CBSE | DEPARTMENT OF SKILL EDUCATION

MEDICAL DIAGNOSTICS (SUBJECT CODE 828)

MARKING SCHEME FOR CLASS XII (SESSION 2022-2023)

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

General Instructions:

1. Please read the instructions carefully.
2. This Question Paper consists of **24 questions** in two sections – Section A & Section B.
3. Section A has Objective type questions whereas Section B contains Subjective type questions.
4. **Out of the given (6 + 18 =) 24 questions, a candidate has to answer (6 + 11 =) 17 questions in the allotted (maximum) time of 3 hours.**
5. All questions of a particular section must be attempted in the correct order.
6. **SECTION A - OBJECTIVE TYPE QUESTIONS (30 MARKS):**
   - **i.** This section has 06 questions.
   - **ii.** There is no negative marking.
   - **iii.** Do as per the instructions given.
   - **iv.** Marks allotted are mentioned against each question/part.
7. **SECTION B – SUBJECTIVE TYPE QUESTIONS (30 MARKS):**
   - **i.** This section contains 18 questions.
   - **ii.** A candidate has to do 11 questions.
   - **iii.** Do as per the instructions given.
   - **iv.** Marks allotted are mentioned against each question/part.

SECTION A: OBJECTIVE TYPE QUESTIONS

Q. No.	QUESTION	Source Material (NCERT/PSSCIVE/ CBSE Study Material)	Unit/ Chap. No.	Page no. of source material	Marks
Q. 1	**Answer any 4 out of the given 6 questions on Employability Skills (1 x 4 = 4 marks)**				
i.	_____ is defined as an unpleasant feeling triggered by the perception of danger, real or imagined a) Risk b) Fear c) Anger **ANS: Fear**	**CBSE STUDY MATERIAL**	**4**	**93**	**1**
ii.	_____ guides independent individuals as it helps them consider long term consequences rather than just transient feelings. a) Self-regulation b) Self – awareness c) Self-motivation **ANS: Self-regulation**	**CBSE STUDY MATERIAL**	**2**	**23**	**1**
iii.	_____ is a school of Hindu philosophy reducing stress, which includes a series of postures and breathing exercises practiced to achieve control of body and mind. a) Yoga b) Meditation c) Physical exercise **ANS: Yoga**	**CBSE STUDY MATERIAL**	**2**	**25**	**1**

iv.	A _____is a software that helps you type and work with text on a computer. a) Power point b) Word processor c) Adobe **ANS: Word processor**	**CBSE STUDY MATERIAL**	**3**	**63**	**1**
v.	_____is a process of developing a business plan, launching and running a Business using innovation to meet customer needs and to make a profit. a) Business Studies b) Entrepreneurship c) Business mind **ANS: Entrepreneurship.**	**CBSE STUDY MATERIAL**	**4**	**80**	**1**
vi.	_____is a rectangular block of contiguous cells, i.e., cells that touch each other, especially along a line a) Toolbar b) Range c) Standard bar **ANS: Range**	**CBSE STUDY MATERIAL**	**3**	**46**	**1**
Q. 2	**Answer any 5 out of the given 7 questions (1 x 5 = 5 marks)**				
i.	Write down the full form of CBC. a) Common blood count b) Complete blood count c) Complete bone count **ANS: Complete blood count**	**CBSE STUDY MATERIAL**	1	9	**1**
ii.	Name the anticoagulant that is best to use for coagulation studies. a) EDTA b) Trisodium Citrate c) Heparin **ANS: Trisodium Citrate**	**CBSE STUDY MATERIAL**	1	11	**1**
iii.	What do you mean by MCHC? a) Major Corpuscular hemoglobin Concentration b) Mean Corpuscular hemoglobin Concentration c) Major Cellular hemoglobin Concentration **ANS: Mean corpuscular haemoglobin concentration**	**CBSE STUDY MATERIAL**	1	31	**1**
iv.	What do you mean by MCH? a) Mean Corpuscular hemoglobin b) Major Corpuscular hemoglobin c) Major Cellular hemoglobin **ANS: Mean corpuscular haemoglobin**	**CBSE STUDY MATERIAL**	1	31	**1**
v.	In which condition decreased osmotic fragility is seen? a) Congenital spherocytosis b) Thalassemia c) Autoimmune hemolytic anemia **ANS: Thalassemia**	**CBSE STUDY MATERIAL**	1	40	**1**
vi.	Write down the full form of PCV. a) Pus cell Volume b) Periodic cell Volume	**CBSE STUDY MATERIAL**	1	30	**1**

