

*SH-II/PHY/201/C-3/(T)/19***B.Sc. 2nd Semester (Honours) Examination, 2019****PHYSIOLOGY****Paper : SH/PHY/201/C-3(T)****(Physiology of Nerve and Muscle cells)****Course ID : 22511****Time: 1 Hour 15 minutes****Full Marks: 25***The figures in the right hand side margin indicate marks.**Candidates are required to give their answers in their own words  
as far as practicable.*

1. Answer *any five* questions of the following: 1×5=5
- (a) What is neurotransmitter? Give one example.
  - (b) Define repolarization.
  - (c) State the function of 'Intercalated disc'.
  - (d) Name the regulatory proteins of muscle contraction.
  - (e) Why does nerve cell not divide?
  - (f) What do you mean by denervation hypersensitivity?
  - (g) Name the receptors for cold and pain sensation.
  - (h) What is synaptic plasticity?
2. Answer *any two* questions of the following: 5×2=10
- (a) Describe the process of depolarization in nerve cell with suitable diagram. 3+2=5
  - (b) Define 'All or None law'. 'Heart muscle does not fatigue due to exhaustive exercise.'—  
Mention the reasons. 2+3=5
  - (c) Differentiate between smooth muscle and skeletal muscle. Mention the location and  
function of inter-synaptic canaliculi. 3+2=5
  - (d) What is 'Hursh factor'? Classify nerve fibres on the basis of diameter and velocity  
of impulse conduction. 1+4=5
3. Answer *any one* question of the following: 10×1=10
- (a) (i) What is sarcomere? Mention the role of sarcotubular system.
  - (ii) Describe the mechanism of synaptic transmission of impulse with a labelled  
diagram. (1+2)+(5+2)=10
  - (b) (i) Mention the ionic fluxes operations in skeletal muscle. Briefly elucidate the role  
of any one of them.
  - (ii) Discuss the electrical properties of cardiac muscle. (2+2)+6=10

*SH-II/PHY/201/CP3/PR/19*

**B.Sc. 2nd Semester (Honours) Practical Examination, 2019**

**PHYSIOLOGY**

**Paper : SH/PHY/201/CP3**

**(Physiology of Nerve and Muscle Cells Lab)**

**Course ID : 22521**

**Time: 2 Hours**

**Full Marks: 15**

*The figures in the right hand side margin indicate marks.*

*Answer all the questions.*

1. Take a part of sciatic nerve of toad on a clean slide and stain it with silver nitrate solution with proper procedure. Focus node of Ranvier under high power objective of microscope at the centre of your focussing field. Draw a labelled diagram of the field you have focussed. 10  
[Teasing = 2, Staining = 2, Mounting = 1, Focussing of single node of Ranvier = 3, Drawing and labelling = 2]
  2. Laboratory Notebook 3
  3. Viva voce 2
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*SH-II/PHY/202/C-4/(T)/19*

**B.Sc. 2nd Semester (Honours) Examination, 2019**

**PHYSIOLOGY**

**Paper : SH/PHY/202/C-4(T)**

**(Chemistry of Biomolecules)**

**Course ID : 22512**

**Time: 1 Hour 15 minutes**

**Full Marks: 25**

*The figures in the right hand side margin indicate marks.*

*Candidates are required to give their answers in their own words  
as far as practicable.*

1. Answer *any five* questions of the following: 1×5=5
- (a) What is liposome?
  - (b) Define essential fatty acid.
  - (c) What is isoelectric precipitation?
  - (d) What is glycosidic bond?
  - (e) State the clinical importance of inulin.
  - (f) What do you mean by deamination?
  - (g) Name any two sulphur containing amino acid.
  - (h) 'Cholesterol is an amphipathic molecule'. — Explain.
2. Answer *any two* questions of the following: 5×2=10
- (a) Write the functional classification of protein. 5
  - (b) Differentiate between A-DNA and Z-DNA. Classify different types of RNA and state their function. 1+2+2=5
  - (c) State the important properties of monosaccharides. "Glucose and galactose are epimers of each other". — Explain. 3+2=5
  - (d) What is neutral fat? Classify lipid with proper example. 2+3=5

3. Answer *any one* question of the following:

10×1=10

(a) What will happen if glucose is heated with strong mineral acid. What are enediols? Distinguish between the chemical structure of starch and cellulose. Why sucrose is a non-reducing sugar. 3+2+3+2=10

(b) Describe the primary structures of protein. Write the classification of Carbohydrates. What do you mean by 'D' and 'L' sugar? 4+4+2=10

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*SH-II/PHY/202/C-4/PR/19*

**B.Sc. 2nd Semester (Honours) Practical Examination, 2019**

**PHYSIOLOGY**

**Paper : SH/PHY/202/C-4(P)**

**(Chemistry of Biomolecules Lab)**

**Course ID : 22522**

**Time: 2 Hours**

**Full Marks: 15**

*The figures in the right hand side margin indicate marks.*

*Answer all the questions.*

1. Identify the supplied bio-chemical substance (by lottery) in solution through systematic analysis with one Confirmatory test.  
(Write in details of all the tests performed. Systematic analysis – 8, Confirmatory test – 2)  
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2. Laboratory Notebook 3
3. Viva voce 2
  - (a) On practicals performed
  - (b) On practical instruments
  - (c) On theoretical part of the syllabw

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*SH-II/PHY/203/GE-2(T)/19*

**B.Sc. 2nd Semester (Honours) Examination, 2019**

**PHYSIOLOGY**

**Paper : SH/PHY/203/GE-2(T)**

**(Developmental Biology and Embryology)**

**Course ID : 22514**

**Time: 1 Hour 15 minutes**

**Full Marks: 25**

*The figures in the right hand side margin indicate marks.*

*Candidates are required to give their answers in their own words  
as far as practicable.*

