

**ROYAL CIVIL SERVICE COMMISSION
BHUTAN CIVIL SERVICE EXAMINATION (BCSE) 2016
EXAMINATION CATEGORY: TECHNICAL**

PAPER III: SUBJECT SPECIALIZATION PAPER FOR OT TECHNOLOGY

Date: 2 October 2016
Total Marks: 100
Examination Time: 150 minutes (2.5 hours)
Reading Time: 15 minutes (*prior to examination time*)

GENERAL INSTRUCTIONS

1. Write your Registration Number clearly and correctly on the Answer Booklet.
2. The first 15 minutes is being provided to check the number of pages, printing error, clarify doubts and to read instructions in Question Paper. You are NOT permitted to write during this time.
3. This paper consists of **TWO Sections, namely Section A and Section B.**
Section A has two parts: Part I - **30 Multiple Choice Questions.**
Part II - **4 Short Answer Questions.**
All questions under **Section A** are **COMPULSORY.**
Section B consists of 2 case studies. Choose only **ONE** case study and answer the questions under your choice.
4. All answers should be written on the Answer Booklet provided to you. Candidates are not allowed to write anything on the question paper. If required, ask for additional Answer Booklet.
5. All answers should be written with correct numbering of Section, Part and Question Number in the Answer Booklet provided to you. Note that any answer written without indicating correct Section, Part and Question Number will NOT be evaluated and no marks would be awarded.
6. Begin each Section and Part in a fresh page of the Answer Booklet.
7. You are not permitted to tear off any sheet(s) of the Answer Booklet as well as the Question Paper.
8. Use of any other paper including paper for rough work is not permitted.
9. You are required to hand over the Answer Booklet to the Invigilator before leaving the examination hall.
10. The Question paper has 7 printed pages including this Instruction Page.

GOOD LUCK!

SECTION A

PART I – Multiple Choice Questions (30 marks)

Choose the correct answer and write down the letter of your chosen answer in the Answer Booklet against the question number e.g. 31 (c). Each question carries ONE mark. Any double writing, smudgy answers or writing more than one choice shall not be evaluated.

1. Which of the following is considered part of the Nasopharynx?
 - a. Arytenoid folds
 - b. Nares
 - c. soft palate
 - d. mandible

2. The “Adam’s apple” is also referred to as the
 - a. Hyoid
 - b. Carina
 - c. Thyroid cartilage
 - d. Trachea

3. The endotracheal tube size refers to the _____ in millimeters:
 - a. length of tube that will pass beyond the vocal chords
 - b. length
 - c. internal diameter
 - d. external diameter

4. An unconscious stroke patient has snoring-type breathing. If the sounds persist after repositioning the patient’s head and neck you should
 - a. ventilate every 5 seconds.
 - b. suction vigorously.
 - c. perform the Sellick maneuver.
 - d. insert an oropharyngeal or nasopharyngeal airway.

5. _____ in the spontaneously breathing patient is indicative of partial upper airway obstruction.
 - a. Tracheal deviation
 - b. Flushed skin
 - c. Rales
 - d. Stridor

6. The most likely cause of death during intubation is
 - a. failure to intubate and obtain airway.
 - b. failure to put laryngeal mask.
 - c. failure to insert oropharyngeal airway.
 - d. failure to oxygenate the patient due to airway block.

7. The procedure of compressing cricoid cartilage posteriorly against vertebral bodies during intubation is called
 - a. Valsava maneuver
 - b. Sellick maneuver
 - c. Heimlich maneuver
 - d. Leopold's maneuver

8. Which of the following statement about the mean arterial pressure is true?
 - a. MAP above 80 mmHg is necessary for coronary and brain perfusion.
 - b. MAP pressure is the difference between systolic and diastolic pressure.
 - c. MAP is calculated as (2 x diastolic plus systolic) divided by 3.
 - d. MAP is the sum of diastolic and systolic pressure.

9. Pulse oximeter indicates the
 - a. percentage oxygen dissolve in the plasma.
 - b. percentage of oxygen combined to the haemoglobin.
 - c. percentage of oxygen that is present in blood.
 - d. potal of oxygen dissolved in plasma and combined to Hb.

10. The outer meningeal layer is called the
 - a. Dura mater
 - b. Arachnoid membrane
 - c. Pia mater
 - d. Subarachnoid space

11. A protein that bonds oxygen to the red blood cells is called
 - a) globulin
 - b) albumen
 - c) Platelet
 - d) Hemoglobin

12. The only vein in the body that carries oxygenated blood is
 - a) Superior vena cava
 - b) Inferior vena cava
 - c) Pulmonary veins
 - d) Coronary veins

13. Which situation explains the following capnogram?



- a. Hypoventilation
- b. Incompetent expiratory valve

- c. Esophageal intubation
 - d. Kinked endotracheal tube
14. The second heart sound occurs when the
- a. Aortic and pulmonic valves open.
 - b. Aortic and pulmonic valves close.
 - c. Mitral and tricuspid valves open.
 - d. Mitral and tricuspid valves close.
15. The requirements for manufacturing and transportation of medical gas cylinders are set by the
- a. Department of Transportation
 - b. Occupational Safety and Health Administration
 - c. Food and Drug Administration
 - d. American National Standards Institute
16. The most effective method of keeping the adult patient warm is the
- a. heated humidifier.
 - b. heating blanket.
 - c. forced air warmer (Bair hugger).
 - d. heating lamp.
17. The purpose of unidirectional valves in the circle system is to
- a. protect the patient from a build-up of positive pressure.
 - b. protect the patient from a negative pressure
 - c. prevent disconnect.
 - d. prevent rebreathing of exhaled gases.
18. What will disinfect the laryngoscope blade after intubating a HIV-infected patient?
- a. Hexachlorophene
 - b. Alcohol
 - c. Glutaraldehyde
 - d. Soap
19. Which of the following components of the gas machine is not under intermediate pressure?
- a. The ventilator power inlet
 - b. Flush valve
 - c. Flowmeter tubes
 - d. Oxygen pressure-failure device
20. When the uvula cannot be visualized, the patient is considered Mallampati class
- a. I
 - b. II
 - c. III
 - d. IV

