

Paper Code: 6102

Programme	Exam Code	Course Code
Bachelor of Arts	103206	BARL-6031 ✓
Bachelor of Science (Non-Medical)	103306	BSNL-6031 ✓
Bachelor of Science (Medical)		BSML-6031 ✓
Bachelor of Science (Economics)		BECL-6031
Bachelor of Science (Computer Science)		BCSL-6031 ✓
Bachelor of Commerce	108506	BCRL-6031
Bachelor of Business Administration	105406	BBRL-6031

Semester-VI
Course Title: Basic Punjabi
(30)

Time Allowed: 3 Hours

Max Marks: 40

ਨੋਟ: ਹਰ ਭਾਗ ਵਿੱਚੋਂ ਇੱਕ ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਜ਼ਰੂਰੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਭਾਗ ਵਿੱਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ। ਹਰ ਇੱਕ ਪ੍ਰਸ਼ਨ ਦੇ 8 ਨੰਬਰ ਹਨ।

ਯੂਨਿਟ -I

1. ਪੰਜਾਬ ਸਭਿਆਚਾਰ ਦੀ ਭੂਗੋਲਿਕ ਸਥਿਤੀ ਸਪਸ਼ਟ ਕਰੋ।

2. ਪੰਜਾਬ ਸਭਿਆਚਾਰ ਦੇ ਪ੍ਰਮੁੱਖ ਲੱਛਣਾਂ ਬਾਰੇ ਜਾਣਕਾਰੀ ਪ੍ਰਦਾਨ ਕਰੋ।

ਯੂਨਿਟ -II

3. ਪੰਜਾਬ ਦੇ ਪ੍ਰਮੁੱਖ ਮੇਲਿਆਂ ਬਾਰੇ ਵਿਸਥਾਰ ਸਹਿਤ ਨੋਟ ਲਿਖੋ।
4. ਪੰਜਾਬ ਦੇ ਧਾਰਮਿਕ ਸਥਾਨਾਂ ਦੀ ਮਹੱਤਤਾ ਬਾਰੇ ਨੋਟ ਲਿਖੋ।

ਯੂਨਿਟ -III

5. ਜਨਮ ਨਾਲ ਸੰਬੰਧਤ ਪ੍ਰਮੁੱਖ ਰਸਮਾਂ ਕਿਹੜੀਆਂ-ਕਿਹੜੀਆਂ ਹਨ?
ਜਾਣਕਾਰੀ ਪ੍ਰਦਾਨ ਕਰੋ।
6. ਮੌਤ ਸਮੇਂ ਨਿਭਾਈਆਂ ਜਾਣ ਵਾਲੀਆਂ ਰਸਮਾਂ ਬਾਰੇ ਚਰਚਾ ਕਰੋ।

ਯੂਨਿਟ -IV

7. ਪੰਜਾਬੀ ਲੋਕ ਪਹਿਰਾਵੇ ਸੰਬੰਧੀ ਆਪਣੇ ਵਿਚਾਰ ਸਪਸ਼ਟ ਕਰੋ।
8. ਲੋਕ ਵਿਸ਼ਵਾਸ ਤੋਂ ਕੀ ਭਾਵ ਹੈ? ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਵਿੱਚ ਪ੍ਰਚਲਿਤ ਲੋਕ-ਵਿਸ਼ਵਾਸਾਂ ਬਾਰੇ ਚਰਚਾ ਕਰੋ।

Lib 14/6/25 K.M.V-II (MOR)

Paper Code: 6104

Programme	Exam Code	Course Code
Bachelor of Arts	103206	BARL-6212 ✓
Bachelor of Science (Non-Medical)	103306	BSNL-6212 ✓
Bachelor of Science (Medical)		BSML-6212 ✓
Bachelor of Science (Economics)		BECL-6212 ✓
Bachelor of Science (Computer Science)		BCSL-6212 ✓
Bachelor of Commerce	108506	BCRE-6212 ✓
Bachelor of Business Administration	105406	BBRL-6212 ✓

Semster- VI

Course Title: English (Compulsory)

(200)

Time Allowed: 3 Hours

Max Marks: 40

Section-A

I. Answer any five questions, each carrying 2 marks (50 words each)

- i. Describe the rest house in Mano Majra and its importance and use.

