[LH 0815] **AUGUST 2015** **Sub.code: 1510**

B.Sc. CARDIAC TECHNOLOGY

FIRST YEAR

PAPER III – MEDICAL ELECTRONIC, BIOPHYSICS AND COMPUTER USAGE RELEVANT TO CARDIAC TECHNOLOGY BASIC ELECTROCARDIOGRAPHY

Q.P. Code : 801510

Time: Three Hours **Maximum: 100 Marks**

Answer all questions

I. Elaborate on: **(3 x 10 = 30)**

1. What are the sources of Biomedical signals?
2. What is defibrillator and explain its function?
3. Explain the measures to reduce the radiation exposure.

II. Write Notes on: **(8 x 5 = 40)**

1. Explain impedance Plethysmography.
2. Describe Differential Ascultatory Technique.
3. Write note on Dc defibrillator.
4. Write about Strain gauge transducer.
5. Write the applications or CRT.
6. What is Ultrasound wave? What is the frequency used in Medical Ultrasound and write its medical applications.
7. What are the procedures done at catheterization lab?
8. Write the role of computers in medical care.

III. Write Notes on: **(10 x 3 = 30)**

1. Write about patient monitor?
2. Calculate Pulse Pressure and MAP (Mean Arterial Pressure) for the following parameters.
3. Draw the Einthoven Triangle.
4. Describe the Placement of precordial Leads.
5. What is radiation and what are the types of radiation?
6. Difference between a transducer and a sensor.
7. Calculate the Heart rate for the given Parameter.
   Speed of the paper = 50 mm/sec, the distance between the two peaks of QRS complex = 20 mm.
8. Write the color coding for ECG leads for any one system.
9. Write about Action Potential.
10. Write notes on Depolarization and Re polarization.

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[LI 0216] FEBRUARY 2016 **Sub.code: 1510**

B.Sc. CARDIAC TECHNOLOGY
(New Syllabus 2014-2015)

FIRST YEAR

PAPER III – MEDICAL ELECTRONICS, BIOPHYSICS AND COMPUTER USAGE RELEVANT TO CARDIAC TECHNOLOGY BASIC ELECTROCARDIOGRAPHY

Q.P. Code : 801510

Time: Three Hours **Maximum: 100 Marks**

Answer all questions

I. Elaborate on: **(3 x 10 = 30)**

1. What are the unipolar limb leads and how are there different from augmented limb leads?
2. What is defribrillator and explain its function?
3. Explain the measures to reduce the radiation exposure.

II. Write Notes on: **(8 x 5 = 40)**

1. What are the basic functional components present in the Medical instrumentation System?
2. Write notes on DC Defribrillator with synchronization mode.
3. Write about unbounded strain gauge transducers.
4. What is Blood Pressure and Mean Arterial Pressure?
5. Define Pulse Pressure and Mean Arterial Pressure.
6. Write the color coding for placement of electrodes for any one of the systems.
7. Draw an ECG showing right bundle branch block in VI and describe right bundle anatomy?
8. What are the non cardiac factors influencing ECG recording?

III. Write Notes on: **(10 x 3 = 30)**

1. Write about Placements of Pericardial Electrodes.
2. Calculate the heart rate for the following data:
   Paper speed = 50 mm/sec and Distance between the two peaks of QRS complex = 12.5 mm.
3. What is MRI? And write its applications.
4. Write about AED.
5. Draw the Einthoven triangle.
6. Write about oximetry.
7. What are the leads showing P-wave well? What is the normal duration of P-Wave?
8. Write about Action Potential.
9. Draw the ECG pattern in a VR. Explain reason behind that morphology.
10. Explain impedence Phiethysmography.

