

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।

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?
- (5×2=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.

(2×5=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-1

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।

Paper Code: 6105

Programme	Exam Code	Course Code
Bachelor of Arts	103206	BARM-6333 (I) ✓
Bachelor of Science (Non-Medical)	103306	BSNM-6333 (I) ✓
Bachelor of Science (Economics)		BECM-6333 (I) ✓
Bachelor of Science (Computer Science)		BCSM-6333 (I) ✓

Semester-VI

Course Title: Mathematics (Linear Algebra)

(40)

Time Allowed: 3 Hours

Max Marks: 40

Attempt five questions in all, selecting at least one question from each section. The Fifth question may be attempted from any section. Each question will carry 8 marks.

Section-A

Q1. (a) Define the following

- (i) Commutative ring
- (ii) Ring with Zero Divisor
- (iii) Linear Combination of Vectors
- (iv) Direct sum of vectors

(4)

(b) Show that the set of rationals $\mathbb{Q}$ is a field under the composition $*$ and $\cdot$ defined as $a*b = a+b-1$ and $a \cdot b = a+b-ab$ for all $a, b \in \mathbb{Q}$.

(4)

Q2(a) Let V be a vector space over the field F . Prove that the set S of non-zero vectors $v_1, v_2, \dots, v_n \in V$ is linearly dependent iff some of these vectors say $v_k, 2 \leq k \leq n$, can be expressed as the linear combination of the preceding vectors of set S .

(4)

(b) Show that the vectors $v_1 = (1, -2, 1)$, $v_2 = (2, 1, -1)$ and $v_3 = (7, -4, 1)$ in $\mathbb{R}^3$ are linearly dependent.

(4)

Section-B

Q3 Prove that any two bases of a finite dimensional vector space have the same number of elements.

(8)

Q4 If U and W are two subspaces of a finite dimensional vector space $V(F)$. Prove that

$$\dim(U + W) = \dim U + \dim W - \dim(U \cap W)$$

(8)

Section- C

Q5 (a) Prove that every n -dimensional vector space over the field F is isomorphic to the space F^n .

(5)

(b) Let $T: \mathbb{R}^3 \rightarrow \mathbb{R}^3$ be defined by $T(x,y,z) = (2x, 4x-y, 2x+3y-z)$. Show that T is invertible and find T^{-1} . (3)

Q6(a) Let V be a vector space over F and $T: V \rightarrow V$ be a linear operator. Prove that T is invertible iff T is one-one and onto. (5)

(b) Find a linear transformation $T: \mathbb{R}^4 \rightarrow \mathbb{R}^3$ whose null space is generated by $(2,3,4,1)$ and $(1,0,1,1)$. (3)

Section-D

Q7(a) If the matrix of a linear operator $T: \mathbb{R}^3 \rightarrow \mathbb{R}^3$ relative to the usual basis is $\begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & -1 \\ -1 & -1 & 0 \end{bmatrix}$ Find the matrix of T relative to the basis $B_1 = \{(0,1,-1), (-1,1,0), (1,-1,1)\}$. (4)

(b) Given a matrix $\begin{bmatrix} 1/2 & 1 \\ 2/3 & 4 \end{bmatrix}$ Find the corresponding linear operator T on $\mathbb{R}^2$ relative to the basis $B = \{(1,0), (1,1)\}$. (4)

Q8(a) Let $B = (v_1, v_2, \dots, v_n)$ be a basis for a vector space $V(F)$. Let $T: V \rightarrow V$ be a linear transformation. Prove that for any vector v in V $[T;B][v;B] = [T(v); B]$. (5)

(b) Let T be a linear operator on $\mathbb{R}^2$ defined by $T(x,y) = (4x-2y, 2x+y)$. Find matrix of T relative to the basis $B = \{(1,1), (-1,0)\}$. (3)

Paper Code: 6106

Programme	Exam Code	Course Code
Bachelor of Arts	103206	BARM-6333 (II)
Bachelor of Science (Non-Medical)	103306	BSNM-6333 (II)
Bachelor of Science (Economics)		BECM-6333 (II)
Bachelor of Science (Computer Science)		BCSM-6333 (II)

Semester- VI

Course Title: Mathematics (Numerical Analysis)

(40)

Time Allowed: 3 Hours

Max Marks: 40

Note: Attempt five questions in all selecting at least one question from each section. The fifth question may be attempted from any section. All questions carry equal marks (8 marks each). The student can use only Non Programmable & Non storage type calculator.

