नेपाल स्वास्थ्य सेवा, विविध समूह, सहायक पाँचौं तह, ई. सी. जी. टेक्निसियन पदको खुला र आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

पाठ्यक्रमको रुपरेखा :– यस पाठ्यक्रमको आधारमा निम्नानुसार चरणमा परीक्षालिइने छ :

प्रथम चरण :–	लिखित परीक्षा	पूर्णाङ्क :– १००
द्वितीय चरण :–	अन्तर्वार्ता	पूर्णाङ्क :– २०

प्रथम चरण – लिखित परीक्षा योजना (Written Examination Scheme)

विषय	पूर्णाङ्क	उत्तीर्णाङ्क	परीक्षा प्रणाली	प्रश्न संख्या x अङ्कभार	समय
सेवा सम्बन्धी	१००	४०	वस्तुगत बहुवैकल्पिक (Multiple Choice)	५० प्रश्न x २अङ्क = १००	४५ मिनेट

द्वितीय चरण

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	२०	मौखिक

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. लिखित परीक्षामा यथासम्भव निम्नानुसार प्रश्नहरु सोधिनेछ ।

Unit	1	2	3	4	5
No. of Questions	22	5	15	4	4

३. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

४. यस पाठ्यक्रम योजना अन्तर्गतका पत्र ⁄ विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

५. प्रथम चरणको लिखित परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको अन्तर्वार्तामा सम्मिलित गराइनेछ ।

६. पाठ्यक्रम लागू मिति : **२०७२/०५/१७ देखि**

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पत्र/विषय :– सेवा सम्बन्धी

1. **ECG Basics**

   1.1 Introduction and history of ECG (Electrocardiogram)

   1.2 Cardiac electrical activity: ECG, anatomic orientation of the heart, cardiac impulse formation and conduction

   1.3 Basic principles of instruments

   1.4 Patient preparation

   1.5 Placement of leads in adult and paediatric patients

   1.6 Recording of cardiac electrograms:

      1.6.1 Evolution of frontal plane leads

      1.6.2 Correct and incorrect lead placement

      1.6.3 Display 12 standard electrocardiogram leads

   1.7 ECG Measurement:

      1.7.1 Identify and relate waveform components (P, Q, R, S, T and U) with cardiac cycle

      1.7.2 Definition and normal range of PR interval, QRS duration, QT interval and calculation of corrected QT interval from Bazett's formula.

      1.7.3 ECG wave measurement and segment

      1.7.4 Vertical measurement (voltage)

      1.7.5 Horizontal measurement (millisecond)

      1.7.6 Regularity of P wave and / or QRS complexes

   1.8 Utilize a systematic process when approaching the interpretation of the ECG

      1.8.1 Recognition of normal sinus rhythm

      1.8.2 Identify normal and abnormal components on ECG

   1.9 Heart rate: Introduction, measurement of heart rate from ECG

   1.10 Electrical axis:

      1.10.1 Determination of normal axis

      1.10.2 Methods of electrical axis estimation

      1.10.3 Left Axis Deviation

      1.10.4 Right Axis Deviation

   1.11 Recognition of electrocardiogram to the electrical events in the heart

      1.11.1 Tachyarrhythmias

         1.11.1.1 Narrow QRS tachycardia

         1.11.1.2 Wide QRS tachycardia

      1.11.2 Bradyarrhythmias

         1.11.2.1 Sinus bradycardia and sinus pause

         1.11.2.2 Conduction defects: Sino-atrial exit block, AB block: First degree, second degree (Mobitz type I and type II) and third degree AV block

         1.11.2.3 Bundle branch/fascicles block: Right Bundle Branch Block and Left Bundle Branch Block, bifascicular and trifascicular block

      1.11.3 ECG of patients with devices (Pacemakers, Implantable cardio defibrillators (ICD) and Cardiac resynchronization therapy (CRT)