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[LJ 0816] AUGUST 2016 **Sub.code: 1510**

B.Sc. CARDIAC TECHNOLOGY
(New Syllabus 2014-2015)

FIRST YEAR

PAPER III – MEDICAL ELECTRONICS, BIOPHYSICS AND COMPUTER USAGE RELEVANT TO CARDIAC TECHNOLOGY BASIC ELECTROCARDIOGRAPHY

Q.P. Code : 801510

Time: Three Hours **Maximum: 100 Marks**

Answer all questions

I. Elaborate on: **(3 x 10 = 30)**

1. What is Ultra-Sound? Explain modes of Ultra-Sound Scan.
2. Explain Electro Cardiographic processing and display system.
3. Explain the methods of Blood Pressure Measurements.

II. Write Notes on: **(8 x 5 = 40)**

1. What is the importance of Blood Pressure Measurement?
2. Write the stages of Hypertension.
3. Mention the types of Pulse Oximeter probes and it's parts.
4. Blood Pressure Cuff selection and sizing.
5. Advantages of Biphasic Defibrillator over Monophasic Defibrillator.
6. Augmented limb leads.
7. What is electrical axis?
8. What is left axis and right axis deviation?

III. Write Notes on: **(10 x 3 = 30)**

1. What is Radioactivity, half life period and decay constant?
2. What is action potential?
3. If there are 7 R Wave in 60 seconds strip, calculate the Heart rate.
4. What is computer tomography?
5. Difference between transducers and sensors.
6. What is Piezoelectric effect?
7. Mention the Ultra-Sound frequency for superficial and deeper structure scanning.
8. Write the recommended range for delivering shock during Defibrillation.
9. What is pressure transducer?
10. Write the types of Defibrillator electrodes.

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[LK 0217] FEBRUARY 2017 **Sub.code: 1510**

B.Sc. CARDIAC TECHNOLOGY
(New Syllabus 2014-2015)

FIRST YEAR

PAPER III – MEDICAL ELECTRONICS, BIOPHYSICS AND COMPUTER USAGE RELEVANT TO CARDIAC TECHNOLOGY BASIC ELECTROCARDIOGRAPHY

Q.P. Code : 801510

Time: Three Hours **Maximum: 100 Marks**

Answer all questions

I. Elaborate on: **(3 x 10 = 30)**

1. Mention indication and contra-indication for defibrillation. Explain the working principle of DC Defibrillator.
2. Explain various techniques for monitoring Radiation Exposure.
3. Explain working principle and mechanism of Pulse Oximeter.

II. Write Notes on: **(8 x 5 = 40)**

1. What are the measures to reduce Radiation Exposure?
2. What are the parameters monitored during defibrillation?
3. Mention the effects of Radiation Exposure.
4. What is Ascultatory method of blood pressure measurement?
5. Different types of Ultrasound probes and its applications.
6. Explain impedance plethysmography.
7. Explain ECG 12-Lead system.
8. Normal P wave.

III. Write Notes on: **(10 x 3 = 30)**

1. What is Radiation and list the types of radiations.
2. What are the sources of Bio-potential?
3. What is Doppler Effect?
4. What is Ascultatory gap?
5. If there are 3 large squares in an R-R interval, what could be the heart rate?
6. What are the effects of body position in BP measurement?
7. What are the uses of computers in medicine?
8. What is positioning of Defibrillator paddles on defibrillation?
9. What is mean arterial pressure and pulse pressure?
10. What is pre-load and after-load?

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B.Sc. CARDIAC TECHNOLOGY

FIRST YEAR

PAPER III – MEDICAL ELECTRONICS BIOPHYSICS AND COMPUTER USAGE RELEVANT TO CARDIAC TECHNOLOGY BASIC ELECTROCARDIOGRAPHY

Q.P. Code: 801510

Time: Three Hours **Maximum: 100 Marks**

Answer all questions

I. Elaborate on: **(3 x 10 = 30)**

1. Explain different scanning modes of Medical Ultrasound.
2. Explain indirect methods of blood pressure measurements.
3. Explain measures to reduce radiation exposure.

II. Write notes on: **(8 x 5 = 40)**

1. What are the basic functional components present in the medical instruments?
2. How Defibrillator restores the normal rhythm of heart?
3. What are the causes for false Pulse Oximeter reading?
4. Differentiate cardioversion and defibrillation.
5. Draw normal ECG waveform by mentioning segments, interval and time duration of each wave.
6. What is Precordial Chest leads?
7. What is electrical axis of heart?
8. What are the sources of radiation?