21. In the reaction of CO₂ with soda lime, the final products are
- Bicarbonates.
 - Carbonic acids.
 - Hydroxides.
 - Carbonates.
22. If a vaporizer accidentally gets knocked over and then used, would the concentration to the patient read differently than dialed?
- The patient only receives what is dialed.
 - The patient concentration would be greater.
 - The patient concentration would be less.
 - The patient will not receive any inhalational agent.
23. How many unidirectional valves does the semi closed anesthetic breathing system have?
- One
 - Two
 - Three
 - Four
24. Which of the following gas machine components is not exposed to intermediate, pipeline pressure (50 psig)?
- Pipeline inlets
 - Common gas outlet
 - Oxygen flush valve
 - Ventilator driving inlet
25. The Capnograph shown below is most consistent with



- Pulmonary embolism
 - Esophageal intubation
 - Cardiogenic oscillation
 - External chest compression
26. Which of the following methods can be used to detect all leaks in the low-pressure circuit of any contemporary anesthesia machine?
- Oxygen flush test
 - Common gas outlet occlusion test
 - Traditional positive-pressure leak test
 - Negative-pressure leak test
27. Which of the following valves prevents transfilling between compressed-gas cylinders?
- Fail-safe valve
 - Pressure-sensor shutoff valve

- c. Adjustable pressure-limiting valve
 - d. Check valve
28. The second-stage O₂ pressure regulator delivers a constant O₂ pressure to the rotameters of
- a. 4 psi
 - b. 8 psi
 - c. 16 psi
 - d. 32 psi
29. If the anesthesia machine is discovered Monday morning having run with 5 L/min of oxygen all weekend long, the most reasonable course of action to take before administering the next anesthetic would be
- a. turn machine off for 30 minutes before induction.
 - b. avoid use of sevoflurane.
 - c. change the CO₂ absorbent.
 - d. administer 100% oxygen for the first hour of the next case.
30. The device on anesthesia machines that most reliably detects delivery of hypoxic gas mixtures is the
- a. Fail-safe valve
 - b. O₂ analyzer
 - c. Second-stage O₂ pressure regulator
 - d. Proportion-limiting control system

PART II – Short Answer Questions (20 marks).

This part has 4 Short Answer Questions. Answer ALL the questions. Each question carries 5 marks.

1. Draw a neat diagram of normal ECG and label the parts. How will you calculate the heart rate from ECG tracing?
2. What are the methods of confirmation of endotracheal tube placement and write in detail about end –tidal carbon dioxide monitoring.
3. What are the common parameters monitored during anesthesia and effect of hypothermia in anesthetized child.
4. Explain in detail the steps of checking anesthesia machine at the start of the day and describe the safety mechanism in anesthesia machine.

SECTION B

Case Study

Choose either Case 1 or 2 from this section. Each case study carries 50 marks.

Case 1

A fifty year old woman with a large goiter has been posted for elective thyroidectomy under general condition. On the preoperative checkup, she has the following finding:
BP: 130/80mmHg, Pulse: 90/min. Airway: Melampati grade 3, all routine lab checkups are within normal limits. She was put under ASA II.

- a) Describe the ASA classification. (10 marks)
- b) You have been asked to prepare the patient for difficult intubation. Describe in details how you will prepare the difficult intubation/airway management tray for the case. (10 marks)
- c) Describe in details the difficult airway assessment and what is melampati grading of the airway (15 marks)
- d) What parameters will you monitor in the intraoperative period, and describe anesthesia record chart in details. (15 marks)

OR

Case 2

A thirty year old driver has been admitted in the emergency ward with blunt abdominal injury from the motor vehicle accident. Emergency physicians report that the patient is in shock with intra-abdominal bleeding. He looks pale, with pulse of 120/min, Blood Pressure 80/40mmHg, and he seems to be diaphoretic. Emergency abdominal ultrasound scan shows collection of fluid in the retroperitoneum. His lab report shows Hb of 8gm/dl. He has received 3pints of normal saline in ED. His previous medical record shows that he is a patient of HIV and is presently on anti- retroviral therapy. Surgeon on call has been consulted and emergency laparotomy has been planned. You have been called to assist anesthesiologist in managing the patient in OT.

- a) Define shock, types of shock, and what type of shock this patient is suffering from?
(10 marks)
- b) Describe universal precaution. (5 marks)
- c) What are the things you have to follow if you accidentally get needle prick injury with the same needle used on the patient? (5 marks)
- d) You are asked to take consent for the surgery and anesthesia. What things will you inform the patient while taking consent? (5 marks)
- e) Describe informed consent and its importance. (10 marks)
- f) How do you classify equipment for sterilization? (5 marks)
- g) What is meant by semi critical items? (5 marks)
- h) Describe methods of disinfection of equipment used in operation room.(5 marks)

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