BA III 27 2018

Total Pages : 7

PC–3802/MH

C–2058

REGIONAL SECURITY AND COOPERATION–II (i)

(Semester–VI)

Time : Three Hours] [Maximum Marks : 64

Note : Attempt *one* question each from Sections A, B, C & D carrying 10 marks each and the entire Section E consisting of 12 short answer type questions carrying 2 marks each.

SECTION—A

I. Write an essay on the concept of Regional Co-operation.

II. Explain the meaning and scope of the term 'Region'.

SECTION—B

III. Evaluate the achievements of Gulf Co-operation Council (GCC).

IV. Write an essay on the working of North Atlantic Treaty Organisation (NATO).

SECTION—C

V. Write an essay on the aims and organisation of Shanghai Co-operation Organisation (SCO).

VI. Critically examine the objectives of ASEAN.

SECTION—D

VII. What are the problems and achievements of Non-Alignment Movement (NAM)?

VIII. Examine the problems and obstructions for SAARC.

SECTION—E

(Compulsory)

Write brief answers :

1. What is Regional Security?
2. Any two features of Regional Organisation.
3. Name any four organs of NATO's Command Structure.

4. Name any three members of S.C.O.
5. Write any three achievements of SAARC.
6. Discuss the achievements of NATO.
7. Define Region.
8. Explain the aims of Gulf Co-operation Council (GCC).
9. Mention any two objectives of ASEAN.
10. Discuss the main features of NAM.
11. Any two features of GCC.
12. Write any two achievements of NAM.

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PC–3779/MH

C–2058

INTERNATIONAL POLITICS – THEORY & PRACTICE

(Semester–VI)

Time : Three Hours] [Maximum Marks : 70

Note : Attempt *two* questions each from Sections A & B carrying 10½ marks each and the entire Section C consisting of 14 short answer type questions carrying 2 marks each.

SECTION—A

I. What do you mean by International Politics? Discuss its nature and importance.

II. Critically explain the Realist Theory of International Politics.

III. What do you understand by National Power? Discuss its various elements.

IV. Critically explain the principle of Collective Security.

SECTION—B

V. Define Cold War. Discuss the impact of Cold War on International Politics.

VI. What do you understand by Bi-Polarity? Discuss the causes of the emergence of Bi-Polar system.

VII. Discuss the relevance of SAARC in the modern world.

VIII. Discuss in detail the achievements of UN.

SECTION—C

(Compulsory)

IX. Give answer of each short answer type question in 50 words i.e. 7-10 lines :

1. Write down the characteristics of International Politics.
2. Write down any four subjects included in the subject matter of International Politics.
3. When was Idealism originated?

4. Write a note on Balance of Power.
5. Write main characteristics of Balance of Power.
6. Explain the main methods of Balance of Power.
7. Explain the meaning of Collective Defense.
8. What was the Partial Test Ban Treaty?
9. What do you mean by New Cold War?
10. What do you mean by Polar System?
11. What do you mean by Uni-Polar system?
12. What do you mean by Globalisation?
13. What do you mean by Privatisation?
14. What do you mean by G-15?

B.A III Sem 2018

Total Pages : 7

PC–3785/MH

C–2058

HISTORY OF PUNJAB (1799-1966)–II

(Semester–VI)

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *two* questions each from Sections A & B carrying 12 marks each. Section C has 2 parts : The 1st part has 8 questions carrying 2 marks each and 2nd part has question on map along with explanatory note.

SECTION—A

I. Write the political condition of Punjab when Ranjit Singh assumed power.

II. Discuss in detail the conquest of Multan, Kashmir and Peshawar by Ranjit Singh.

III. Critically analyse the relations of Ranjit Singh with British from 1800-1839.

IV. Describe the civil and military administration of Ranjit Singh. 2×12=24

SECTION—B

V. Discuss the causes and effects of 2nd Anglo-Sikh War.

VI. Write a detailed note on John Lawrence as a Chief Commissioner.

VII. Give a detailed description of Arya Samaj and Namdhari Movement in Punjab.

VIII. Write a note on Reorganisation of the Punjab in 1966. 2×12=24

SECTION—C

(Compulsory)