         1.11.3.1 Obtaining magnet ECG in pacemaker patients

      1.11.4 ECG of patients with dextrocardia

1.12 Coronary artery disease:

      1.12.1 Effects of myocardial injury and infarction in ECG

      1.12.2 Manifestations of ST elevation MI and non ST elevation MI

      1.12.3 Types of myocardial infarction (MI): anterior, inferior, lateral, posterior and right ventricular infarction

1.13 Chamber enlargement and hypertrophy:

      1.13.1 Right atrial and left atrial enlargement

      1.13.2 Right ventricular hypertrophy

      1.13.3 Left ventricular hypertrophy

1.14 Miscellaneous :

      1.14.1 Pericarditis and pericardial effusion

      1.14.2 Hyperkalemia and hypokalemia

      1.14.3 Pre excitation (WPW)

      1.14.4 Electrode misplacement (technical dextrocardia).

      1.14.5 Long and short QT syndrome

      1.14.6 Early repolarization pattern

      1.14.7 Brugada pattern

1.15 Recognition of normal variations in ECG regarding age, sex, body built and ethnicity, state of activity, obesity, pregnancy, presence of other pathological conditions like Chronic Obstructive Airway Disease

1.16 Reporting of ECG

1.17 Special lead placements:

      1.17.1 Inferior myocardial infarction with suspected right ventricular infarction

         1.17.1.1 Right sided placement of chest leads

         1.17.1.2 Posterior placement of chest leads

      1.17.2 Brugada pattern ECG(elevated lead position)

      1.17.3 Dextrocardia

2. Electricity

2.1 Circuits and units:

      2.1.1 Electron theory of conduction

      2.1.2 Watts and Joules.

      2.1.3 Resistance, properties of electrical charge

      2.1.4 Properties of capacitor, potential difference (voltage)

      2.1.5 Properties of AC and DC circuits

2.2 Electromagnetism:

      2.2.1 Electromagnetic induction

      2.2.2 Magnetic poles, fields, flux and influx density

      2.2.3 Magnetic field due to straight and circular coil wire

3. **ECG Instrument**

   3.1 ECG instrumentation: understanding the function and control of ECG instrument, paper speed, calibration, lead selection, gain filters, manual and automatic operation, need for grounding of the instrument, battery maintenance

   3.2 Care: Care of instrument and recording paper (thermal and laser)

   3.3 Understanding electrodes, application and connection of electrodes, electrode positions, care of electrodes and cables

   3.4 Understanding lead system, unipolar and bipolar, limb leads, augmented and chest leads

   3.5 Einthoven's theory and its application, Wilson's central terminal

   3.6 Recording: Assess the recording to see the need for re recording

   3.7 Artifacts: Recognition and elimination / minimization of the artifacts

   3.8 Labeling of the completed recording sequentially as appropriate

   3.9 Cleaning and storage of instruments and cables ready for subsequent recording and correct sterilization and disposal procedures

   3.10 Calibration and servicing of the instrument

4. **Basic Science**

   4.1 Normal Anatomy and physiology of heart, conduction system and the coronary circulation

       4.1.1 Function of cardiovascular system

       4.1.2 Structure of cardiovascular system

       4.1.3 Cardiac cycle

       4.1.4 Functional tissue of the heart and their function

       4.1.5 Cardiac output, blood pressure and heart rate

   4.2 Basic diseases of heart:

       4.2.1 Coronary disease

       4.2.2 Rhythm disorders

       4.2.3 Others: heart failure, pericardial effusion, cardiomyopathy, myocarditis

5. **Practical Issues**

   5.1 **Social aspect of ECG recording**

       5.1.1 **Counselling, explaining and assurance**

       5.1.2 **Well ventilation, screening of the recording room**

       5.1.3 **Procedure of ECG recording (hyegine, sanitation, after care, etc.)**

   5.2 **Ethical Issues**

       5.2.1 **Verbal consent**

       5.2.2 **Patient's right, dignity and witness (male, female patient)**

       5.2.3 **Duty of ECG technician**

   5.3 **ECG Reporting**

       5.3.1 **Report presentation, folding and delivery labelling and authencity)**

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