- ii. Describe the coming of a ghost train from Pakistan in daytime and people's reaction to it.
- iii. Show your acquaintance with Malli.
- iv. Why is Emily crying and feeling agitated at the Beginning of the play 'The will'?
- v. What are Gaston's apprehensions about the villa Jeanne wants him to buy?
- vi. Why does Mrs. Meldon kill Prof. Corrie?

(5x2=10)

Section -B

II. Attempt any two questions, each carrying 5 marks (250 words each)

- i. Give a character sketch of Juggut Singh.
- ii. What is the symbolic significance of the four part division of Train to Pakistan into Dacoity, Kalyug, Mano Majra and Karma?
- iii. Discuss the theme of the novel Train to Pakistan.
- iv. Give a Character sketch of Hukan Chand.

(2x5=10)

Section -C

**III. Attempt any two questions, each Carrying 5 marks
(250 words each).**

- i. How does the play 'The Will' dramatise the theme of withering human relationships? Discuss.
- ii. Discuss 'Villa for Sale' as a hilarious comedy.
- iii. Briefly explain and comment upon the anti-war theme of the play 'Progress'.
- iv. Fate rules over the people. 'Explain the theme of the play 'The Monkey's Paw' in the light of this statement. (2x5=10)

Section-D

IV. Write an essay on any of the given topics (word limit 300 words).

- i. Pleasures of Reading
- ii. Environmental Pollution (1x6=6)

- V. Write a press report for a newspaper about the seminar on 'Rising Prices' held in your college. (word limit 200 words)

Write a report on the accident that has taken place near Kartarpur-Jalandhar Highway. (1x4=4)

Paper Code: 6101

Programme	Exam Code	Course Code
Bachelor of Arts	103206	BARL-6421 ✓
Bachelor of Science (Non-Medical)	103306	BSNL-6421 ✓
Bachelor of Science (Medical)		BSML-6421 ✓
Bachelor of Science (Economics)		BECL-6421
Bachelor of Science* (Computer Science)		BCSL-6421 ✓
Bachelor of Commerce	108506	BCRL-6421
Bachelor of Business Administration	105406	BBRL-6421

Semester-VI

Course Title: Punjabi (Compulsory)
(160)

Time Allowed: 3 Hours**Max Marks: 40**

ਨੋਟ:- ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ ਸੈਕਸ਼ਨ ਹਨ। ਹਰ ਸੈਕਸ਼ਨ ਵਿੱਚੋਂ ਇੱਕ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹੈ ਅਤੇ ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨ ਵਿੱਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ। ਹਰ ਇੱਕ ਪ੍ਰਸ਼ਨ ਦੇ 8 ਨੰਬਰ ਹਨ।

ਸੈਕਸ਼ਨ -I

- ਹੇਠ ਲਿਖੇ ਕਾਵਿ-ਟੋਟੇ ਦੀ ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ ਕਰੋ।
ਨਾਥਾ! ਜਿਉਂਦਿਆਂ ਮਰਨ ਹੈ ਖਰਾ ਔਖਾ, ਸਾਥੋਂ ਇਹ ਨ ਵਾਇਦੇ ਹੋਵਣੇ ਨੀ।

ਅਸੀਂ ਜੱਟ ਨਾਹੜੀਆਂ ਕਰਨ ਵਾਲੇ, ਅਸਾਂ ਕਚਕੜੇ ਨਹੀਂ ਪਰੋਵਣੇ ਨੀ।

ਅਸੀਂ ਕੰਨ ਪੜਾਇ ਖੁਆਰ ਹੋਏ, ਸਾਥੋਂ ਨਹੀਂ ਹੋਂਦੇ ਐਡੇ ਰੋਵਣੇ ਨੀ।
ਸਾਥੋਂ ਖੱਪਰੀ ਨਾਦ ਨ ਜਾਣ ਸਾਂਭੇ, ਅਸਾਂ ਢੱਗੇ ਹੀ ਅੰਤ ਨੂੰ ਜੋੜਕੇ ਨੀ।

2. ਜਪੁ ਜੀ ਸਾਹਿਬ ਬਾਣੀ (ਸ਼੍ਰੀ ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਜੀ) ਦਾ ਸਾਰ ਲਿਖੋ।