IX. (a) Attempt all questions. Write in brief about the following :

1. Ranjit Singh
2. Military system of Ranjit Singh
3. Board of Administration of Punjab
4. Causes of 1st Anglo-Sikh War
5. Singh Sabha Movement

6. Gurudwara Reform Movement
7. Causes of Partition of Punjab
8. Effects of Partition of Punjab. 8×2=16

(b) Write an explanatory note on the following and mark on the map also. Attempt *one* out of two :

1. Battles of 2nd Anglo-Sikh War.

OR

2. Punjab in 1966. 7+4=11

(For Blind Students)

[In lieu of question on map, attempt *two* questions from the following]

1. Military system of Ranjit Singh.
2. Board of Administration.
3. Causes and effects of Partition of Punjab.
4. Gurudwara Reform Movement. 2×5½=11

Roll No..... Total No. of Pages : 3

PC 3789-MH

C-2058
ENGLISH COMMUNICATION SKILLS
Semester-VI

Time Allowed : Three Hours] [Maximum Marks : 75

Note :— Attempt **all** questions.

1. Bring out the central idea of the poem 'Ulysses' by Tennyson.

OR

Write a critical summary of 'A Prayer for My Daughter' by W.B. Yeats. 12

2. Explain with reference to the context any ***two*** of the following :

(i) I fall upon the thorns of life ! I bleed ! A heavy weight of hours has chained and bowed, one too like thee ! Lawless, and swift, and proud.

(ii) With every movement that the scorpion made,
His poison moved in Mother's blood, they said
May he sit still, they said
May your suffering decrease
the misfortune of your next birth, they said.

(iii) I shall be telling this with a sigh
Somewhere ages and ages hence :
Two roads diverged in a wood, and I
I took the one less travelled by
And that has made all the difference. 11

3. Develop a story in 200-250 words from the given outline :

Devki's eighth birthday _____ wanted to celebrate differently _____ mother and Devki went to orphanage _____ took cake and other things to eat _____ one girl Mona _____ unhappy _____ her birthday too _____ thinks they are for her _____ Mona cuts cake _____ Devki says this is the best birthday she ever had. 11

4. Write an application for the job of a Lecturer in English in a college. Attach a suitable resume also. 4+7=11

5. Answer any ***ten*** questions :

(1) How is the second stage of man described ?
(All the World's a Stage)

(2) What was the locale of the palace ? (Kubla Khan)

(3) What is the power of the West Wind shown over the ocean ?
(Ode to the West Wind)

(4) What was the horrible dream of the knight ?
(La Belle Dame Sans Merci)

(5) Explain the line "This grew; I gave commands; then all smiles stopped together". (My Last Duchess)

(6) What does the battle scene indicate ?
(Say Not the Struggle Naught Availeth)

(7) Why does the song of nightingales represent as the voice of desires ?
(Nightingales)

(8) Why does the poet compare himself with the Kingfisher ?
(The Kingfisher)

(9) How are the two roads different ? (The Road Not Taken)

(10) What are the institutions taking care of the unknown citizen ?
(The Unknown Citizen)

(11) What did the father do to help the mother ?
(Night of the Scorpion)

(12) How does the poetess feel after the teacher's scolding ?
(Punishment in Kindergarten)

10×3=30

Total Pages : 7

PC–3780/MH

C–2058

DEVELOPMENT ADMINISTRATION IN INDIA (WITH SPECIAL REFERENCE TO PUNJAB)–II

(Semester–VI)

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *two* questions each from Sections A & B carrying 12 marks each and the entire Section C consisting of 9 short answer type questions carrying 3 marks each.