III. Short answers on: **(10 x 3 = 30)**

1. Describe the Einthoven Triangle.
2. What are the parameters that can be measured in Physiological Monitor?
3. What is Doppler Effect?
4. Draw ECG graph sheet and mention its dimensions.
5. What is hyperpolarisation?
6. What are the characteristics of normal P Wave?
7. What is Peizoelectric Effect?
8. What should be done when the Oxygen saturation falls below the normal?
9. What is Electromagnetic spectrum?
10. What are the Phases of Korotkoff Sound?

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[LM 0218] FEBRUARY 2018 **Sub. Code: 1510**

B.Sc. CARDIAC TECHNOLOGY

FIRST YEAR

PAPER III – MEDICAL ELECTRONICS BIOPHYSICS AND COMPUTER USAGE RELEVANT TO CARDIAC TECHNOLOGY BASIC ELECTROCARDIOGRAPHY

Q.P. Code: 801510

Time: Three Hours **Maximum: 100 Marks**

Answer all questions

I. Elaborate on: **(3 x 10 = 30)**

1. Explain impedance Plethysmography.
2. Explain ECG Lead system.
3. Explain the usage of computer in medical field.

II. Write notes on: **(8 x 5 = 40)**

1. What is Bio-Impedance signal?
2. What is Synchronized and Asynchronized Defibrillator?
3. Differentiate Pace maker and implantable Defibrillator.
4. What are the factors interfere with Pulse Oximeter reading?
5. Explain radiation monitoring devices.
6. Mention the applications of the Ultrasound in medicines.
7. What is normal standardization?
8. What is Unipolar leads?

III. Short answers on: **(10 x 3 = 30)**

1. What are the interpretations of ECG?
2. What is Acoustic Impedance?
3. What is ionic channel?
4. What are the effects of radiation Exposure?
5. When do the alarm rise in Pulse Oximetry?
6. What is the necessity of Defibrillator?
7. What is Depolarization and Repolarisation?
8. What is the cause of the appearance, change in quality and disappearance of the sound at various phases of blood pressure measurements?
9. What are the main components of an Intra arterial blood pressure measuring system?
10. What is radioactivity?

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[LN 0818] AUGUST 2018 **Sub. Code: 1510**

B.Sc. CARDIAC TECHNOLOGY

FIRST YEAR

PAPER III – MEDICAL ELECTRONICS, BIOPHYSICS AND COMPUTER USAGE RELEVANT TO CARDIAC TECHNOLOGY BASIC ELECTROCARDIOGRAPHY

Q.P. Code: 801510

Time: Three Hours **Maximum: 100 Marks**

Answer all questions

I. Elaborate on: **(3 x 10 = 30)**

1. Explain in detail the ECG lead system.
2. Explain radiation dose reduction strategies.
3. Discuss on impedance plethysmography.

II. Write notes on: **(8 x 5 = 40)**

1. Write notes on synchronized and asynchronized defibrillator.
2. Asculatory method of blood pressure monitoring.
3. Normal P wave.
4. Method of monitoring oxygen saturation using pulse oximeter.
5. Unipolar leads.
6. Necessity of defibrillator.
7. Write a note on strain guage transducer.
8. Imaging modes in ultrasound.

III. Short answers on: **(10 x 3 = 30)**

1. Acoustic impedance.
2. Action potentials.
3. Placement of pericardial electrodes.
4. Sensor used in pulse oximeter.
5. Electrode used to detect P wave and the time duration of P-wave.
6. Piezo electric effect.
7. Depolarisation and repolarization.
8. Doppler effect.
9. Calculate the heart rate if there are 5 R waves in a 60 seconds strip.
10. What is radiation and mention its types?