ਸੈਕਸ਼ਨ -II

3. 'ਧਰਤੀਆਂ ਦੇ ਗੀਤ' ਇਕ ਸਫਲ ਸਫਰਨਾਮਾ ਹੈ, ਚਰਚਾ ਕਰੋ।
4. 'ਧਰਤੀਆਂ ਦੇ ਗੀਤ' ਵਿੱਚ ਪੇਸ਼ ਵੱਖ-ਵੱਖ ਧਰਤੀਆਂ ਦੇ ਸਭਿਆਚਾਰ ਪਰਿਪੇਖ ਨੂੰ ਸਪਸ਼ਟ ਕਰੋ।

ਸੈਕਸ਼ਨ -III

5. ਹੇਠ ਲਿਖਿਆਂ ਵਿੱਚੋਂ ਕਿਸੇ ਇੱਕ ਵਿਸ਼ੇ ਤੇ ਨੋਟ ਲਿਖੋ।
 ਓ) ਵਿਦਿਆਰਥੀ ਤੇ ਟੀ. ਵੀ ਚੈਨਲਾਂ ਦਾ ਪ੍ਰਭਾਵ
 ਅ) ਮਾਤ ਭਾਸ਼ਾ ਦਾ ਪੜ੍ਹਾਈ ਵਿੱਚ ਮਹੱਤਵ
 ਏ) ਵਿਦਿਆਰਥੀ ਅਤੇ ਅਨੁਸ਼ਾਸਨ
6. ਕਹਾਣੀ ਦੀ ਪਰਿਭਾਸ਼ਾ ਦੇ ਕੇ ਇਸ ਦੇ ਤੱਤਾਂ ਤੇ ਚਾਨਣਾ ਪਾਓ।

ਸੈਕਸ਼ਨ -IV

7. ਕਾਰਕ ਨੂੰ ਪਰਿਭਾਸ਼ਤ ਕਰਦਿਆਂ ਇਸ ਦੀਆਂ ਕਿਸਮਾਂ ਬਾਰੇ ਵਰਣਨ ਕਰੋ।
8. ਕਿਰਿਆਂ ਦੀ ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਇਸ ਦੀਆਂ ਕਿਸਮਾਂ ਬਾਰੇ ਜਾਣਕਾਰੀ ਦਿਉ।

Paper Code: 6103

Programme	Exam Code	Course Code
Bachelor of Arts	103206	BARL-6431 ✓
Bachelor of Science (Non-Medical)	103306	BSNL-6431 ✓
Bachelor of Science (Medical)		BSML-6431 ✓
Bachelor of Science (Economics)		BECL-6431
Bachelor of Science (Computer Science)		BCSL-6431 ✓
Bachelor of Commerce	108506	BCRL-6431
Bachelor of Business Administration	105406	BBRL-6431

Semester-VI

Course Title: *Punjab History and Culture* ;
(30)

Time Allowed: 3 Hours

Max Marks: 40

Note: Attempt five questions, selecting at least one question from each section in 600 word and the 5th question may be attempted from any of the four section. Each question carries 8 marks.

Section-A

1. Describe the factors and forces leading to the partition of Punjab in 1947.

2. Discuss the problems of the resettlement of displaced people from the West Pakistan after the partition of the country?

Section-B

3. Describe the circumstances leading to the Formation of the Punjabi Suba in 1966.
4. Discuss the important features of Green Revolution.

Section-C

5. How did the Indian Diaspora contributed to Canada's economy
6. What do you know about the development of higher education in Punjab?

Section-D

7. Discuss the causes for Drug Addiction in the Punjab.
8. Write a note on the development of Punjabi literature with special reference to Bhai Veer Singh and Shiv Kumar Batalvi.

Hindi Version

यूनिट-I

1. 1947 में पंजाब के विभाजन के कारणों और शक्तियों का वर्णन कीजिए।
2. देश के विभाजन के बाद पश्चिमी पाकिस्तान से विस्थापितों के पुनर्वास की समस्याओं पर चर्चा कीजिए।

यूनिट-II

3. उन परिस्थितियों का वर्णन कीजिए जिनके कारण 1966 में पंजाबी सूबा का गठन हुआ।
4. हरित क्रांति की महत्वपूर्ण विशेषताओं की चर्चा कीजिए।

यूनिट-III

5. भारतीय प्रवासियों ने कनाडा की अर्थव्यवस्था में किस प्रकार योगदान दिया।
6. पंजाब में उच्च शिक्षा के विकास के बारे में आप क्या जानते हैं?