SECTION—A

I. What do you understand by Development Administration? Discuss its scope and significance.

II. Discuss and compare the political and administrative features of developed and developing countries.

III. Give the meaning of Planning. Examine the objectives of socio-economic planning in India.

IV. Examine the composition, functions and role of NITI Aayog.

SECTION—B

V. What is Department? Discuss its features, merits and demerits.

VI. Critically examine the parliamentary control over public enterprises in India.

VII. What is a Welfare State? Is India a welfare State? Make an analysis.

VIII. Discuss the welfare measures undertaken for Scheduled Castes in Punjab.

SECTION—C

(Compulsory)

IX. Answer each question in 50 words i.e. 7-8 lines :

1. Give two definitions of Development Administration.
2. What is the nature of Comparative Public Administration?

3. Write three economic features of developing countries.
4. What is the composition of NITI Aayog?
5. Give three merits of Public Corporation.
6. Explain Socialist State.
7. Write four limitations of Parliamentary Control over public enterprises in India.
8. Give two constitutional provisions for the welfare of Backward Classes.
9. Write three functions of Punjab State Commission for Women.

B.A (II) ਕੋਰਸ 2018

Total Pages : 4

PC–3782/MH

C–2058

PUNJABI (COMPULSORY)

(Semester–VI)

Time : Three Hours] [Maximum Marks : 75

ਭਾਗ—ੳ

I. 'ਪੰਜਾਬ ਦੀਆਂ ਲੋਕ ਖੇਡਾਂ' ਲੇਖ ਦਾ ਸਾਰ ਆਪਣੇ ਸ਼ਬਦਾਂ ਵਿਚ ਲਿਖੋ।

ਜਾਂ

'ਲੋਕਧਾਰਾ : ਵਰਤਮਾਨ ਸੰਦਰਭ' ਲੇਖ ਦਾ ਵਿਸ਼ੇ-ਵਸਤੂ ਬਾਰੇ ਲਿਖੋ। 12

ਭਾਗ ਅ–1

II. ਕਾਰਕ ਕੀ ਹੁੰਦਾ ਹੈ? ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਵਿਚ ਇਸ ਦੀ ਵਰਤੋਂ ਬਾਰੇ ਵਿਸਥਾਰ ਵਿਚ ਲਿਖੋ।

ਜਾਂ

ਵਾਕ ਨੂੰ ਪਰਿਭਾਸ਼ਿਤ ਕਰਦੇ ਹੋਏ ਕਾਰਜ ਦੇ ਆਧਾਰ ਤੇ ਵਾਕ ਦੀਆਂ ਕਿਸਮਾਂ ਬਾਰੇ ਲਿਖੋ। 12

[P. T. O.

ਭਾਗ ਅ-2

III. ਪੰਜਾਬੀ ਵਿਚ ਅਨੁਵਾਦ ਕਰੋ :

When Guru Gobind Singh gave the Gift of Amrit, it was also not limited to the people of any specific region. If one of Panj Pairas belonged to Punjab, the other came from as far as Karnataka and many other parts of India. More so if one of these five beloveds was a khatri, then the other four belonged to other different castes. Thus, the five ones from different regions and castes were blessed to drink Amrit from one bowl and with that began the unique process of unifying mankind. With the initiative, the centuries old chains of casteism started to break up. This noble and dynamic deed on the part of the Guru was not only revolutionary but also unique and unparalleled in the annals of Indian history. 9

ਭਾਗ—ਏ

IV. ਹੇਠ ਲਿਖੇ ਵਾਕਾਂ ਦੀ ਭਾਸ਼ਾ ਦਾ ਵਿਵਹਾਰਕ ਵਿਆਕਰਨਕ ਵਿਸ਼ਲੇਸ਼ਣ ਕਰੋ :

(ੳ) ਬੁਝਾਰਤਾਂ ਜਿਹਨਾਂ ਨੂੰ ਬੁਝਣ ਵਾਲੀਆਂ ਬਾਤਾਂ ਕਿਹਾ ਜਾਂਦਾ ਹੈ ਆਦਿ ਕਾਲ ਤੋਂ ਹੀ ਲੋਕ ਜੀਵਨ ਦਾ ਅੰਗ ਰਹੀਆਂ ਹਨ। (ਵਾਕ ਦੀ ਕਿਸਮ ਦੱਸੋ)

(ਅ) ਖੁਦਾਈ ਕਰਦਿਆਂ ਕਿਸੇ ਰਾਜੇ ਦਾ ਬੁੱਤ ਮਿਲਦਾ ਹੈ? (ਕਾਰਕੀ ਸਬੰਧ ਅਤੇ ਰੂਪ ਦੱਸੋ)

(ੲ) ਖੇਡਾਂ ਕੇਵਲ ਮਨ ਪ੍ਰਚਾਵੇ ਲਈ ਨਹੀਂ ਹੁੰਦੀਆਂ। (ਵਿਆਕਰਣਕ ਮੇਲ ਕਿਨ੍ਹਾਂ ਇਕਾਈਆਂ ਵਿਚ ਹੈ?)