1. Answer *any five* questions of the following: 1×5=5  
নিম্নলিখিত যে কোনো পাঁচটি প্রশ্নের উত্তর দাও :
- (a) Differentiate between haloblastic and meroblastic cleavage.  
হলোব্লাস্টিক ও মেরোব্লাস্টিক ক্লিভেজের পার্থক্য কী?
- (b) Write the full form of hCG.  
hCG-র সম্পূর্ণ নাম লেখো।
- (c) What is Allantois?  
অ্যালানটয়েস কী?
- (d) State the functions of Sertoli cell.  
সারটোলি কোশ-এর কাজ লেখো।
- (e) What is Pollor body?  
পোলার বডি কী?
- (f) What is fertilizin?  
ফার্টিলাইজিন কী?
- (g) What are primary sex organs in male and female?  
পুরুষ এবং স্ত্রীলোকের মুখ্য যৌন অঙ্গগুলি কী কী?
- (h) What is corpus luteum?  
করপাস লিউটিয়াম কী?
2. Answer *any two* questions from the following: 5×2=10  
নিম্নলিখিত যে কোনো দুটি প্রশ্নের উত্তর দাও :
- (a) Briefly describe the structure of matured egg with proper diagrapheme. 3+2=5  
পরিণত ডিম্বাণুর গঠন চিত্রসহযোগে বর্ণনা করো।

**22514/13173**

(b) What is morphogenetic movement? State different types of morphogenetic movement. 1+4=5

মরফোজেনেটিক মুভমেন্ট কী? মরফোজেনেটিক মুভমেন্টের প্রকারভেদ বর্ণনা করো।

(c) What is Puberty? State the female physiological changes during Puberty. 1+2+2=5

বয়ঃসন্ধিকাল কী? বয়ঃসন্ধিকালের মহিলার শারীরিক পরিবর্তনগুলি উল্লেখ করো।

(d) What is implantation? State the site and process of implantation in man. 1+1+3=5

রোপণ কী? মানবদেহে রোপণের স্থান ও পদ্ধতি বর্ণনা করো।

3. Answer *any one* question from the following:

10×1=10

নিম্নলিখিত যে কোনো একটি প্রশ্নের উত্তর দাও :

(a) What is Oogenesis? State the process of Oogenesis. Mention the significance of Oogenesis. 2+6+2=10

উজেনেসিস কী? উজেনেসিস পদ্ধতি লেখো। উজেনেসিসের তাৎপর্য উল্লেখ করো।

(b) What is fertilization? Diagrammatically state the process of fertilization in man.

2+3+5=10

নিষেক কী? চিত্রসহ মানবদেহে নিষেকের পদ্ধতি উল্লেখ করো।

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*SH-II/PHY/203/GEP-2/PR/19*

**B.Sc. 2nd Semester (Honours) Practical Examination, 2019**

**PHYSIOLOGY**

**Paper : SH/PHY/203/GE-P-2**

**(Developmental Biology and Embryology Lab)**

**Course ID : 22524**

**Time: 2 Hours**

**Full Marks: 15**

*The figures in the right hand side margin indicate marks.*

*Answer all the questions.*

1. Stain the supplied (by lottery) paraffinised tissue section with haematoxylin and eosin and identify it with two reasons. 4+4+2=10  
হিমাটক্সিলিন ও ইওসিন রঞ্জক দ্বারা প্রাপ্ত গোমস্ত ছেদককে রঞ্জিত করো এবং দুটি কারণ লিখে শনাক্ত করো।
  2. Laboratory Notebook 3  
পরীক্ষাগারে ব্যবহৃত খাতা
  3. Viva voce 2  
মৌখিক
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*SP-II/PHY/201/C-1B(T)/19*

**B.Sc. 2nd Semester (Programme) Examination, 2019**

**PHYSIOLOGY**

**Paper : SP/PHY/201/C-1B(T)**

**(Developmental Aspects of Embryo and Foetus)**

**Course ID : 22518**

**Time: 1 Hour 15 Minute**

**Full Marks: 25**

*The figures in the right hand side margin indicate marks.*

*Candidates are required to give their answers in their own words  
as far as practicable.*

1. Answer *any five* questions of the following: 1×5=5  
যে কোনো পাঁচটি প্রশ্নের উত্তর দাও :
- (i) What is spermiation? 1  
স্পার্মিয়েশান কী?
  - (ii) What is Cryptorchidism? 1  
ক্রিপ্টরকিডিসম কী?
  - (iii) What is menarche? 1  
মেনার্কি কী?
  - (iv) What is colostrum? 1  
কোলস্ট্রাম কী?
  - (v) What do you mean by LH surge? 1  
LH-সার্জ বলতে কী বোঝো?
  - (vi) Mention any two secondary sex characters in male. 1  
পুরুষের দেহের যে কোনো দুটি গৌণ যৌন বৈশিষ্ট্য উল্লেখ করো।
  - (vii) What is Puberty? 1  
বয়ঃসন্ধি কী?
  - (viii) What do you mean by Premenstrual syndrome? 1  
প্রাক ঋতুচক্রজনিত লক্ষণ বলতে কী বোঝো?
2. Answer *any two* questions of the following: 5×2=10  
যে কোনো দুটি প্রশ্নের উত্তর দাও :
- (i) What is implantation? Discuss about the process of implantation of fertilized ovum. 1+4=5  
ভ্রূণ রোপণ কী? নিষিক্ত ডিম্বাণু রোপণের পদ্ধতি আলোচনা করো।
  - (ii) Discuss about the ultrastructure of ovum with proper diagram. 3+2=5  
উপর্যুক্ত চিত্রসহ ডিম্বাণুর আলট্রা গঠন বর্ণনা করো।

(iii) What is gastrulla? Write briefly the process of fertilization in mammals. 1+4=5  
গ্যাস্ট্রা কী? স্তন্যপায়ী প্রাণীর নিষেক পদ্ধতি লেখো।

(iv) What do you mean by Oogenesis? Discuss about the different stages of Oogenesis. 1+4=5

উজেনেসিস বলতে কী বোঝো? উজেনেসিস-এর বিভিন্ন ধাপগুলি বর্ণনা করো।

3. Answer any one of the following: 10×1=10

যে কোনো একটি প্রশ্নের উত্তর দাও :

(i) Describe the histological structure of testis with proper diagram. Briefly mention the functions of Sertoli Cell. (5+3)+2=10