यूनिट-IV

7. पंजाब में मादक पदार्थों की लत के कारणों की चर्चा कीजिए।
8. भाई वीर सिंह, शिव कुमार बटालवी के विशेष संदर्भ में पंजाबी साहित्य के विकास पर टिप्पणी लिखिए।

Exam Code: 103306
(30)

Paper Code: 6159

Programme: Bachelor of Science
Semester-VI

Course Title: Botany (Ecology)

Course Code: BSMM-6075 (I) ✓

Time Allowed: 3 Hours

Max Marks: 30

Candidates are required to attempt -five questions, selecting at least one question from each section. The fifth question may be attempted from any Section. Each question carry equal (6) marks.

Section 1

1. Discuss the following
 - (a) Properties of water cycle
 - (b) Atmosphere
2. Discuss the morphological, physiological, and anatomical adaptation of xerophytes?

Section 2

3. Discuss the quantitative characteristics of community?
4. Explain the following: -
 - (a) Whittaker's classification of biodiversity
 - (b) Life forms

Section 3

5. Describe the following -
 - (a) Ecotype & Ecads
 - (b) Food chain and food web
6. Explains the biogeochemical cycle: -
 - (a) Phosphorous cycle
 - (b) Nitrogen cycle

Section 4

7. Writes a note on biogeographical regions of India?
8. Explain the grassland vegetation of India?

Exam Code: 103306
(30)

Paper Code: 6160

Programme: Bachelor of Science
Semester-VI

Course Title: Botany (Economic Botany)

Course Code: BSMM-6075 (II)



Time Allowed: 3 Hours

Max Marks: 30

Note: Attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section. All questions carry equal (6) marks. Draw labelled diagrams wherever necessary.

Section-I

1. What are the major cereals grown in India? Write down the botanical characters of Wheat? (6)
2. What are fibers? Describe any one fiber plant of commercial importance? (6)

Section-2

3. Give Botanical name, Family and botany of part used of following spices:
A) Coriander
B) Ginger
C) Black pepper (2+2+2)

4. What is a spice? Give a general account on morphology and economic importance of *Zingiber officinalis*? (6)

Section-3

5. Describe the botany and medicinal values of Sarpagandha plant. Why this plant is known by the name chota chand? (6)
6. Write a short note on the following: -(3+3)
- A) Morphology of Neem plant.
- B) Medicinal values of Harar.

Section-4

7. Write down the processing of tea leaves. What do you mean by black tea and green tea? (6)
8. What are woods? Describe any two wood producing plants (6)

Exam Code: 103306

Paper Code: 6161

Programme: Bachelor of Science (Semester-VI)

Course Title: Food Science and Quality Control (Vocational) (Food Plant Layout and Management)

Course Code: BSMM-6255 ✓

Time: 3 Hours

Max. Marks: 60

Note: Students are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section. Each question carries 12 marks.

Section A

- Q1) Discuss the importance of site selection and plant layout design.
Q2) Explain in detail about machinery selection in a food plant. How cost of machinery affect the margin of profit in the food industry?

Section B

- Q3) Explain the role of market research in the food industry and how it is becoming a major focus area for every sector, discuss.
Q4) Describe in detail the major food patterns across India and how geography plays an important role in food consumption patterns across the globe.

Section C

- Q5) What role do media and social networking sites play in the food choices of a population? Explain.
Q6) What are the major factors that affect post-harvest losses in food crops and can they be minimized?

Section D

- Q7) Discuss various traditional foods of your area and what makes them be accepted as healthy foods? Explain.
Q8) What is meant by snack foods and convenience foods? What are their types and basic steps in preparing these foods? Discuss.