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[LO 0219] FEBRUARY 2019 **Sub. Code: 1510**

B.Sc. CARDIAC TECHNOLOGY

FIRST YEAR

PAPER III – MEDICAL ELECTRONICS, BIOPHYSICS AND COMPUTER USAGE RELEVANT TO CARDIAC TECHNOLOGY BASIC ELECTROCARDIOGRAPHY

Q.P. Code: 801510

Time: Three Hours **Maximum: 100 Marks**

Answer all questions

I. Elaborate on: **(3 x 10 = 30)**

1. Explain in detail the direct and indirect method of blood pressure monitoring.
2. Discuss on 12 lead ECG system.
3. Explain on the radiation dose reduction strategies for minimizing radiation exposure in cath lab.

II. Write notes on: **(8 x 5 = 40)**

1. Write a note on synchronization in defibrillator.
2. Write a short note on impedance plethysmography.
3. Write note on monophasic and biphasic defibrillator and discuss its advantages.
4. What are the effects of radiation exposure?
5. What are ionic currents and discuss on the phases of cardiac action potential?
6. Augmented limb leads.
7. Working principle of pulse oximeter.
8. Biological effects of radiation

III. Short answers on: **(10 x 3 = 30)**

1. What is the frequency used in ultrasound imaging?
2. What is radiation and mention its types?
3. What are the basic principles of radiation safety?
4. Calculate the heart rate if there are four large squares in an R-R interval.
5. Curie temperature.
6. Einthoven triangle.
7. Positioning of defibrillator paddles during defibrillation.
8. What is mean arterial pressure?
9. Transducer.
10. What are unipolar leads?

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[LP 0819] AUGUST 2019 **Sub. Code: 1510**

B.Sc. CARDIAC TECHNOLOGY

FIRST YEAR

PAPER III – MEDICAL ELECTRONICS, BIOPHYSICS AND COMPUTER USAGE RELEVANT TO CARDIAC TECHNOLOGY BASIC ELECTROCARDIOGRAPHY

Q.P. Code: 801510

Time: Three Hours **Maximum: 100 Marks**

Answer all questions

I. Elaborate on: **(3 x 10 = 30)**

1. Describe the concept of augmented limb leads.
2. Explain various methods to reduce radiation exposure.
3. Explain different types of defibrillators.

II. Write notes on: **(8 x 5 = 40)**

1. What are the basic components of medical instrument system?
2. Basic principle of pulse oximeter.
3. Cathode ray tube.
4. What is synchronisation in defibrillator?
5. Electrode position in ECG measurement.
6. Explain ionic current.
7. ECG changes for posterior wall myocardial infarction.
8. How to calculate heart rate in sinus rhythm and atrial fibrillation?

III. Short answers on: **(10 x 3 = 30)**

1. Application of ultrasound imaging.
2. Mean Arterial Pressure.
3. What is computed tomography?
4. U wave.
5. What are the procedures done with fluoroscopy?
6. ECG paper.
7. Factors determining the amplitude of QRS complex.
8. Calibration check in ECG.
9. How do you calculate PR interval?
10. Draw hexaaxial reference system Label the leads and indicate the degree.

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[LQ 0220] FEBRUARY 2020 **Sub. Code: 1510**

B.Sc. CARDIAC TECHNOLOGY

FIRST YEAR

PAPER III – MEDICAL ELECTRONICS, BIOPHYSICS AND COMPUTER USAGE RELEVANT TO CARDIAC TECHNOLOGY BASIC ELECTROCARDIOGRAPHY

Q.P. Code: 801510

Time: Three Hours **Maximum: 100 Marks**

Answer all questions

I. Elaborate on: **(3 x 10 = 30)**

1. What is the function of a defibrillator and differentiate between pacemaker and implantable defibrillator?
2. Explain how an image is formed in ultrasound?
3. Explain unipolar and augmented limb leads.

II. Write notes on: **(8 x 5 = 40)**

1. Phases of cardiac action potential.
2. Direct method of blood pressure monitoring.
3. Write notes on left and right axis deviation.
4. Write a note on the various devices used for monitoring radiation.
5. Biological effects of radiation.
6. What are the various cardiac and non cardiac factors influencing ECG recording?
7. Write the colour coding for placement of ECG electrodes in 12 lead system.
8. Importance of blood pressure monitoring.

