all fluid aspirates received where sediment is present. • Fluid received is centrifuged at 3000 rpm for 10 minutes. • Smears are made and stained. • To the sediment, approximately double the volume of Bouin's fluid is added followed by	

	one drop of egg albumin. • This is then centrifuged at 200 rpm for 10 minutes. • Supernatant is poured off and the button is transferred with forceps to formalin for 4 to 6 hours, after which it is taken for processing. **½ x 6=3**	

Answer any 3 questions out of the given 5 questions of 5 marks each:

38.	Mention the Laboratory factors which influence ESR. Ans: 1. Temperature: ESR is increased at higher temperature **1** 2. Time: The sedimentation is maximum in first 4 hrs. of collection of sample hence test should preferably do within this time. **1** 3. Anticoagulant: Heparin, Oxalate, are not suitable. Citrate in 3.8 percent solution is preferable **1** 4. Length of the ESR tube: ESR is greater with longer tubes. **1** 5. Inclination of the tube: Deviation from the vertical increases the ESR. A 3-degree tilt from vertical can lead to an increase in ESR by as much as 30%. **1**	**(5)**
39.	Enumerate the five properties of well prepared blood film. Ans: 1. Two third the length of the glass slide should be covered by the film. Film should be narrower than the slide for better examination of side edges. **1** 2. A homogeneous spread should be displayed with a gradual transition from thick to thin areas and with no deformities.**1** 3. It should end in a slightly curved feathered end. **1** 4. The film should be thin to allow proper fixation during the staining procedure. Thick areas appear dark green or gray or are washed off during staining. **1** 5. It should contain at least 10 low – power fields in which 50% of the erythrocytes do not overlap. Single erythrocytes should have a well preserved central pale area.**1**	**(5)**

40.	Write down the principle, sample, method and interpretation of Rh antibody titers. PRINCIPLE: Ans: Titration is a semi-quantitative technique of measuring the concentration of an antibody in a serum. The titer of an antibody is usually determined by testing two-fold serial dilution of the serum against selected red cells. **1** SAMPLE: 4 to 5 ml clotted blood. REAGENTS: SALINE AGH Pooled Cells.**1** METHOD: Label a row of tubes according to serum dilution 1 to 10 Place 1 volume (0.1 ml) or 1 drop of saline in all tubes except the first. Add 1 volume (0.1ml) or 1 drop of serum to tubes 1 and 2 so that the first tube contains neat serum (1:1) and 2nd tube has 1 volume of serum in volume of saline (1:2). Using a clean pipette mix the contents of tube 2 (1 : 2 dilution) without forming any bubbles and transfer one volume of mixture to tube 3 (1:4). Continue the same process through all dilutions, Remove I volume from last tube and save for use if further dilutions are required. Add 1 volume of 2-5% saline suspended appropriate red cells to each tube. Mix well and incubate at RT for 60 minutes (IgM antibodies) and centrifuge all tubes at 1000 rpm for 1 minute. Gently dislodge the cell button and record results using grades of agglutination reaction. The last tube showing positive reaction is considered as the titer of the antibody. For detection of IgG antibodies: arrange a 2nd row of tubes with the same serial dilution. Incubate at 37^0 C. Centrifuge and remove supernatant, incubate at 37C for 45 minutes. Wash with saline thrice. Arrange fresh tubes and add 1 drop of AHG and add the corresponding washed cells. Incubate at room temperature for 5 minutes, spin at 1000 rpm for 1 minute and look for clumping. **2** INTERPRETATION: If there is clumping in first row of test tubes, it indicates the presence of saline antibodies or IgM. If there is clumping in the second row of test tubes in indicates the presence of IgG antibodies.**1**	**(5)**
41.	Enumerate the equipment for blood component preparation. Ans: • Electronic weighing machine -for weighing the bags accurately.**1** • Refrigerated centrifuge -bucket handle typed of centrifuge to hold the collected bags with a provision for a wide range of temperature is preferred. The main	**(5)**

	unit is built on a sturdy metal frame resting on castors and enclosed by sheet metal, which has an electrical interlock. Rotor consists of 4 to 6 buckets. **1** • Plasma expresser- to manually express the plasma **1** • Cell separator -Cell separator is a instrument used into separate what ever components required for the patients. But in our blood bank we are using mainly for the whatever the large amount of components, platelets required. **1** • Sterile connecting device-used to connect ends of two different segments in a sterile manner. Widely used for separation of small volumes of blood for pediatric transfusion, buffy coat pooling and lab side leukodepletion. **1**	
42.	Write down the procedure and result of Hematoxylin and eosin staining method. Ans: 1. Fix the smears in 95% alcohol for 30 min 2. Wash in running tap water 3. Stain in hematoxylin for 5 min 4. Wash in running tap water 5. Decolorize in acid alcohol and wash in running tap water 6. Ammonia water – 1 dip and then wash in tap water 7. Stain in eosin for 2 min 8. Dip in 100% alcohol for 2 min 9. Dip in 100% alcohol for 2 min 10. Dip in 100% alcohol for 2 min 11. Dip in acetone for 2 min 12. Dehydrate and mount with DPX **$^{1}/_{3}$ x 12=4** Result: Nuclei: Blue/Black Cytoplasm: Varying shades of pink **1**	