SECTION-A

Q1. (a) Find $\frac{1}{\sqrt{14}}$ correct to three decimals using Newton-Raphson method.

(b) If $u = 3v^3 - 6v$, find the percentage error in u at $v=1$, if the error in v is 0.05. [4 X 2=8]

Q2 (a) Find the order of convergence of Secant method.

(b) Find a root of equation $x^3 + x^2 - 3x - 3 = 0$ between 1.5 and 1.75 correct to three decimal places using false-position method. [4 X 2=8]

SECTION-B

Q3. (a) Solve the following system of equations by Gauss-Jordan method:

$2x + 3y + 5z = 5$, $3x + 4y + 7z = 6$, $x + 3y + 2z = 5$. [4 X 2=8]

(b) Solve the following system of equations by Gauss Jacobi method (three iterations)

$5x - y + z = 10$, $2x + 4y = 12$, $x + y + 5z = -1$ (use initial solution as (2, 3, 0)).

Q4 (a) Using Newton's forward difference formula, find the sum of $S_k = 1^3 + 2^3 + 3^3 + \dots + k^3$.

(b) Given $f(1) = 1$, $f(2) = 5$, $f(4) = 59$, obtain $f(3.5)$ using Lagrange Interpolation. [4 X 2=8]

SECTION-C

Q5. Use trapezoidal rule and Simpson's 1/3 method to compute $I = \int_0^{0.6} e^{-x^2} dx$ by taking 7 ordinates. [8]

Q6 (a) Find $I = \int_0^1 2x dx$ by Gauss legendre two point formula.

(b) Use interpolation to evaluate $f'(4.5)$, given

[4 X 2=8]

x	1	2	3	4	5	6	7
f(x)	0	1	3	5	8	12	18

SECTION-D

Q7. Apply Runge-Kutta fourth order method to find the solution of differential equation

$$\frac{dy}{dx} = x^2 - y \text{ at } x=0.2 \text{ in steps of } 0.1 \text{ given that } y=1 \text{ when } x=0.$$

[8]

Q8. Given $\frac{dy}{dx} = x^2(1+y)$ with $y(1) = 1$, $y(1.1) = 1.233$, $y(1.2) = 1.548$, $y(1.3) = 1.979$, by Predictor-Corrector method, compute $y(1.4)$.

[8]

Paper Code: 6155

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

Semester- VI

Course Title: Chemistry (Molecular Spectroscopy)

(40)

Time Allowed: 3 Hours

Max Marks: 30

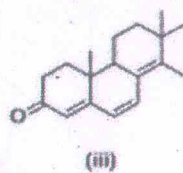
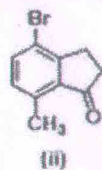
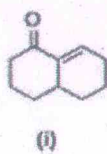
Note: Attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section. Each question carries 6 marks. Students are allowed to use non-programmable calculator.