উপযুক্ত চিত্রসহ শুক্রাশয়ের কলাস্থানিক গঠন বর্ণনা করো। সংক্ষেপে সারটোলি কোশের কাজ উল্লেখ করো।

(ii) What is meant by trilaminar germ disc? Briefly discuss the process of development of eye as organogenesis in man. 3+7=10

ত্রিস্তরীয় জার্ম ডিস্ক বলতে কী বোঝায়? মানবদেহে অর্গানোজেনেসিসে চোখের পরিস্ফুটন পদ্ধতি সংক্ষেপে আলোচনা করো।

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*SP-II/PHY/201/C-1B/PR/19*

**B.Sc. 2nd Semester (Programme) Practical Examination, 2019**

**PHYSIOLOGY**

**Paper : SP/PHY/201/C-1B(P)**

**(Developmental Aspects of Embryo and Foetus Lab)**

**Course ID : 22528**

**Time: 2 Hours**

**Full Marks: 15**

*The figures in the right hand side margin indicate marks.*

*Answer all the questions.*

1. Stain the paraffinised tissue section supplied (by lottery) with haematoxylin and eosin and identify it with two reasons. 8+2=10  
লটারির মাধ্যমে প্রাপ্ত গোমস্ত ছেদককে হিমাটক্সিলিন ও ইওসিন রঞ্জক দ্বারা রঞ্জিত করো এবং দুটি কারণ লিখে শনাক্ত করো।
  2. Laboratory Notebook 3  
পরীক্ষাগারে ব্যবহৃত খাতা
  3. Viva voce 2  
মৌখিক
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**B.Sc. 2nd Semester (Honours) Practical Examination, 2019**

**PHYSIOLOGY**

**Paper : SH/PHY/201/CP3**

**(Physiology of Nerve and Muscle Cells Lab)**

**Course ID : 22521**

*Instruction to the Examiners*

1. One slide should be marked by the Examiner.

Marking:

- Teasing – 2
- Staining – 2
- Mounting – 1
- Focussing of single node of Ranvier – 1 or
- Focussing of more than one node of Ranvier – 1
- Drawing and Labelling – 1+1

2. Credit should be given on the basis of: 3

- Laboratory notebook signed by the class teacher(s) regularly.
- Percentage of syllabus covered.
- Neat presentation of the notebook.

3. Viva voce: Questions are to be asked from Practicals performed, Instrument used and theoretical knowledge of syllabus. 2

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**B.Sc. 2nd Semester (Honours) Practical Examination, 2019**

**PHYSIOLOGY**

**Paper : SH/PHY/202/C-4(P)**

**(Chemistry of Biomolecules Lab)**

**Course ID : 22522**

*Instruction to the Examiners*

1. (i) At least seven samples should be prepared from the following groups— 10
- (a) Glucose, Sucrose, Fructose, Starch, Dextrin
  - (b) Albumin, Peptone, Gelatin
  - (c) Bile salts, Glycerol, Acetone
- (ii) Samples should be prepared as—
- U<sub>1</sub>, U<sub>2</sub>, U<sub>3</sub>, ..... with confidential key
- (iii) Marking —
- (a) Systematic analysis – 8
  - (b) Confirmatory test – 2

Note: No mark for wrong Confirmatory test but partial marking should be given for partial correct analysis. No mark for identification without any test.

2. Examiners are requested to note that— 3
- Laboratory notebook should be signed properly. Marks are to be given on the basis of syllabus covered.
3. Questions are to be asked from Practical(s) performed, Instruments/glass goods used as well as from theoretical portion of the syllabus. 2

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**B.Sc. 2nd Semester (Honours) Practical Examination, 2019**

**PHYSIOLOGY**

**Paper : SH/PHY/203/GE-P-2**

**(Developmental Biology and Embryology Lab)**

**Course ID : 22524**

*Instruction to the Examiners*

1. (a) Paraffinised tissue section is to be given by lottery from common items available within the syllabus.
  - (b) (i) Staining with haematoxylin = 3  
(ii) Staining with eosin = 2  
(iii) Cleanness = 1  
(iv) Mounting = 1  
(v) Identification with two characteristic features. = 1+(1+1)=3
  2. Marks should be awarded in the notebook on the basis of coverage of syllabus and regular signature by class teacher(s). 3
  3. Questions are to be asked from both practical and theoretical portions including the instruments used within practical syllabus. 2
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**B.Sc. 2nd Semester (Programme) Practical Examination, 2019**

**PHYSIOLOGY**

**Paper : SP/PHY/201/C-1B(P)**

**(Developmental Aspects of Embryo and Foetus Lab)**

**Course ID : 22528**

*Instruction to the Examiners*

1. Paraffinised tissue section containing slides (as per syllabus) are to be supplied to the examinees for staining.
  - The paraffinised slides is to be supplied through lottery.
  - Roll No. of each candidate is to be mentioned on the slide received through lottery.

Marking:

(i) Haematoxylin staining	– 2
(ii) Eosin staining	– 2
(iii) Mounting	– 1
(iv) Neatness	– 1
(v) Two identifying characters	– 1+1
(vi) Proper identification	– 2

[Mark will be deducted if character, spelling and identification are wrong.]