Exam Code: 103306
(20)

Paper Code: 6154

Programme: Bachelor of Science Semester-VI

Course Title: Microbiology (Applied Microbiology-II)

Course Code: BSMM-6343 ✓

Time Allowed: 3 Hours

Max Marks: 60

Note:- Attempt five questions in all, selecting one question from each of the four sections (A- D). The fifth question may be attempted from any section. All questions carry equal marks. (12)

Section A

1. a. What is the importance of using fermented cereals. 6
b. Discuss the microbiology of fermentation process involved in the production of Soya sauce. 6
2. a. Explain the various steps involved in production of Yoghurt. 6
b. Discuss the fermentation process of production of cheese. 6

Section B

3. a. Discuss the fermentation process used for production of butanol. 6
b. Giving examples explain the uses of microbial single cell proteins 6
4. a. What is the scientific name of brewer's yeast. Discuss it's role in beer production. 6
b. Briefly discuss the role played by microorganisms in production of citric acid. 6

Section C

5. a. Explain the various steps involved in the production of red wine. 6
b. Discuss in detail the process used for the production of following alcoholic beverages: Whisky, Brandy 6
6. a. Briefly explain the significance of immobilization of enzymes. 6
b. Write a short note on industrial production of Amylases. 6

Section D

7. a. Explain how cyanocobalamin (Vitamin B12) is produced commercially. Describe the process involved.

6

b. Give name of microorganisms used for the production of Glutamic acid. Explain the process involved in its production using anyone of the above microorganisms.

6

8. a. Write a short note on microorganisms involved in production of Penicillin.

6

b. Discuss the commercial production of streptomycin.

6

Exam Code: 103306
(40)

Paper Code: 6152

Programme: Bachelor of Science
Semester-VI

Course Title: Zoology (Medical Zoology)

Course Code: BSMM-6483 (I) ✓

Time Allowed: 3 Hours

Max Marks: 30

Note: Attempt five questions in all, selecting at least one question from each section (A to D) Fifth question can be attempted from any section. Draw diagrams wherever necessary. Each question carries 6 marks.

Section A

1. Explain diagrammatically the life cycle, mode of infection and pathogenicity of Giardia. How can it be treated?
(6)
2. Discuss the life history, pathogenicity, prophylaxis and treatment of Ancylostoma.
(6)

Section B

3. a) Discuss the diseases caused by Xenopsylla cheopis. Also write down the control measures. (4)
b) Write a note on the methods to control the vector of malaria. (2)

4. What are the various programs implemented to eradicate cholera? (6)

Section C

5. Define antibodies and give an account of the different classes and functions of antibodies. (6)
6. Give brief account of antigen-antibody interactions. (6)

Section D

7. Give brief account of precipitation, agglutination and immunodiffusion assay. (6)
8. What are vaccines? Give the classification of the vaccines with suitable examples. (6)

Exam Code: 103306
(40)

Paper Code: 6153

Programme: Bachelor of Science
Semester-VI

Course Title: Zoology (Medical Laboratory Technology)

Course Code: BSMM-6483 (II) ✓

Time Allowed: 3 Hours

Max Marks: 30

Note: Attempt FIVE questions in all, selecting at least ONE from each section (A to 'D). Fifth question can be attempted from any section. All questions carry equal marks (6 marks each). Draw neat & well labelled diagrams wherever necessary.

Section - A

1. Describe the rules to be followed while working in a lab, also discuss various types of Biosafety cabinets and equipments used in a laboratory. (6)
2. Write detailed account of a Electron Microscopy, discuss its types in detail. (6)

Section - B

3. Discuss collection of various clinical samples and their preservation. (6)

4. Describe Erythrocyte Sedimentation Rate and DLC.

(3+3)

Section - C

5. Give an account of dry and moist heat methods of sterilization. (6)
6. Discuss different types of culture media and bacterial cultures. (6)

Section - D

7. Describe the following staining techniques-

- a) Feulgen staining
- b) Eosin-Haematoxylin staining in detail.

(3+3)

8. Write detailed note on

- a) Liver Function Test
- b) Estimation of Uric acid in blood

(3+3)

Paper Code: 6155

Examinee	Exam Code	Course Code
Science (Medical)	103306	BSMM-6084 (I)
Non-Medical)	103306	BSNM-6084 (I)

Semester- VI

Course Title: Chemistry (Molecular Spectroscopy)

(40)

Max Marks: 30

Students are to select at least one question from each section. The fifth question is from Section. Each question carries 6 marks. Students are allowed to use a calculator.