	c) Packed cell Volume **ANS: Packed cell volume**				
vii.	Name the instrument to separate solution into sediment and supernatant by using required speed. a) Centrifuge b) Microscope c) Hemocytometer **Ans. Centrifuge**	**CBSE STUDY MATERIAL**	1	10	**1**
Q. 3	**Answer any 6 out of the given 7 questions (1 x 6 = 6 marks)**				
i.	Name one commonly used method to measure ESR. a) Benedict's test method b) Fehling's test method c) Westergren's Method. **ANS: Westergren's Method**	**CBSE STUDY MATERIAL**	1	32	**1**
ii.	_____is the ideal fixative used for cell block preparation of fluid specimens. a) Formalin b) AAF Fixative c) Xylene **ANS: AAF Fixative**	**CBSE STUDY MATERIAL**	3	90	**1**
iii.	Which is a better RBC diluting fluid if one wants to prevent rouleux formation? a) Hingleman's solution b) Toisson's fluid c) Gower's Solution **ANS: Gower's Solution**	**CBSE STUDY MATERIAL**	1	19	**1**
iv.	What do you mean by Hematopoiesis? a) An increase in platelet count b) Production of blood cells c) An increase in WBC count **ANS: Production of blood cells**	**CBSE STUDY MATERIAL**	1	40	**1**
v.	Who discovered Rhesus blood group system? a) Land Steiner and Wiener b) Thompson c) Charles Darwin **ANS: Land Steiner and Wiener**	**CBSE STUDY MATERIAL**	2	74	**1**
vi.	The titer of an antibody is usually determined by testing two fold serial dilution of the serum against selected _____cells. a) Red b) White c) Blue **ANS: Red**	**CBSE STUDY MATERIAL**	2	76	**1**
vii.	Name two antigens of kidd blood group system. a) Jkd and Jke b) Jkm and Jkn c) Jka and Jkb **Ans. Jka And Jkb**	**CBSE STUDY MATERIAL**	2	73	**1**
Q. 4	**Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)**				
i.	_____is defined as clumping of particles that have antigen on their surface and is brought about by anti-bodies.	**CBSE STUDY MATERIAL**	2	67	**1**

	a) Agglutination b) Hemolysis c) Reaction **ANS: Agglutination**				
ii.	_____ develop due to immunization following pregnancy, previous transfusion or deliberate injection of immunogenic material. a) Ig G b) Ig M c) Ig E **ANS: Ig G**	**CBSE STUDY MATERIAL**	2	76	**1**
iii.	_____are serum proteins, more specifically immunoglobulins. a) Antigens b) Antibodies c) Pathogen **ANS: Antibodies**	**CBSE STUDY MATERIAL**	2	67	**1**
iv.	An increase in lymphocyte count above normal reference range is known as _____ a) Lymphocytosis b) Lymphopenia c) Lymphoedema **ANS: Lymphocytosis**	**CBSE STUDY MATERIAL**	**1**	39	**1**
v.	What are the antigens of Lutheran system? a) Lu m and Lu n b) Lu c and Lu d c) Lu a and Lu b **ANS: Lu a and Lu b**	**CBSE STUDY MATERIAL**	2	74	**1**
vi.	Write down the full form of ELISA. a) Enzyme linked immunosorbent Assay b) Energy linked immunosorbent Assay c) Evolution linked immunosorbent Assay **ANS: Enzyme linked immunosorbent Assay**	**CBSE STUDY MATERIAL**	2	66	**1**
Q. 5	**Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)**				
i.	What is the basic function of autoclave in laboratory? a) Drying b) Heating c) Sterilization **ANS: Sterilization**	**CBSE STUDY MATERIAL**	2	61	**1**
ii.	_____is rupture of red cells with release of intracellular haemoglobin can occur if the Antibody has the property of hemolysin. a) Agglutination b) Hemolysis c) Reaction **ANS: Hemolysis**	**CBSE STUDY MATERIAL**	2	66	**1**
iii.	Name one special purpose fixative used in cytology laboratory. a) AAF fixative b) Carnoy's fixative c) Formalin **ANS: AAF fixative**	**CBSE STUDY MATERIAL**	3	90	**1**