2. Laboratory Notebook

[Marks will be given on the basis of syllabus covered alongwith regular signature by the respective teacher(s).] 3

3. Viva voce:

[Questions are to be asked on Practicals components of the total syllabus, Instruments used as well as on the work done on the day of examination mainly.] 2

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SH-IV/PHY-401/C-8/19

**B.Sc. 4th Semester (Honours) Examination, 2019****PHYSIOLOGY****(Energy Balance, Metabolism and Nutrition)****Paper : SH/PHY/401/C-8(T)****Course ID : 42511****Time: 1 Hour 15 Minutes****Full Marks: 25***The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.*

1. Answer *any five* questions: 1×5=5
- (a) Define deamination.
  - (b) Name any two inhibitors of TCA cycle.
  - (c) What is neoglucogenesis?
  - (d) What is Carnitine shuttle?
  - (e) Name the parent structure of all sterols.
  - (f) Mention any two significances of HMP shunt pathway.
  - (g) What do you mean by omega oxidation?
  - (h) What is SDA? Write the SDA value of protein.
2. Answer *any two* questions: 5×2=10
- (a) What are ketone bodies? Discuss the biosynthesis of ketone bodies. 1+4=5
  - (b) Name the key enzymes of TCA cycle and explain the role of any one of them. 2+3=5
  - (c) 'Gluconeogenesis is not fully reversible process of glycolysis' – Justify the statement. 5
  - (d) Write a brief note on Ornithine cycle. 5
3. Answer *any one* question: 10×1=10
- (a) (i) How biochemical oxidation of palmitic acid takes place in our body? Calculate the energetics of this pathway.
  - (ii) Define 'Redox' potential. (6+2)+2=10
  - (b) Write the sources of water soluble antioxidant vitamin. Briefly describe the physiological role and deficiency symptoms of that vitamin. 2+(6+2)=10



SH-IV/PHY-402/C-9/19

**B.Sc. 4th Semester (Honours) Examination, 2019****PHYSIOLOGY****(Gastrointestinal Function)****Paper : SH/PHY/402/C-9 (T)****Course ID : 42512****Time: 1 Hour 15 Minutes****Full Marks: 25***The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.*

1. Answer *any five* questions of the following: 1×5=5
- (a) What is crypts of Lieberkuhn?
  - (b) Differentiate between fat and oil.
  - (c) Write the name of calcium complex deposited in bone and teeth.
  - (d) What is steatorrhoea?
  - (e) What is ORS?
  - (f) Name any two H<sub>2</sub>-receptor blocker drug.
  - (g) What is Zollinger-Ellison syndrome?
  - (h) What is peptic ulcer?
2. Answer *any two* questions of the following: 5×2=10
- (a) Discuss the role of pancreatic juice on protein digestion. What is 'Pavlov's Pouch'? 4+1=5
  - (b) What is myenteric reflex? Mention the characteristic features and functions of rhythmic segmental movement of intestine. 1+(2+2)=5
  - (c) What do you mean by liver function test? Discuss the importance of enzymatic liver function test. 2+3=5
  - (d) Discuss in brief the role of salivary enzymes on carbohydrate digestion. Name the major hormones secreted from GI tract. 3+2=5
3. Answer *any one* question of the following: 10×1=10
- (a) What is enterohepatic circulation of bile? Describe in brief the modern concept of fat absorption in our body. What are the major differences between liver bile and gall bladder bile? 3+5+2=10
  - (b) Describe the mechanism of gastric HCl secretion. What do you mean by hyperchlorhydria? 8+2=10

SH-IV/PHY-403/C-10/19

**B.Sc. 4th Semester (Honours) Examination, 2019****PHYSIOLOGY****(Respiration)****Paper : SH/PHY/403/C-10 (T)****Course ID : 42513****Time: 1 Hour 15 Minutes****Full Marks: 25***The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.*

1. Answer *any five* questions: 1×5=5
- (a) Mention the role of pleura on breathing.
  - (b) Write any two secondary functions of respiratory system.
  - (c) State the location and function of dust cells.
  - (d) What is FVC?
  - (e) Define compliance.
  - (f) What is Caisson's disease?
  - (g) What do you mean by 'Haldane effect'?
  - (h) State the role of surfactant on lungs.
2. Answer *any two* questions of the following: 5×2=10
- (a) Name the muscles involved in inspiration and mention their role. 3+2=5
  - (b) Mention the peculiarities of pulmonary circulation. 5
  - (c) Define chloride shift. Write the importance of chloride shift. 1+4=5
  - (d) What is venous admixture? What do you mean by artificial respiration? State its significance. 2+1+2=5
3. Answer *any one* question of the following: 10×1=10
- (a) (i) Describe the mechanism of Oxygen transport from the alveoli to the tissues of our body.
  - (ii) Discuss the different phases of Oxygen dissociation curve and write the factors regulating it. 5+(2+3)=10
  - (b) Describe the neural control of breathing with proper diagram. What is asphyxia? 8+2=10

**SH-IV/PHY-404/GE-4/19****B.Sc. 4th Semester (Honours) Examination, 2019****PHYSIOLOGY****(Biotechnology)****Paper : 404 GE-4****Course ID : 42514****Time: 1 Hour 15 Minutes****Full Marks: 25***The figures in the margin indicate full marks.**Candidates are required to give their answer in their own words as far as practicable.*

দক্ষিণ প্রান্তস্থ সংখ্যাগুলি প্রশ্নের পূর্ণমানের নির্দেশক।  
পরীক্ষার্থীদের যথাসম্ভব নিজের ভাষায় উত্তর দিতে হবে।

**1. Answer any five questions from the following:****1×5=5**

যে কোনো পাঁচটি প্রশ্নের উত্তর দাও :

(a) What is VNTR?

VNTR কী?

(b) Name any two transgenic animals.

দুটি ট্রান্সজেনিক প্রাণীর নাম দাও।

(c) What is Shuttle Vector?

স্যাটল্ ভেক্টর কী?

(d) Name of the most important enzyme used in c-DNA Library production.

c-DNA লাইব্রেরি উৎপাদনে ব্যবহৃত সবচেয়ে গুরুত্বপূর্ণ উৎসেচকের নাম লেখো।

(e) What is Southern Blot?

সাদার্ন ব্লট কী?

(f) Give one example of cosmid.

কসমিডের একটি উদাহরণ দাও।

(g) Write the name of any two types of non-classical gene therapy.

নন-ক্লাসিক্যাল জিন থেরাপির যে কোনো দুটি প্রকার-এর নাম লেখো।

(h) Which class do the restriction enzymes belong? Mention their kinds.