(ਸ) ਘੁਮਿਆਰ ਚੱਕ ਉਤੇ ਭਾਂਡੇ ਘੜਦਾ ਹੈ। (ਵਿਆਕਰਣਕ ਮੇਲ ਕਿਨ੍ਹਾਂ ਇਕਾਈਆਂ ਵਿਚ ਹੈ?)

(ਹ) ਵਾਹ! ਇਹ ਰਾਜੇ ਦਾ ਬੁੱਤ ਹੈ। (ਕਾਰਜ ਦੇ ਆਧਾਰ ਤੇ ਵਾਕ ਦੀ ਕਿਸਮ ਦੱਸੋ)

(ਕ) ਪੰਜਾਬੀ ਲੋਕ ਮਨ ਅੰਦਰੋਂ ਲੋਕ ਰਸਮਾਂ ਦਾ ਅਸਲ ਮਹੱਤਵ ਖ਼ਤਮ ਹੁੰਦਾ ਜਾ ਰਿਹਾ ਹੈ। (ਕਾਰਕੀ ਸਬੰਧ ਤੇ ਰੂਪ ਦੱਸੋ) 6×2=12

V. ਹੇਠ ਲਿਖੇ ਪ੍ਰਸ਼ਨਾਂ ਦਾ ਉੱਤਰ ਸੰਖੇਪ ਵਿਚ ਦਿਓ। ਸਾਰੇ ਪ੍ਰਸ਼ਨ ਜ਼ਰੂਰੀ ਹਨ :

1. ਲੋਕਧਾਰਾ ਦੀ ਭੂਮਿਕਾ ਦੇ ਸੰਪਾਦਕ ਕੌਣ ਹਨ?
2. ਖੇਤਰਪਾਲ ਦਿਉਤੇ ਦਾ ਕੀ ਮਹੱਤਵ ਹੈ?
3. ਦਿਲਬਰ ਚੋਰ ਦੀ ਕਹਾਣੀ ਰਾਜਕੁਮਾਰ ਦੀ ਮਦਦ ਕਿਵੇਂ ਕਰਦਾ ਹੈ?
4. ਇਮਾਰਤਸਾਜੀ ਕਲਾ ਕੀ ਹੁੰਦੀ ਹੈ?

5. ਗੀਤ ਫ਼ਿਲਮਾਂਕਣ ਵਿਚ ਔਰਤ ਨੂੰ ਕਿਵੇਂ ਪੇਸ਼ ਕੀਤਾ ਜਾਂਦਾ ਹੈ?

6. ਕੁੜੀਆਂ ਅਤੇ ਮੁੰਡਿਆਂ ਦੀਆਂ ਚਾਰ-ਚਾਰ ਖੇਡਾਂ ਦੇ ਨਾਂ ਲਿਖੋ।

7. ਮੌਤ ਦੀਆਂ ਰੀਤਾਂ ਬਾਰੇ ਲਿਖੋ।

8. ਲੋਕਧਾਰਾ ਨੂੰ ਪਰਿਭਾਸ਼ਿਤ ਕਰੋ।

9. ਸੰਯੁਕਤ ਵਾਕ ਕੀ ਹੁੰਦਾ ਹੈ?

10. ਕਾਰਜ ਦੇ ਆਧਾਰ ਤੇ ਵਾਕਾਂ ਬਾਰੇ ਦੱਸੋ।

11. ਕਰਣ ਕਾਰਕ ਉਦਾਹਰਣ ਦੇ ਕੇ ਦੱਸੋ।

12. ਕਾਰਕੀ ਪਿਛੇਤਰ ਕੀ ਹੁੰਦੇ ਹਨ?

13. ਕਿਹੜੀਆਂ-ਕਿਹੜੀਆਂ ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ ਵਿਚ ਮੇਲ ਹੁੰਦਾ ਹੈ?