iv.	_____ is a special purpose fixative for haemorrhagic samples. a) Carnoy's fixative b) AAF fixative c) Formalin **ANS: Carnoy's fixative**	**CBSE STUDY MATERIAL**	3	90	**1**
v.	Name the chemical which is used for dehydration process. a) Alcohol b) Water c) Xylene **ANS: Alcohol**	**CBSE STUDY MATERIAL**	3	89	**1**
vi.	What do you mean by Cytology? a) Study of tissue b) Study of cells c) Study of organ **ANS: Study of cells**	**CBSE STUDY MATERIAL**	3	82	**1**
Q. 6	**Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)**				
i.	Write down full form of FNAC. a) Fine needle aspiration cytology b) Free needle aspiration cytology c) Fine needle activation cytology **ANS: Fine needle aspiration cytology**	**CBSE STUDY MATERIAL**	3	87	**1**
ii.	_____is strictly for taking materials from endocervix. a) Endo-cervical brush b) Exo-cervical brush c) Endo-cellular brush **ANS: Endo-cervical brush**	**CBSE STUDY MATERIAL**	3	85	**1**
iii.	It is important that no air-drying occurs prior to_____. a) Fixation b) Dehydration c) Clearing **ANS: Fixation**	**CBSE STUDY MATERIAL**	3	89	**1**
iv.	By which process Respiratory tract malignancies can be detected? a) By sputum cytology or by bronchoscopic material b) By CSF cytology or by bronchoscopic material c) By sputum cytology or by Endoscopic material **ANS: By sputum cytology or by bronchoscopic material**	**CBSE STUDY MATERIAL**	3	85	**1**
v.	Name one routine fixative that was originally recommended by Papanicolaou. a) Carnoy's Fixative b) AAF Fixative c) Ether alcohol mixture **ANS: Ether alcohol mixture**	**CBSE STUDY MATERIAL**	3	89	**1**
vi.	Name one clearing agent used in laboratory. a) Formalin b) Water c) Xylene	**CBSE STUDY MATERIAL**	3	89	**1**

	ANS: Xylene				

SECTION B: SUBJECTIVE TYPE QUESTIONS

Q. No.	QUESTION	Source Material (NCERT/PSSCIVE/ CBSE Study Material)	Unit/ Chap. No.	Page no. of source material	Marks
Answer any 3 out of the given 5 questions on Employability Skills in 20 – 30 words each (2 x 3 = 6 marks)					
Q. 7	Write down the function of scan option. **ANS: This option provides various scanning options, like, Full System Scan, Custom Scan, Memory Scan, Mobile scan and Boot Time Scan.** ½ x4=2	**CBSE STUDY MATERIAL**	**3**	**59**	**2**
Q. 8	List any four characteristics of entrepreneurship. **ANS: 1. Ability to take up risks and Financial literacy and money management skills.** **2. Believe in hard work and discipline and Effective planning and execution.** **3. Adaptable and flexible to achieve the goals of enhancing quality and customer satisfaction** **4. Knowledge of the product and services and their need or demand in the market.** **½ x 4=2**	**CBSE STUDY MATERIAL**	**4**	**80**	**2**
Q. 9	Enumerate four steps of time management. **ANS: 1. Organize** **2. prioritize** **3. Control** **4. Track** **½ x 4=2**	**CBSE STUDY MATERIAL**	**4**	**104**	**2**
Q. 10	What are the steps of deleting a data in a cell? **ANS: 1. Click on the cell.**	**CBSE STUDY MATERIAL**	**3**	**46**	**2**

	2. Press Delete key on the keyboard. This deletes the text entry of that cell making it blank. **1+1=2**				
Q. 11	List any four common personality disorders. **ANS: 1. Paranoid** **2. Antisocial** **3. Schizoid** **4. Borderline** **5. Narcissistic** **6. Dependent (Any 2)** **½ X 4 = 2**	**CBSE STUDY MATERIAL**	**2**	**34-35**	**2**
Answer any 3 out of the given 5 questions in 20 – 30 words each (2 x 3 = 6 marks)					
Q. 12	Write down the advantages of Evacuated Tube System. **ANS: 1. Adequate sample is ensured (vacuum in the tube controls the amount of blood entering the tube.)** **2. Correct ratio of anticoagulant to blood is ensured.** **3. This is a closed system and spillage of blood and hence any Bio-hazard is thus avoided.** **4. Large amounts of blood (in multiple tubes) can be collected with minimum discomfort to patient.** **½ x 4=2**	**CBSE STUDY MATERIAL**	**1**	**15**	**2**
Q. 13	What do you mean by neutrophilia and neutropenia? **ANS: Neutrophilia: It refers to an increase in the number/percentage of neutrophils in the blood.** **Neutropenia: It refers to a decrease in the number of neutrophils in the blood.** **2 x 1=2**	**CBSE STUDY MATERIAL**	**1**	**37**	**2**