রেস্ট্রিকশন উৎসেচক কোন শ্রেণির অন্তর্গত? তাদের প্রকারগুলি উল্লেখ করো।

2. Answer *any two* questions from the following: 5×2=10

যে কোনো দুটি প্রশ্নের উত্তর দাও :

- (a) Write the application of DNA fingerprinting. 5  
DNA ফিংগারপ্রিন্টিং-এর ব্যবহার লেখো।
- (b) What diseases can be treated with monoclonal antibodies? Discuss the applications of monoclonal antibodies. 2+3=5  
মনোক্লোনাল অ্যান্টিবডি কোন কোন রোগের চিকিৎসায় ব্যবহৃত হয়? মনোক্লোনাল অ্যান্টিবডির প্রয়োগ আলোচনা করো।
- (c) Why CO<sub>2</sub> incubator is required for cell culture? How does gene therapy work? 2+3=5  
কোশ সৃষ্টি করার জন্য কেন CO<sub>2</sub> incubator-এর প্রয়োজন হয়? জিন থেরাপি কীভাবে কাজ করে?
- (d) Discuss the procedure for generating transgenic animals. Write the applications of transgenic organisms. 4+1=5  
ট্রান্সজেনিক প্রাণী সৃষ্টির পদ্ধতি আলোচনা করো। ট্রান্সজেনিক জীবের প্রয়োগ লেখো।

3. Answer *any one* of the following questions: 10×1=10

নীচের যে কোনো একটি প্রশ্নের উত্তর দাও :

- (a) Write a short note on RT-PCR. What happens at each stage of PCR? Why does a primer is require in PCR reaction? 4+3+3=10  
RT-PCR সম্পর্কে একটি সংক্ষিপ্ত টীকা লেখো। PCR-এর প্রত্যেকটি ধাপে কী ঘটে তা লেখো। PCR-এর বিক্রিয়ায় কেন প্রাইমার প্রয়োজন?
- (b) Briefly describe the method of enzyme immobilization. Write any two advantages of enzyme immobilization. 8+2=10  
Enzyme immobilization পদ্ধতি সংক্ষেপে আলোচনা করো। Enzyme immobilization-এর যে কোনো দুটি সুবিধা উল্লেখ করো।

**B.Sc. 4th Semester (Honours) Examination, 2019****PHYSIOLOGY****(Clinical Biochemistry)****Paper : 405 SEC-2A****Course ID : 42515****Time: 2 Hours****Full Marks: 40***The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.*

1. Answer *any five* questions from the followings: 2×5=10
- Write any two physiological role of albumin and globulin in our body.
  - Write the 'Beer's Law and Lambert Law'.
  - State any two physiological condition when blood inorganic phosphate become decrease.
  - Differentiate between serum protein and plasma protein.
  - What do you mean by one unit of activated amylase?
  - What is the molecular weight of albumin? How can you transform 'Standard Stock Phosphate' to 'Dilute Standard Solution'?
  - What is the role of Phosphate buffer in measurement of serum amylase by iodometric method?
  - What do you mean by hyperglycemia?
2. Answer *any four* questions from the following: 5×4=20
- Write down the working principle and application of Photo-Colorimeter. 2+3=5
  - Briefly discuss about principle of Fiske-Subbarow method in measurement of inorganic phosphate. How can you prepare protein-free filtrate? What is the normal range of blood inorganic phosphate? 2+2+1=5
  - Describe the principle of measurement of serum protein by Biuret method. Mention the chemical reagents used in measurement of protein in Biuret method. What is the normal range of serum amylase in our blood? 2+2+1=5
  - Discuss about the procedure of deproteinization method of blood glucose by Nelson-Somogyi method. Write down it's principle. 3+2=5
  - Write down the principle of serum amylase by Iodometric method. Which chemical reagents are used in measurement of blood inorganic phosphate by Fisk-Subbarow method? 3+2=5

- (f) Discuss briefly about procedure of measurement of serum total protein by Biuret method.  
Give any one example of non-reducing sugar. 4+1=5

**3.** Answer *any one* question from the following: 10×1=10

- (a) Write down the procedure of measurement of blood inorganic phosphate by Fiske-Subbarow method. What is the role of molybdate solution in measurement of blood inorganic phosphate? 8+2=10

- (b) Describe the procedure of measurement of blood glucose by 'Nelson-Somogyi method'. 10

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SH-IV/PHY-405/SEC-2B/19

**B.Sc. 4th Semester (Honours) Examination, 2019****PHYSIOLOGY****(Pathological Microbiology and Bio-Medical Technology)****Paper : 405 SEC-2B****Course ID : 42515****Time: 2 Hours****Full Marks: 40***The figures in the margin indicate full marks.**Candidates are required to give their answer in their own words as far as practicable.*

দক্ষিণ প্রান্তস্থ সংখ্যাগুলি প্রশ্নের পূর্ণমানের নির্দেশক।  
পরীক্ষার্থীদের যথাসম্ভব নিজের ভাষায় উত্তর দিতে হবে।

**1. Answer any five questions from the following: 2×5=10**

যে কোনো পাঁচটি প্রশ্নের উত্তর দাও :

- (a) What do you mean by 'Gram positive' and 'Gram negative' bacteria? Give example one in each case.  
গ্রাম-পজিটিভ ও গ্রাম-নেগেটিভ ব্যাকটেরিয়া বলতে কী বোঝো? প্রতিটি ক্ষেত্রে একটি করে উদাহরণ দাও।
- (b) What is Beer-Lambart law?  
Beer-Lambart সূত্র কী?
- (c) Write any two symptoms of tuberculosis.  
টিউবারকিউলোসিস-এর যে কোনো দুটি লক্ষণ লেখো।
- (d) What is bactericidal agent?  
ব্যাকটেরিওসাইডাল এজেন্ট কী?
- (e) What is unipolar limb lead?  
একমেরু তড়িৎদ্বার কী?
- (f) What are the positive waves found in E.C.G.?  
E.C.G.-তে ধনাত্মক তরঙ্গগুলি কী কী?
- (g) What is 'Mean Electrical Axis' of heart?  
হৃৎপিণ্ডে গড় তড়িৎ অক্ষ কী?
- (h) What are the types of samples used for centrifugation?  
কী ধরনের নমুনাসমূহ সেন্ট্রিফিউগেশন-এর জন্য ব্যবহার করা হয়?