14. ਅਧਿਕਾਰ ਤੋਂ ਕੀ ਭਾਵ ਹੈ?

15. ਬਣਤਰ ਦੇ ਆਧਾਰ ਤੇ ਵਾਕਾਂ ਦੀਆਂ ਕਿਸਮਾਂ ਦੱਸੋ।

15×2=30

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Total Pages : 3

PC-3790/MH

C-2058

ENGLISH LITERATURE (Module-I)

LITERARY MASTERPIECES : STUDY OF THE CLASSICS–II

(Semester–VI)

Time : Three Hours] **[Maximum Marks : 75**

Note : Attempt all the questions.

UNIT–I & II

I. Bring out the principal traits of character of the heroine of the novel *Jane Eyre.*

OR

Do you think there is an autobiographical element in Charlotte Bronte's *Jane Eyre ?* 12

II. "*Gitanjali* is the spiritual autobiography of Tagore". Discuss.

OR

Write a summary of the song that appeals to you most in *Gitanjali.* 11

III. Delineate the character of Marie Cordona as presented by Albert Camus in *The Outsider.*

OR

What is the theme of *The Outsider ?* 11

IV. Write a character-sketch of Arun on the basis of your perusal of *Kanyadaan.*

OR

Discuss the theme of the play *Kanyadaan.* 11

UNIT–III

V. Answer any *fifteen* of the following questions in about 30-40 words each :

(i) Who is Mr. Rochester in the novel *Jane Eyre ?*

(ii) Name the charity institution where Jane Eyre was sent for her schooling.

(iii) Who is Mr. Brocklehurst in the novel *Jane Eyre ?*

(iv) Who is St. John Rivers in the novel *Jane Eyre ?*

(v) Who is Bessie Lee in the novel *Jane Eyre* ?

(vi) How many poems are collected together in the English *Gitanjali.*

(vii) Explain the meaning of the title *Gitanjali.*

(viii) When was *Gitanjali* first published in English ?

(ix) Is *Gitanjali* a spiritual autobiography of the poet or a material one ?

(x) What special prize was given to Tagore for his *Gitanjali ?*

(xi) Who is Meursault in the book *The Outsider ?*

(xii) Who is Raymond in *The Outsider ?*

(xiii) Where did Meursault live ? (*The Outsider)*

(xiv) Who is Salamano in *The Outsider ?*

(xv) Where did Meursault's mother live ? *The Outsider*

(xvi) Why does Jyoti decide in favour of inter-caste marriage ? (*Kanyadaan*)

(xvii) Why does Arun turn violent ? (*Kanyadaan*)

(xviii) What are Nath's views about evil ? (*Kanyadaan*)

(xix) Why does Arun hate Jyoti ? (*Kanyadaan*)

(xx) Why doesn't Jyoti complain to her parents about Arun's rough handedness ? (*Kanyadaan*)

(15×2=30)

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PC-3772/MH

C-2058

DISCRETE MATHEMATICS–II

Paper–IV

(Semester–VI)

Time : Three Hours] [Maximum Marks : 36

Note : Attempt *two* questions each from Section A and B carrying 5½ marks each, and the entire Section C consisting of 7 short answer type questions carrying 2 marks each

SECTION–A

I. Given a row of n 0's and 1's, we wish to rearrange them so that the 0's will be grouped at the left and the 1's will be grouped at the right. The basic operation is to compare two adjacent digits and exchange their position, if so desired. Design an algorithm and determine its complexity.

(5½)

II. (a) Solve $S_n - 4S_{n-1} + 4S_{n-2} = 3n + 2^n$ with $S_0 = S_1 = 1$.

(b) Find sequence whose generating function is

$$\frac{1}{1 - z - z^2}.$$

(3+2½=5½)

III. (a) By finding the generating function of sequence S_n, find the solution of recurrence relation

$S_{n+2} - 7S_{n+1} + 12S_n = 0$ for $n \geq 0$,
given $S_0 = 2$, $S_1 = 5$.