III. Short answers on: **(10 x 3 = 30)**

1. Three methods to reduce radiation exposure.
2. Impedance plesthysmography.
3. Calculate the heart rate when the paper speed is 50 mm/sec and the distance between two peaks of QRS complex is 12 mm/sec?
4. Maximum energy used in defibrillator.
5. ECG waveform.
6. Calibration check in electrocardiography.
7. Transducer.
8. ECG pattern in atrial fibrillation.
9. Positioning of defibrillator paddles on defibrillation.
10. Inverse square law.

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THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[AHS 0321] MARCH 2021 Sub. Code: 1510

(AUGUST 2020 EXAM SESSION)

B.Sc. CARDIAC TECHNOLOGY

FIRST YEAR (Regulation 2014-2015)

PAPER III – MEDICAL ELECTRONICS, BIOPHYSICS AND COMPUTER USAGE RELEVANT TO CARDIAC TECHNOLOGY BASIC ELECTROCARDIOGRAPHY

Q.P. Code : 801510

Time: Three hours Answer ALL Questions Maximum: 100 Marks

I. Elaborate on: (3 x 10 = 30)

1. Explain the working principle of DC defibrillator. What are the advantages of AC defibrillator over DC defibrillator?
2. Explain various methods of monitoring Radiation exposure.
3. What are unipolar limb leads and how are they different from augmented limb leads?

II. Write notes on: (8 x 5 = 40)

1. What is the importance of Blood pressure measurement?
2. Method of measuring oxygen saturation using pulse oximeter.
3. How ultrasound image is produced?
4. Strain gauge transducer.
5. Use of computers in medicine.
6. Write colour coding for the placement of electrodes for any one of the system.
7. What is clockwise and counterclockwise rotation of heart?
8. What is normal QRS complex duration? What are the reasons for QRS prolongation?

III. Short answers on: (10 x 3 = 30)

1. Physiological monitor.
2. Impedance plesthymography.
3. Action potential.
4. Three methods to reduce radiation exposure.
5. Electromagnetic radiation.
6. What is Einthoven's triangle?
7. Ventricular tachycardia.
8. Calibration check in Electrocardiography.
9. Draw ECG pattern in VR.
10. U wave.

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THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[AHS 0422] APRIL 2022 Sub. Code: 1510

(FEBRUARY 2021 & AUGUST 2021 EXAM SESSIONS)

B.Sc. CARDIAC TECHNOLOGY

FIRST YEAR (Regulations 2014-2015)

PAPER III – MEDICAL ELECTRONICS, BIO-PHYSICS & COMPUTER USAGE RELEVANT TO CARDIAC TECHNOLOGY BASIC ELECTROCARDIOGRAPHY

Q.P NO. 801510

Time: Three Hours **Maximum : 100 Marks**

Answer All questions

I. Elaborate on: **(3X10=30)**

1. What is basic principle of impedance plethysmography? Explain one equipment with a diagram?
2. Draw the conduction system of the heart from the Sino-atrial node to the Purkinje system. What are the causes of Sinus tachycardia?
3. What is meant by bio-potential? Give two applications of bio- potentials in monitoring?

II. Write Notes on: **(8X5=40)**

1. Auscultatory gap.
2. What are the stages of Hypertension?
3. The distance between two R waves, that is the R-R interval is 3 big squares or 15 small squares. Speed of ECG wave is 25 mm/sec. 1 mm = 1 small square =0.04 seconds. 5 small squares = 1 large square=0.2 second. 5 large squares =one second.Calculate the heart rate in beats per minute.
4. Give two indications for defibrillation. What is the energy level used?
5. Draw the ECG pattern of Left Bundle branch block in lead V6. Explain anatomy of Left bundle branch.
6. Enumerate 5 advantages of computerized Record Keeping.
7. A patient has had treatment for Chest pain three days previously. He has now come to casualty with retrosternal crushing pain associated with sweating. How will computerized record keeping help in managing this patient?
8. Which ECG lead is best suited for analyzing rhythm abnormalities? What is complete heart block?