Section A

Calculate the wavelength in Å of an electromagnetic radiation having 10^{14} Hz.

Which region of the electromagnetic spectrum do photons with the following

(i) 2000 cm^{-1} (ii) 20000 cm^{-1}

Explain and understand by the fluorescence mechanism? How it is different from phosphorescence process?

The molar absorptivity of a substance in a 1 cm length cell at λ_{max} 245 nm has

17, Calculate its molar extinction coefficient (i.e., molar absorptivity)

Effect of polar solvents on (i) $n \rightarrow \pi^*$ and $\pi \rightarrow \pi^*$ transitions.

Acetone has a maximum at 280 nm, but in an acidic solution, its absorbance shifts to 300 nm.

Section B

Acetanilide is deep yellow but para-nitroacetanilide is yellow. Why

acetanilide exists? Explain by using the principles of absorption

How to distinguish the following pairs of compounds by UV/vis

Section C

- Q5 (a) Write a detailed note on spin-spin coupling using a suitable example. 3
(b) Explain why NMR spectrum of benzene is observed at a lower field whereas that of acetylene is observed at a higher field strength. 3
- Q6 (a) How will you distinguish between Cis and Trans isomers with the help of NMR spectroscopy? Explain with a suitable example. 3
(b) A compound with molecular formula, $C_7H_5OCl_3$ shows a singlet for 3H at δ 3.9 and two doublets ($J = 8$ Hz) for 1H each at δ 6.76 and 7.3, respectively. Identify the compound. 3

Section D

- Q7 (a) How would you distinguish between ethylamine, and diethylamine and triethylamine on the basis of mass spectroscopy? 3
(b) In the mass spectrum of toluene, strong peaks are formed at $m/e = 91$ and $m/e = 65$. In addition, a broad peak appears at $m/e = 46.4$. Justify the origin of these signals. 3
- Q8 (a) Write a note on the following: 4
(i) McLafferty Rearrangement
(ii) Nitrogen Rule
(b) What is characteristic in the mass spectrum of a compound containing (i) one bromine atom and (ii) one chlorine atom? 2

Paper Code: 6156

Programme	Exam Code	Course Code
Bachelor of Science (Medical)	103306	BSMM-6084 (II)
Bachelor of Science (Non-Medical)	103306	BSNM-6084 (II)

Semester--VI

Course Title: Chemistry (Physical Chemistry)

(40)

Time Allowed: 3 Hours

Max Marks: 30

Note: Candidates are required to attempt five questions in all selecting atleast one question from each section. The fifth question may be attempted from any section. Each question carries equal (6) marks.

SECTION-I

1. Derive Schrodinger wave equation for a particle in three dimensional box for eigen function and eigen value of energy? (6)
2. (a) What is zero point energy? (2)
(b) Explain the term eigen operator, eigen value and eigen function by taking suitable examples? (2)
(c) State Heisenberg Uncertainty Principle? (2)

SECTION-II

3. Solve Schrodinger wave equation for simple harmonic oscillator and discuss wave functions curves and probability distribution curves for simple harmonic oscillator? (6)
4. (a) How do three quantum number n , l , m follow from the solution of schrodinger wave equation? (3)
- (b) Discuss the shapes of s , p and d orbitals? (3)

SECTION-III

5. (a) Derive Brag's equation for X-Ray Diffraction by crystals? (4)
- (b) A crystal plane intercepts the three axis of the crystals at the multiple of $3/2$, 2 and 1 of the axial length. What are the miller indices of this plane? (2)
6. (a) Determine number of atoms per unit cell for
 - (i) Simple lattice
 - (ii) Cubic lattice
 - (iii) Body centered lattice
 - (iv) End centered lattice (4)
- (b) State law of constancy of interfacial angles? (2)

SECTION-IV

7. (a) State and derive Beer's Law? (4)
(b) Calculate the value of an Einstein of energy in eV for radiation of frequency $3 \times 10^{13} \text{ s}^{-1}$ (2)
8. What do you mean by chemical yield of a photochemical reaction? Explain why photosynthesis of HBr is very low? (6)