(b) Determine $a * b$ for the following Numeric functions :

$$a_r = \begin{cases} 1, & 0 \leq r \leq 2 \\ 0, & r \geq 3 \end{cases} \text{ and } b_r = \begin{cases} r+1, & 0 \leq r \leq 2 \\ 0, & r \geq 3 \end{cases}.$$

(3+2½=5½)

IV. (a) The Time complexity of algorithm A is $O(r^2)$, and that of algorithm B is $\Omega(r^2 \ln r)$. Can we conclude that algorithm A is superior to algorithm B?

(b) Let a_r denotes the number of ways a sum of r can be obtained when two indistinguishable dice are rolled. Determine $A(z)$. (3+2½=5½)

SECTION–B

V. (a) Let L be a bounded distributive lattice. Prove that the complement of any element (if it exists) is unique.

(b) Define TOSET and give *one* example. (3+2½=5½)

VI. (a) Simplify the Boolean expression

$$f(x, y, z) = (\overline{x} \wedge z) \vee (y \wedge z) \vee (y \wedge \overline{z})$$

and write in min term normal form.

(b) Reduce the following, using Boolean algebra :

$$AB + A\overline{C} + \overline{A}\overline{B}\,C(AB + C).$$ (3+2½=5½)

VII. (a) Show that a lattice $(A, \leq)$ is distributive if and only if for and elements a, b, c in A,

$$(a \wedge b) \vee (b \wedge c) \vee (c \wedge a) = (a \vee b) \wedge (b \vee c) \wedge (c \vee a).$$

(b) Show that $a \vee (\overline{a} \wedge b) = a \vee b$ and

$$a \wedge (\overline{a} \vee b) = a \wedge b$$

in a Boolean algebra.

(3+2½=5½)

VIII. (a) Let G and G* be two groups. If $f : G \to G^*$ be a homomorphism, show that $f(G)$ is a subgroup of G*.

(b) Prove D_{105} is a uniquely complemented lattice under divisibility. (3+2½=5½)

SECTION–C

IX. Attempt all the following :

(a) Solve $a_k = 8a_{k-1} + 10k - 1$ where $a_0 = 1$.

(b) Give an example to justify that every integral domain is not a field.

(c) Define Least upper bound and greatest lower bound in a POSET.

(d) Prove the validity of the following argument :

If man is a bachelor, he is unhappy. If a man is unhappy, he dies young.

Therefore , bachelors die young.

(e) Prove that dual of distributive lattice is distributive.

(f) Prove that every cyclic group is Abelian, converse is not true. Justify.

(g) Give Big–O estimate for ($n!$) and for log ($n!$).

(7×2=14)

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Total Pages : 4

PC-3771/MH

C-2058

ALGEBRA–II (i)

(Semester–VI)

Time : Three Hours] [Maximum Marks : 36

SECTION–A

Note : Attempt any *two* questions.

I. (a) Let V be a vector space over the field, F. Prove that the set S of non-zero vectors, $v_1, v_2, v_3 \ldots\ldots v_n \in V$ is linearly dependent if and only if one of these vectors say v_k, $2 \leq k \leq n$, can be expressed as a linear combination of vectors preceding it in the set S.

(b) Define vector subspace of a vector space V(F). Also prove that a non-empty subset W of V is a subspace of V over F if and only if $\alpha x + \beta y \in W$, for all $\alpha, \beta \in F$ and $x, y \in W$. (2.5,3)

II. (a) Prove that a set $S \subset V$, is a subspace of V(F) if and only if $L(S) = S$.

(b) Give an example to show that if a set of vectors in a vector space V(F) are L.I., they may not be L.I., in V(F'), where F' is a field different from F. (2.5,3)

III. Define a finite dimensional vector space, and prove that every finite dimensional vector space has a basis. (5.5)

IV. (a) Let V be the vector space of $n \times n$ matrices over the field of real numbers. W_1 and W_2 are subspaces of symmetric and skew symmetric matrices of order n respectively. Show that V is direct sum of the subspaces W_1 and W_2.

(b) Define Quotient Space. If V(F) is a finite dimensional vector space and W is a subspace of V, prove that dim (V/W) = dim (V) – dim (W). (2.5,3)

SECTION–B

Note : Attempt any *two* questions.