2. Answer any four questions from the following:

5×4=20

যে কোনো চারটি প্রশ্নের উত্তর দাও :

(a) Write the location of setting of chest leads.

5

বক্ষ লিডগুলির স্থাপনের স্থান লেখো।

(b) Discuss about Einthoven triangle.

5

আইনোথেভেন ত্রিভুজ সম্পর্কে আলোচনা করো।

(c) Describe the application of spectrophotometer.

5

স্পেকট্রোফটোমিটারের প্রয়োগ আলোচনা করো।

(d) Describe the 'Gram Staining Procedure'.

5

গ্রাম-রঞ্জক পদ্ধতির বর্ণনা দাও।

(e) What is Centrifugation? Mention the working principle of centrifugation.

1+4=5

সেন্ট্রিফিউগেশন কী? সেন্ট্রিফিউগেশনের কার্যকারী মূলনীতি উল্লেখ করো।

(f) What kind of precaution to be taken handle the samples infected with Mycobacteria tuberculosis?

5

মাইকোব্যাকটেরিয়া টিউবারকিউলোসিস সম্পন্ন নমুনা নাড়াচাড়া করার পূর্বে কী ধরনের সাবধানতা অবলম্বন করা দরকার?

3. Answer any one question from the following:

10×1=10

নীচের যে কোনো একটি প্রশ্নের উত্তর দাও :

(a) Describe with significance the different normal waves found in E.C.G.

6+4=10

স্বাভাবিক E.C.G.-তে বিভিন্ন তরঙ্গগুলির গুরুত্বসহ আলোচনা করো।

(b) Write briefly the structure of cell wall of gram positive bacteria. Why is safranin used in gram stain?

6+4=10

গ্রাম পজিটিভ ব্যাকটেরিয়ার কোশ প্রাচীরের গঠন সংক্ষেপে লেখো। গ্রাম রঞ্জকে স্যাফ্রানিন ব্যবহার করা হয় কেন?



SP-IV/PHY-401/C-1D/19

**B.Sc. 4th Semester (Programme) Examination, 2019****PHYSIOLOGY****(Bio-engineering)****Paper : 401/C-1D****Course ID : 42518****Time: 1 Hour 15 Minutes****Full Marks: 25***The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.*

দক্ষিণ প্রান্তস্থ সংখ্যাগুলি প্রশ্নের পূর্ণমানের নির্দেশক।  
পরীক্ষার্থীদের যথাসম্ভব নিজের ভাষায় উত্তর দিতে হবে।

**1. Answer any five questions from the following:****1×5=5**

যে কোনো পাঁচটি প্রশ্নের উত্তর দাও :

(a) Define totipotency?

টোটিপোটেন্সির সংজ্ঞা দাও।

(b) Write the full name of VNTR.

VNTR-এর পুরো নাম লেখো।

(c) What is Shuttle Vector?

শাটল ভেক্টর কী?

(d) Name any two examples of transgenic animal.

যে কোনো দুটি ট্রান্সজেনিক প্রাণীর উদাহরণ দাও।

(e) What is palindrome?

প্যালিনড্রোম কী?

(f) Write the name of one bacteria in gene transfer.

জিন স্থানান্তরণে ব্যবহৃত হয় এমন একটি ব্যাকটেরিয়ার নাম লেখো।

(g) What is restriction endonuclease?

রেসট্রিকশান এন্ডোনিউক্লিয়েজ কী?

(h) What is Codon?

কোডন কী?

2. Answer any two questions from the following: 5×2=10

যে কোনো দুটি প্রশ্নের উত্তর দাও :

- (a) Discuss the applications of DNA finger printing in genetic engineering. 5  
 জেনেটিক ইঞ্জিনিয়ারিং-এর ক্ষেত্রে DNA ফিংগার প্রিন্টিং-এর প্রয়োগ আলোচনা করো।
- (b) Discuss the process of production of transgenic organism. 5  
 ট্রান্সজেনিক জীব সৃষ্টির পদ্ধতি আলোচনা করো।
- (c) Write the advantages and disadvantages of enzyme immobilization. Write any two applications of enzyme immobilization. 4+1=5  
 Enzyme immobilization-এর সুবিধা ও অসুবিধাগুলি লেখো। Enzyme immobilization-এর দুটি প্রয়োগ উল্লেখ করো।
- (d) How does gene therapy help in treatment of disease? Write the types of non-classical gene therapy. 3+2=5  
 জিন থেরাপির সাহায্যে কীভাবে রোগ নিরাময় করা হয়? নন-ক্লাসিক্যাল জিন থেরাপির প্রকারভেদ লেখো।

3. Answer any one from the following questions: 10×1=10

যে কোনো একটি প্রশ্নের উত্তর দাও :

- (a) How does monoclonal antibody produce in hybridoma technology? What is monoclonal antibody? 8+2=10  
 হাইব্রিডোমা প্রযুক্তির সাহায্যে কীভাবে মনোক্লোনাল অ্যান্টিবডি প্রস্তুত হয়? মনোক্লোনাল অ্যান্টিবডি কাকে বলে?
- (b) Describe the steps of polymerase chain reaction. Discuss the limitations and advantages of polymerase chain reaction. What is Taq polymerase? 3+3+2+2=10  
 পলিমারেজ চেইন বিক্রিয়ার ধাপগুলি বর্ণনা করো। পলিমারেজ চেইন বিক্রিয়ার সীমাবদ্ধতা ও সুবিধা আলোচনা করো। Taq পলিমারেজ কী?