Q. 14	Write down the importance of blood storage cabinets. **ANS: 1. Uniform temperature between 2 degree C – 6 degree C (in AC room)** **2. Stainless steel inner chamber and Inside acrylic door to avoid temperature loss** **3. Digital temperature indicator cum controller with audio visual alarm** **4. Full view glass doors for observation without disturbing the inside conditions.** **½ x 4=2**	**CBSE STUDY MATERIAL**	**2**	**59**	**2**
Q. 15	Explain two types of process that can be done by using cell separator. **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.** **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 takes little longer time than the continuous flow.** **2 x 1=2**	**CBSE STUDY MATERIAL**	**2**	**58**	**2**
Q. 16	How endometria aspiration smear can be made? **ANS: Endometria aspiration smear: After preliminary visualization and cleaning of cervix a sterile cannula is introduced into the uterine cavity and aspiration is then carried out with a syringe. The specimen is squirted on a clean glass slide, gently spread and rapidly fixed.** **2 x 1=2**	**CBSE STUDY MATERIAL**	**3**	**85**	**2**

Answer any 2 out of the given 3 questions in 30– 50 words each (3 x 2 = 6 marks)					
Q. 17	Enumerate three stages of ESR experiment. **ANS: Sedimentation is defined as settlement of red cells to the bottom with an upper plasma layer when anti coagulated blood is kept undisturbed for a period of time. There are three stages in which this occurs: 1) The stage of aggregation - This is the first stage when the red cells form rouleaux and is the most important stage in sedimentation. 2) Stage of sedimentation - is the phase of actual falling of the cells, the larger the aggregates formed in stage I, the faster the rate of fall. This is related to both weights to surface area. 3) The stage of packing - is the final one when individual cells and aggregates slow down due to crowding.** **3x1=3**	**CBSE STUDY MATERIAL**	**1**	**32**	**3**
Q. 18	Enumerate any six features of cold centrifuge. **ANS: Features of cold centrifuge:** **1. Digital speed indicator** **2. Stepless speed regulator with 'O' start switch** **3. Digital automatic timer** **4. Dynamic break** **5. Digital temperature indicator cum controller 6. Unbalance cut out switch** **½ x 6= 3**	**CBSE STUDY MATERIAL**	**2**	**57-58**	**3**
Q. 19	Enlist the indications of FNAC. Outline its methodology. **ANS:** **INDICATIONS:** **Aspiration is done using disposable needles of 21 gauge (external diameter approximately 0.6-1.0mm) attached to a 20ml syringe.**	**CBSE STUDY MATERIAL**	**3**	**87**	**3**

	• The FNAC needles are available in a variety of lengths. Lenghts of a to 1/2 inches are found to be adequate for most palpable measses. **• The 31/2 inches 22 gauge disposable needle is used fordeep seated soft-tissue masses.** **• Ultrasound or computerized tomography (CT) guidance can be utilized, whenever indicated.** **1** **METHODOLOGY:** **Taking all aseptic precautions, the lump is palpated and localized, and the site of puncture determined.** **• The lump is then immobilized with the left hand in a position favorable for needle aspiration and holding the syringe by the barrel in the right hand; the needle is pushed into predetermined site of the lump until needle tip penetrates the center of the lump.** **• The plumger of the needle is then retracted backward to create a negative pressure inside the syringe and needle bore; and without withdrawing the needle through the skin, the syringe is rotated and moved in and out through the lump whilst negative pressure sucks cells into the lumen of the needle.** **• In order to obtain sufficient material, particularly from fibrotic lesions, the needle is moved back and forth three or more times and directed into different areas of the tumor.** **• Throughout this manipulation, negative pressure is maintained in the syringe by keeping the piston retracted.** **• After completion of the aspiration, the pressure in the syringe is allowed to**				