Section A

- Q1** (a) Calculate the wavelength in Å of an electromagnetic radiation having frequency 7×10^{14} Hz. 2
- (b) In which region of the electromagnetic spectrum do photons with the following wavenumbers lie? (i) 2000 cm^{-1} (ii) 20000 cm^{-1} 2
- (c) What do you understand by the fluorescence mechanism? How it is different from phosphorescence process? 2
- Q2** (a) 2.6×10^{-4} M solution of a substance in a 1 cm length cell at λ_{max} 245 nm has absorbance 1.17, Calculate its molar extinction coefficient (i.e., molar absorptivity). 2
- (b) Explain the effect of polar solvents on (i) $n \rightarrow \pi^*$ and $\pi \rightarrow \pi^*$ transitions. 2
- (c) Aniline absorbs at 280 nm, but in an acidic solution, its absorbance shifts to 203 nm. Explain. 2

Section B

- Q3** (a) ortho-Nitroacetanilide is deep yellow but para-nitroacetanilide is yellow. Why this difference exists? Explain by using the principles of absorption spectroscopy. 2
- (b) How will you distinguish the following pairs of compounds by UV/vis spectroscopy? 4
- (i) 1,3-pentadiene and 1,4-pentadiene
- (ii) Benzene and anthracene
- Q4** Following the Woodward-Fieser rules, calculate the absorption maximum for each of the following compounds. 6



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)

Paper Code: 6157

Programme	Exam Code	Course Code
Bachelor of Science (Non-Medical)	103306	BSNM-6395 (I)
Bachelor of Science (Computer Science)	103306	BCSM-6395 (I)

Semester--VI

Course Title: Physics (Nuclear Physics)

(30)

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. Each question carries 6 marks. Candidates can use Non-Scientific calculators and logarithmic tables.

SECTION A

- Explain the terms nuclear spin, nuclear angular momentum, and nuclear magnetic dipole moment.
5
 - Which property of nucleus determines its shape?
1
- Explain binding energy of the nucleus and variation of B.E. per nucleon with mass number A. What is the relationship between binding energy and mass defect?
4

- (b) Explain the term atomic mass unit. Compute energy of 1 a.m.u. in MeV. 2

SECTION B

3. (a) What are radioactive decay laws. Define half-life and derive an expression for half-life. 4
 (b) Give the differences between internal conversion and auger electrons. 2
4. What is β -decay? Discuss energy spectrum curve of β -decay. Discuss law of conservation of energy and linear and angular momentum in β -decay. How it helped Pauli in predicting existence of Neutrino? 6

SECTION C

5. (a) Discuss various conservation laws in nuclear reactions by giving examples? Name the physical quantities which are not conserved in nuclear reactions. 4
 (b) Define following nuclear reactions by giving examples: 2
 (i) Stripping reaction
 (ii) Photo disintegration.
6. In Which star CNO cycle dominates over Proton-Proton cycle. Discuss in detail. 6

SECTION D

7. What is semi empirical mass formula. Derive semi empirical mass formula based on liquid drop model explaining various terms involved. Also show graphically various energy terms involved in it. 6
8. Stating the main assumptions explain the shell model of nucleus and obtain a schematic energy level diagram to justify magic numbers. 6

Paper Code: 6158

Programme	Exam Code	Course Code
Bachelor of Science (Non-Medical)	103306	BSNM-6395 (II)
Bachelor of Science (Computer Science)	103306	BCSM-6395 (II)

Semester--VI

Course Title: Physics (Radiation and Particle Physics)

(30)

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. Each question carries 6 marks.

SECTION A

1. What is Compton Scattering? Derive mathematical relation for Compton wavelength shift. (6)
2. Discuss the following processes:
 - (i) Pair production
 - (ii) Electron-positron annihilation (3+3)

SECTION B

3. Discuss the principle, construction and Working of a scintillation detector. Compare its advantages and disadvantages with semiconductor detector. (6)

4. What is a super-heated liquid? Using a suitable diagram, explain the principle and Working of a bubble chamber. (6)

SECTION C

5. Describe the principle, construction and Working of a cyclotron. (6)
6. Discuss in detail the process of particle acceleration in a linear accelerator. (6)

SECTION D

7. (a) What are strange particles? (3)
- (b) Discuss Gellman-Nishijima formula for hadrons. (3)
8. (a) Discuss with an example the conservation law of energy, linear momentum and charge conjugation. (3)
- (b) Write a note on isospin of particles. Why isospin is not applicable to leptons. (3)