



## BRAINWARE UNIVERSITY

Term End Examination 2023-2024

Programme – B.Sc.(OTT)-2021

Course Name – Electronics and Technology in Surgery and Anesthesia

Course Code - BOTT602

( Semester VI )

Full Marks : 60

Time : 2:30 Hours

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

### Group-A

(Multiple Choice Type Question)

1 x 15=15

1. Choose the correct alternative from the following :

- (i) Identify the primary purpose of an electrocautery machine in an operation theater.
  - a) Cutting tissues
  - b) Controlling bleeding
  - c) Monitoring vital signs
  - d) Sterilizing instruments
- (ii) Recall the purpose of a pulse oximeter in an operation theater.
  - a) Measure blood pressure
  - b) Assess oxygen saturation
  - c) Monitor temperatureAdminister medications
- (iii) Select the term for a device used to monitor and regulate a patient's breathing
  - a) Spirometer
  - b) Nebulizer
  - c) Ventilator
  - d) Incubator
- (iv) Identify the primary purpose of a grounding pad in electrocautery procedures.
  - a) To regulate room humidity
  - b) To prevent electrical burns
  - c) To sterilize surgical instruments
  - d) To control room temperature
- (v) List one benefit of using disposable electrodes in surgery.
  - a) Reduced risk of infection
  - b) Longer lifespan
  - c) Enhanced conductivity
  - d) Compatibility with all patients
- (vi) Associate the term "arc flash" with which electrical safety hazard.
  - a) Overloading
  - b) Short circuit
  - c) Insulation failure
  - d) Ground fault
- (vii) Identify the symbol commonly used to represent ground in electrical diagrams.
  - a)  $\Omega$
  - b) V
  - c) GND
  - d) A
- (viii) Describe the purpose of a ground fault circuit interrupter (GFCI) outlet.
  - a) To increase electrical conductivity
  - b) To regulate voltage
  - c) To prevent electric shock
  - d) To enhance signal transmission
- (ix) Indicate the primary function of a stimulator in nerve damage rehabilitation.

- a) Enhancing pain relief  
c) Regulating blood pressure
- b) Assessing muscle strength  
d) Monitoring oxygen saturation
- (x) Estimate the importance of pacemakers in regulating heart rhythm.  
a) Low  
c) High
- b) Moderate  
d) Negligible
- (xi) Select the term for a device used to deliver controlled electrical stimulation to nerves or muscles.  
a) Defibrillator  
c) Stimulator
- b) Pacemaker  
d) Boyle's apparatus
- (xii) Identify the component responsible for generating electrical impulses in a pacemaker.  
a) Display  
c) Sensor
- b) Battery  
d) Antenna
- (xiii) Establish the importance of psychological support for patients undergoing surgical procedures.  
a) Reducing patient wait times  
c) Ensuring proper inventory management
- b) Promoting healing  
d) Controlling bleeding
- (xiv) Identify the component responsible for storing data permanently in a computer.  
a) RAM (Random Access Memory)  
c) Hard disk drive (HDD)
- b) CPU (Central Processing Unit)  
d) Graphics card
- (xv) Identify the function of a graphics card in a computer system.  
a) Storing data  
c) Displaying images and videos
- b) Processing instructions  
d) Managing network connections

### Group-B

(Short Answer Type Questions)

3 x 5=15

2. Describe the key features of OT tables that contribute to patient comfort and surgical efficacy, highlighting their importance in facilitating various surgical procedures (3)
3. Modify physiological aspects of patients, emphasizing the importance of understanding individual variations in physiological parameters and responses to surgical interventions for personalized care delivery and optimal outcomes. (3)
4. Define the primary function of defibrillators in cardiac resuscitation protocols and discuss their role in improving patient outcomes following cardiac arrest. (3)
5. Describe the role of physiological aspects of patients in operation theaters, emphasizing the importance of assessing vital signs, hemodynamic parameters, and organ function for perioperative management, risk stratification, and individualized care planning. (3)
6. Evaluate the different types of electrodes used in medical procedures and their applications in diagnostic and therapeutic interventions. (3)

OR

- Classify strategies for avoiding the misuse of defibrillators and ensuring their safe and effective use by trained medical personnel. (3)

### Group-C

(Long Answer Type Questions)

5 x 6=30

7. Criticize the implications of healthcare disparities on surgical outcomes and patient access to surgical care, highlighting disparities related to race, ethnicity, socioeconomic status, and geographic location, and proposing strategies for addressing these inequities through targeted interventions and policy initiatives. (5)
8. Criticize the impact of burnout and moral distress on healthcare professionals in surgical specialties, highlighting the consequences for patient safety, clinician well-being, and (5)

healthcare system performance, and proposing strategies for mitigating burnout and promoting resilience among surgical teams.

9. Illustrate the diverse applications of stimulator devices in clinical practice, ranging from neuromodulation for chronic pain management to deep brain stimulation for movement disorders, and discuss their underlying mechanisms of action and therapeutic efficacy. (5)
10. Discover the pivotal role of bookkeeping practices in healthcare finance management, elucidating their contribution to fiscal accountability, resource allocation, and regulatory compliance within healthcare organizations. (5)
11. Contrast the mechanisms of action and therapeutic applications of pacemakers versus stimulators in managing cardiac arrhythmias and neurological disorders, emphasizing differences in implantation techniques, device programming, and long-term patient management strategies. (5)
12. Justify the significance of effective indenting practices in optimizing inventory management and resource allocation within healthcare facilities, emphasizing principles of cost-effectiveness, supply chain efficiency, and regulatory compliance. (5)

**OR**

Summarize the essential components of bookkeeping in healthcare settings, outlining key principles, methods, and tools utilized to maintain accurate financial records, monitor expenditures, and facilitate budgetary control within operational constraints. (5)

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