SH-IV/PHY-401/C-8(PR)/19

**B.Sc. 4th Semester (Honours) Practical Examination, 2019**

**PHYSIOLOGY**

**(Energy Balance, Metabolism and Nutrition Lab)**

**Paper : SH/PHY/401/C-8(P)**

**Course ID : 42521**

**Time: 2 Hours**

**Full Marks :15**

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words  
as far as practicable.*

1. Estimate the percentage quantity (in milligram) of glucose present in the sample received by you with the help of Benedict's titration method.  
Write the procedure that you have followed and then tabulate your result with a signature of examiner. Calculate the percentage of glucose present in your sample. 10
2. Laboratory Notebook 3
3. Viva voce 2

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**B.Sc. 4th Semester (Honours) Practical Examination, 2019**

**PHYSIOLOGY**

**(Energy Balance, Metabolism and Nutrition Lab)**

**Paper : SH/PHY/401/C-8 (P)**

**Course ID : 42521**

*Instructions to the Examiners.*

1. Two sets of sample are to be prepared for each day.
  - Marking :

Procedure —	2
Burette readings (in tabular form) —	2
Calculation —	1
Error up to 2% —	5
Error above 2% up to 5% —	3
Error above 5% up to 10% —	2
Error above 10% —	1
  - Examiner(s) should test the reference value parallel.
2. Laboratory Notebook 3
  - Mark is to be awarded on the basis of syllabus covered and regular signature by the concerned teacher.
3. Viva voce 2
  - Questions are to be asked mostly from practical component of the syllabus including instrument and glass goods used in practical classes.

*General Instructions*

1. All part markings are to be noted in the answer script in respective question.
  2. Answer scripts with award list, sample key and relevant papers should be submitted to H.E. with signature of all examiners.
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SH-IV/PHY-402/C-9(PR)/19

**B.Sc. 4th Semester (Honours) Practical Examination, 2019**

**PHYSIOLOGY**

**(Gastrointestinal Function Lab)**

**Paper : SH/PHY/402/C-9 (P)**

**Course ID : 42522**

**Time: 2 Hours**

**Full Marks :15**

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words  
as far as practicable.*

Answer *all* the questions.

1. Kymographically record the effect of single dilution of adrenaline (i.e. 1 : 100) on the normal movement of Rat's isolated small intestine in Dale's bath apparatus and give your comments on record. 10
2. Submit Practical Notebook 3
3. Viva voce 2

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**B.Sc. 4th Semester (Honours) Practical Examination, 2019**

**PHYSIOLOGY**

**(Gastrointestinal Function Lab)**

**Paper : SH/PHY/402/C-9**

**Course ID : 42522**

*Instructions to the Examiners.*

- |    |  |   |
|----|--|---|
| 1. | (a) Preparation (Setting of intestinal part in Dale's bath)  | 1 |
|    | (b) Smoking and normal tracing   | 2 |
|    | (c) Effect of one dilution (i.e. 1 : 100)  | 3 |
|    | (d) Labelling  | 1 |
|    | (e) Varnishing and neatness  | 1 |
|    | (f) Comment on record  | 2 |
| 2. | (a) Laboratory Notebook should be regularly signed otherwise marks should be deducted.                                       |   |
|    | (b) Laboratory notebook should contain all the practicals that mentioned in the syllabus otherwise marks should be deducted. | 3 |
| 3. | Questions to be asked mostly from practical components of the syllabus including instruments used in the practical classes.  | 2 |
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**B.Sc. 4th Semester (Honours) Practical Examination, 2019**

**PHYSIOLOGY**

**[Respiration (Lab.)]**

**Paper : SH/PHY/403/C-10 (P)**

**Course ID : 42523**

**Time: 2 Hours**

**Full Marks :15**

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words  
as far as practicable.*

Answer *all* the questions.

- |    |  |       |
|----|--|-------|
| 1. | (a) Measure O <sub>2</sub> saturation and pulse rate of your subject at rest.  | 2     |
|    | (b) Perform 3 minutes step test and then measure peak O <sub>2</sub> saturation and pulse rate.                                    | 2     |
|    | (c) Record the recovery O <sub>2</sub> saturation and pulse rate in 1st minute, 2nd minute and 3rd minute of post exercise period. | 3     |
|    | (d) Tabulate your data and interpret your results.   | 1+2=3 |
| 2. | Laboratory Notebook  | 3     |
| 3. | Viva voce  | 2     |
-

**B.Sc. 4th Semester (Honours) Practical Examination, 2019**

**PHYSIOLOGY**

**[Respiration (Lab.)]**

**Paper : SH/PHY/403/C-10(P)**

**Course ID : 42523**

*Instructions to the Examiners.*

1. (a) Measurement of O<sub>2</sub> saturation and pulse rate at rest. 1+1=2
    - (Examiner should check the observations with signature.)
  - (b) Measurement of peak O<sub>2</sub> saturation and pulse rate. 1+1=2
    - (Measurement should be taken within 10 second after completion of exercise.)
  - (c) Recording of recovery O<sub>2</sub> saturation and pulse rate at 1st minute, 2nd minute and 3rd minute in post exercise period. 1+1+1=3
  - (d) Tabulation of data and interpretation of results. 1+2=3
  
  2. Lab. Notebook 3

Credit should be given on the basis of —

    - (a) Notebook having regular signature by teacher(s).
    - (b) Neat preparation of the notebook.
    - (c) Syllabus covered.
  
  3. Viva voce 2
    - (a) Questions will be on the basis of the practicals performed in the classes, including instruments used for practical purposes.
    - (b) Theoretical basis and related questions on practical done in the day of examination should be asked.
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*SH-IV/PHY-404/GE-4(PR)/19*

**B.Sc. 4th Semester (Honours) Practical Examination, 2019**

**PHYSIOLOGY**

**(Biotechnology)**

**Paper : 404 GE-4**

**Course ID : 42524**

**Time: 2 Hours**

**Full Marks: 15**

*The figures in the margin indicate full marks.*

*Candidates are required to give their answer in their own words  
as far as practicable.*

*Answer all the questions.*

1. Calculate the Base Pair (bp) of DNA from the supplied record. 5  
(Calculation - 3, Result - 1, Interpretation - 1)  
প্রদত্ত নমুনা চিত্র থেকে (ডি.এন.এ.)-এর Base Pair গণনা করো।  
(গণনা - 3, ফলাফল - 1, মন্তব্য - 1)
  2. Calculate the molecular weight of protein from the supplied chromatographic record. 5  
(Calculation - 3, Result - 1, Interpretation - 1)  
প্রদত্ত কোমাটোগ্রাফিক রেকর্ড থেকে প্রোটিনের আণবিক ওজন গণনা করো।  
(গণনা - 3, ফলাফল - 1, মন্তব্য - 1)
  3. Laboratory Notebook 3  
পরীক্ষাগারে ব্যবহারিক খাতা
  4. Viva voce 2  
মৌখিক প্রশ্নোত্তর
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**B.Sc. 4th Semester (Honours) Practical Examination, 2019**