V. (a) Let $T : V_2(R) \rightarrow V_3(R)$ be a linear transformation defined as $T(x, y) = (x + y, x - y, y)$. Find Range space and Rank of T.

(b) If V and W be vector spaces over the same field F, and $\{v_1, v_2, v_3, ...v_n\}$ is a basis of V and $w_1, w_2, w_3, ... w_n$ be any vectors in W, prove that there exists a unique linear transformation $T : V \rightarrow W$ such that $T(v_i) = W_i$, $1 \leq i \leq n$. (2.5,3)

VI. (a) Define Non-singular transformation. Prove that a linear transformation $T : V \rightarrow W$ is non-singular iff the set of images of linearly independent set is linearly independent.

(b) Let V be the vector space of 2×2 matrices over R and $A = \begin{bmatrix} 1 & -1 \\ -2 & 2 \end{bmatrix}$. Let $T : V \rightarrow V$ be a linear transformation defined by $T(P) = AP$, $\forall P \in V$. Find a basis and dimension of Null space of T. (2.5,3)

VII. (a) Let $T : R^2 \rightarrow R^3$ is defined as

$T(x, y, z) = (3x, x - y, 2x + y + z)$.

Prove that $(T^2 - 1)(T - 31) = 0$.

(b) Find the matrix representation of the linear operator T on R^2, defined by $T(x, y) = (3x - 4y, x + 5y)$, with respect to basis $B = \{(1, 3), (2, 5)\}$. Also verify $[T; B][v; B] = [T(v); B]$ $\forall v \in R^2$. (2.5,3)

VIII. Prove that two finite dimensional vector spaces V and W over F are isomorphic iff their dimensions are equal. (5.5)

SECTION–C

IX. Attempt all the following :

(a) Define Internal direct sum and External direct sum of vector spaces.

(b) Does the set of vectors $\{(1, 1, 1), (1, 2, 3), (2, -1, 1)\}$ form a basis of R^3 ?

(c) Giving example show that union of two vector subspaces may not be a vector subspace.

(d) Examine whether $W = \{(a, b, c) : a^2 + b^2 + c^2 \leq 1\}$ is a subspace of $V_3(R)$ or not ?

(e) Let $W = \{(a, b, c, d) : a + b = 0, c = 2d\}$ be a subspace of R^4. Find a basis and dimension of W.

(f) Let $T_1 : R^3 \to R^2$ defined by $T_1(x, y, z) = (y, x + z)$ and $T_2 : R^2 \to R^2$ is defined as $T_2(x, y) = (y, 2x)$, find formulae for T_1T_2, T_2T_1 if defined. (1×6=6)

(g) Let $T : R^2 \to R^2$, is represented by the matrix

$$A = \begin{bmatrix} 5 & -6 & -6 \\ -1 & 4 & 2 \\ 3 & -6 & -4 \end{bmatrix}.$$

Find minimal polynomial for T.

(h) Find the linear mapping $T : R^3 \to R^4$ determined by

the matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ -1 & 0 & 4 \\ 3 & 1 & 1 \\ 1 & -2 & 5 \end{bmatrix}$

with respect to the usual basis for R^3 and R^4.

(i) Define Kernel of a linear transformation $T : V \to W$. Prove that Kernel of T is a vector subspace of V.

(j) Define Transition matrix.

If $B_1 = \{1, i\}$ and $B_2 = \{1 + i, 1 - i\}$ are two basis of vector space C(R), find the transition matrix from B_1 to B_2. (2×4=8)

BD D 22 2018

Total Pages : 6

PC–3793/MH

C–2058

PHYSICAL EDUCATION

(Semester–VI)

Time : Three Hours] [Maximum Marks : 76

Note : Attempt *two* questions each from Sections B & C carrying 12 marks each and the entire Section A consisting of 14 short answer type questions carrying 2 marks each.

SECTION—A

(Compulsory)

I. Answer the following questions in brief :

1. Define sports training.
2. What are the characteristics of sports training?
3. Enlist types of load.
4. Explain cross country.