III. Short Answers on: **(10X3=30)**

1. What are the different types of electro-magnetic radiation?

P.T.O.

2. List few uses of pulse oximeter.
3. What are the advantages of intra-arterial blood pressure monitoring ?
4. Sinus bradycardia
5. Curie temperature
6. Ways to minimize radiation exposure
7. Types of ultrasound probes.
8. Biological effects of radiation.
9. P wave
10. Left Ventricular Hypertrophy on ECG

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THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[AHS 1122] NOVEMBER 2022 Sub. Code: 1510

B.Sc. CARDIAC TECHNOLOGY
FIRST YEAR (Regulation 2014-2015)
PAPER III – MEDICAL ELECTRONICS, BIOPHYSICS AND COMPUTER USAGE RELEVANT TO CARDIAC TECHNOLOGY AND BASIC ELECTROCARDIOGRAPHY
Q. P. Code: 801510

Time: Three hours **Maximum : 100 Marks**

Answer ALL Questions

I. Elaborate on: **(3 x 10 = 30)**

1. Explain the principle involved in blood pressure measurement using sphygmomanometer. What is normal range of blood pressure in an adult? Brief on Mean Arterial Pressure.

2. Draw the Cathode ray tubes and discuss the working principle of the equipment.

3. Describe the concept of augmented limb leads in Electrocardiogram (ECG).

II. Write notes on: **(8 x 5 = 40)**

1. What is SpO2 and Plethysmography waveform?
2. What are the applications of Computer in Medicine?
3. Discuss the phases of action potential.
4. Personnel Monitoring TLD badge.
5. Draw the normal electrocardiogram and name the waves and heart activity these waves denote.
6. Types of radiation and mention three methods of reducing radiation exposure.
7. What are the differences between a transducer and sensor?
8. Describe Einthoven triangle and what is normal cardiac axis?

III. Short answers on: **(10 x 3 = 30)**

1. Location of chest leads V7, V8, V9 and Right side chest leads in ECG.
2. U wave in ECG.
3. Calibration check in ECG.
4. Principle and uses of pulse oximeter.
5. Advantages of Intra Arterial Blood Pressure monitoring.
6. PR interval in ECG.
7. Types of radiation.
8. Application of Medical Ultrasound in Cardiology.
9. Frequency of ultrasound probe used in Cardiology.
10. Define Tachycardia and Bradycardia.

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THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[AHS 0423] APRIL 2023 Sub. Code: 1510

B.Sc. CARDIAC TECHNOLOGY
FIRST YEAR (Regulations 2014-2015, 2018-2019 & 2021-2022 onwards)
PAPER III – MEDICAL ELECTRONICS, BIOPHYSICS AND COMPUTER USAGE RELEVANT TO CARDIAC TECHNOLOGY AND BASIC ELECTROCARDIOGRAPHY
Q. P. Code: 801510

Time: Three hours **Maximum : 100 Marks**

Answer ALL Questions

I. Elaborate on: **(3 x 10 = 30)**

1. Discuss in detail about the techniques for Monitoring Radiation Exposure.
2. Explain the uses of Defibrillators and its functions.
3. What is Ultrasound Waves and write its application in Medicine?

II. Write notes on: **(8 x 5 = 40)**

1. Describe about impedance Plethysmography.
2. What are the procedures to be done in Catheterization lab?
3. What is Pulse oximeter and explain its types.
4. Explain the types of waves in ECG.
5. What is Pre-cordial chest leads?
6. How defibrillator restores the normal rhythm of heart?
7. What is bio-impedance signal?
8. Explain the types of ECG tests.

III. Short answers on: **(10 x 3 = 30)**

1. Define ALARA.
2. Properties of X-rays.
3. Computer use in Medical care.
4. Atrial repolarization.
5. Piezo-electric effect.
6. Define Radiation.
7. Ionization.
8. C-arm Fluoroscopy.
9. U wave.
10. Mean arterial pressure.

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