**PHYSIOLOGY**

**(Biotechnology)**

**Paper : 404 GE-4**

**Course ID : 42524**

*Instructions to the Examiners.*

1. (a) Record would be distributed among students through lottery.  
(b) Examiners will calculate the Base Pair of DNA from the supplied graph.  
(c) Result would be expressed with unit. Without unit 1/2 mark will be deducted. Wrong calculation will be credited no marks.  
Calculation – 3, Result – 1, Interpretation – 1. 5
  2. (a) Record would be distributed among students through lottery.  
(b) Examiners will calculate the molecular weight of protein from the supplied record.  
(c) Results would be expressed with unit. Without unit 1/2 mark will be deducted. Wrong calculation will be credited no marks.  
Calculation – 3, Result – 1, Interpretation – 1. 5
  3. Marks would be awarded in the notebook on the basic of coverage of syllabus and regular signature by class teacher(s). 3
  4. Questions are to be asked from both practical and theoretical portions including the instruments used within practical syllabus. 2
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*SP-IV/PHY/401/C-ID/(PR)/19*

**B.Sc. 4th Semester (Programme) Practical Examination, 2019**

**PHYSIOLOGY**

**(Bio-Engineering Lab.)**

**Paper : 401/C-1D**

**Course ID : 42528**

**Time: 2 Hours**

**Full Marks: 15**

*The figures in the margin indicate full marks.*

*Candidates would not be allowed to consult the books/notes  
while writing the report in answer scripts.*

*দক্ষিণ প্রান্তস্থিত সংখ্যাগুলি পূর্ণমানের নির্দেশক।*

*উত্তরপত্র লেখার সময় বই বা নোট দেখতে দেওয়া হবে না।*

1. Identify the unknown DNA base pair from analysis of supplied southern blot record. 5  
সরবরাহকৃত সউদার্ন ব্লট রেকর্ড থেকে অজ্ঞাত DNA base pair সনাক্ত করো।
  2. Calculate the molecular weight of protein from the supplied chromatographic record and interpret the results. 5  
প্রদত্ত ক্রোমাটোগ্রাফিক রেকর্ড থেকে প্রোটিনের আনবিক ওজন নির্ণয় করো এবং তার ফলাফল আলোচনা করো।
  3. Laboratory Notebook. 3  
ল্যাবরেটরি খাতা
  4. Viva voce. 2  
মৌখিক
-

*SP-IV/PHY/401/C-1D/(PRI)/19***B.Sc. 4th Semester (Programme) Practical Examination, 2019****PHYSIOLOGY****(Bio-Engineering Lab.)****Paper : 401/C-1D****Course ID : 42528****INSTRUCTIONS TO THE EXAMINERS**

- |    |   |   |
|----|---|---|
| 1. | (a) Procedure in brief.   | 2 |
|    | (b) Proper identification.<br>(Examiner should check the identification with signature) | 1 |
|    | (c) Interpretation.   | 2 |
| 2. | (a) Principle of chromatography.  | 1 |
|    | (b) Calculation<br>(No marks should be given for wrong calculation)                     | 2 |
|    | (c) Interpretation.   | 2 |
| 3. | Laboratory notebook.  | 3 |
|    | Marks should be given, depending upon—  |   |
|    | (i) Regular signature      —    1   |   |
|    | (ii) Neatness                —    1   |   |
| 4. | Viva voce   | 2 |
|    | (a) Questions will cover the overall practical syllabus.                                |   |
|    | (b) Theoretical basis of the practical, done on the day of examination.                 |   |

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*SP-IV/PHY/404/SEC-P2/(PR)/19*

**B.Sc. 4th Semester (Programme) Practical Examination, 2019**

**PHYSIOLOGY**

**(Methods in Hematology Lab.)**

**Paper : 404/SEC-P2**

**Course ID : 42520**

**Time: 4 Hours**

**Full Marks: 40**

*The figures in the margin indicate full marks.*

*Candidates would not be allowed to consult the books/notes  
while writing the report in answer scripts.*

1. Draw a film of your own blood. Stain it suitably with Leishman's stain. Focus a three lobed neutrophil at the middle of the field under high power objective of a compound microscope. Draw the field exactly which you have focussed and label properly. 15  
[Marks distribution: Blood film preparation = 3, Proper staining = 4, Correct identification = 5, Labelled diagram of focussed field = 3]
  2. Determine the haemoglobin level from supplied blood by Sahlis method. Interpret your results. 15  
[Marks distribution: Principle = 3, Procedure = 3, Result = 7, Interpretation : 2.]
  3. Laboratory Notebook. 5
  4. Viva voce. 5
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*SP-IV/PHY/404/SEC-P2(P1)/(PRI)/19***B.Sc. 4th Semester (Programme) Practical Examination, 2019****PHYSIOLOGY****(Methods in Hematology Lab.)****Paper : 404/SEC-P2 (P1)****Course ID : 42520****INSTRUCTIONS TO THE EXAMINERS:****(Please follow the instructions strictly)**

1. One slide should be marked by the examiner per student.

Blood film preparation	= 3
Staining	= 4
Focussing of three lobed Neutrophil	= 5
Diagramme	= 2
Labelling	= 1

[Marks is to be deducted for improper/incorrect performance in any step mentioned above.]

2. Principle = 3  
 Procedure = 3  
 Result :  
 (a) Error upto 10% = 7  
 (b) Error above 10 to 15% = 4  
 (c) Error above 15% = 2

Three samples should be given in each day of Examination

Interpretation = 2

3. Laboratory notebook having regular signature and syllabus covered. 5
4. Questions to be asked practicals performed, instruments used and theoretical knowledge within the syllabus. 5