	equalize before the needle is withdrawn from the lesion. **• This is achieved by releasing the piston of the syringe. After the needle had been withdrawn, the syringe is disconnected from the needle, filled with air and reconnected.** **• The material in the needle is expelled onto a glass slide, care being taken to deposit it as a single drop at one end of the slide.** **• The needle tip is then brought into light contact with the slide and the aspirate carefully expressed from it.** **2**				
Answer any 3 out of the given 5 questions in 50– 80 words each (4 x 3 = 12 marks)					
Q. 20	How the microscope can be handled properly in laboratory? **ANS: This instrument helps us to examine tiny objects which cannot be visualized with the naked eye. It is a delicate instrument and needs utmost care.** **a) Cleaning of objective and eyepiece should be done regularly and they should be kept free from dust. The optical part is cleaned to remove grease using soft cloth or lens paper.** **b) Hold the microscope firmly while moving it to prevent the lenses from dropping down.** **c) Exposure to sunlight should be avoided and it should be kept at room temperature.** **d) After one use oil immersion, one must always clean the oil from the objective.** **4 x 1=4**	**CBSE STUDY MATERIAL**	**2**	**62**	**4**
Q. 21	How the bleeding time can be measured by IVY method? **ANS: The following steps are followed to measure bleeding time: -**	**CBSE STUDY MATERIAL**	**1**	**45-46**	**4**

	•BP cuff is placed on the patient's arm about 2 to 3 inches above the elbow joint. Pressure is increased to 40 mm Hg. This pressure is kept for the entire procedure. **• An area is selected on the volar surface of the forearm (devoid of any superficial veins) and cleaned with spirit swab. The area is allowed to dry and there will be 2 skin punctures, 5 - 10 cm apart 2.5 mm deep, 1mm wide are made and stop watch started.** **• Blood is blotted from each puncture site on a piece of filter paper every 15seconds. The filter paper should not touch the wound. (As this may interfere with the process of platelet plug formation). When bleeding stops, the watch is stopped, time noted and BP cuff released.** **• Bleeding times of the two puncture sites are noted and average of the two results are reported.** **4 x 1=4**				
Q. 22	Who discovered ABO blood grouping system? Write down the importance of ABO blood grouping system. **Landsteiner discovered the ABO group antigens in 1900 and since then this is one of the most important discoveries in the field of medicine. 2** **The importance of blood grouping:** **1. Safe blood transfusion** **2. Organ transplant especially liver, heart and kidney** **3. Medicolegal and forensic, paternity disputes** **4. Immunology and genetics** **4 x ½=2**	**CBSE STUDY MATERIAL**	**2**	**68-70**	**4**

Q. 23	Enumerate two major categories of cytological sample that are examined in laboratory. **ANS: Two broad categories of samples are received in the cytology laboratory: 1. Exfoliative cytology: It is the study of cells that have been shed or removed from the epithelial or mesothelial linings. Normal cells are cohesive in nature, but malignancy and infection increase exfoliation. Malignant cells show reduced intercellular adhesion due to defective desmosomes. These cells can be recovered either from natural secretions. Such as urine, sputum, vaginal, and prostatic fluids, or by artificial means, such as paracentesis or lavage of fluids like pleural, pericardial, cerebrospinal, synovial, ascetic, CSF, cyst fluid, bronchial washings etc.** **2. Fine needle aspiration cytology includes aspiration done by the pathologist or the clinician as well as guided aspiration done by the radiologists and aspirations. It is a diagnostic procedure used to investigate pathological lesions in organs that do not shed cells spontaneously. In this technique, a thin, hollow needle is inserted into the lesion (usually a lump or a swelling) to obtain cells and tissue fragments, which, after being stained, are examined under a microscope.** **2x2=4**	**CBSE STUDY MATERIAL**	**3**	**82**	**4**
Q. 24	Enumerate the functions of four special purpose fixatives **ANS: • Carnoy's fixative: This is a special purpose fixative for haemorrhagic samples. The acetic acid in the fixative haemolyses the red blood cells. It is an excellent nuclear fixative as well as preservative for glycogen but results in considerable shrinkage of cells. Carnoy's fixative must be prepared fresh when needed and discarded after each use. It loses its effectiveness on long**	**CBSE STUDY MATERIAL**	**3**	**90-91**	**4**

	standing, and chloroform can react with acetic acid to form hydrochloric acid. **• AAF Fixative: This is the ideal fixative used for cellblock preparation of fluid specimens.** **• Saccomanno collection fluid: A green coloured fixative of the collection of sputum.** **• Cytolyt solution: This is a clear water based buffered fixative for the collection of fluid specimens. A 50:50 ratio of specimen to fixative is appropriate (if this unavailable use 50% alcohol).** **4 x1=4**				