5. What are the dimensions of hockey goal post?

6. How many officials are required for hockey match?

7. What are the major fouls of javelin throw?

8. What are the major problems of obesity?

9. What is the full form of EPOC?

10. Enlist types of motion.

11. Write two effects of exercise on circulatory system.

12. What do you mean by centre of gravity?

13. Enlist types of force.

14. Write second law of motion.

SECTION—B

II. What do you mean by load? Explain the principles and methods of loading.

III. Explain interval, fartlek and weight training methods of training.

IV. Enumerate the components of physical fitness.

V. Illustrate the principles and methods of general and specific conditioning.

SECTION—C

VI. What do you mean by obesity? Explain its causes.

VII. Explain the importance and organization of athletic meet.

VIII. What are the effects of exercises on muscular and respiratory system?

IX. Explain lever and its types and laws.

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Total Pages : 7

PC–3781/MH

C–2058

SOCIAL SCIENCE RESEARCH METHODS

(Semester–VI)

Time : Three Hours] [Maximum Marks : 70

Note : Attempt *two* questions each from Sections A & B carrying 10½ marks each and the entire Section C consisting of 14 short answer type questions carrying 2 marks each.

SECTION—A

I. Discuss the objectives and significance of Social Research.

II. Define Hypothesis. Explain the criteria of a workable Hypothesis.

III. Describe various characteristics of Scientific method.

IV. Define Observation. Discuss its advantages and disadvantages.

SECTION—B

V. Explain different types of Random or Probability sampling.

VI. Discuss the importance of Coding and Tabulation in Research.

VII. Define Statistics. Discuss its merits and demerits in Social Research.

VIII. Calculate the mean from the following data :

Items	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40
Frequency	2	5	7	13	21	16	8	3

SECTION—C

(Compulsory)

IX. Write short notes on the following in 5-7 lines each :

1. Research

2. Theory
3. Give TWO limitations of Social Research
4. Quota Sampling
5. Questionnaire
6. Case Study.
7. Primary Data
8. Scientific Method
9. Schedule
10. Objectivity
11. Qualitative Research
12. Interview
13. Editing
14. Experimental Research.

B.D III Exam 2018

Total Pages : 6

PC–3817/MH

C–2058

MODERN INDIAN EDUCATION

(Semester–VI)

Time : Three Hours] [Maximum Marks : 70

Note : Attempt *two* questions each from Sections A & B carrying 10 marks each and the entire Section C consisting of 15 short answer type questions carrying 2 marks each.

SECTION—A

I. Discuss the concept of Secondary Education.

II. Elaborate the objectives of Secondary Education.

III. Enumerate the recommendations of RUSA for Higher Education.

IV. What are the major problems of Higher Education?

SECTION—B

V. What is the meaning and concept of Adult Education?

VI. Discuss the problems of Adult Education.

VII. Elucidate the need of Women Education.

VIII. What is the meaning & status of weaker sections of society ?

SECTION—C

(Compulsory)

IX. Write short notes on :

1. Define secondary education.
2. Two objectives of Indian education commission.
3. Curriculum in secondary education commission.
4. Problems of indiscipline during secondary education.
5. Define Navodya Vidyalaya.
6. U.G.C.

7. Guidance and Counselling Centres.
8. Higher education.
9. Individual aims of adult education.
10. Continuing education.
11. Define non-formal education.
12. Define women education.
13. Multipurpose school.
14. Girl education at secondary level.
15. Problem of drop out in schools.

B.A III [illegible] 2018

Total Pages : 4

PC–3777/MH

C–2058

ਸਿੱਖ ਧਰਮ, ਸਿਧਾਂਤ ਤੇ ਸੰਸਥਾਵਾਂ

(Semester–VI)

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *two* questions from Section A carrying 10 marks each, *five* questions from Section B carrying 5 marks each and the entire Section C consisting of 15 short answer type questions carrying 2 marks each.

SECTION—A

I. Express your views about the compilation of Sri Guru Granth Sahib by Guru Arjun Dev Ji.

II. Write a note on Banis of Dasam Granth.

III. Discuss the historical significance of first var of Bhai Gurdas Ji.

IV. Describe the subject-matter of Sukhmani Sahib.

SECTION—B

V. Explain the concept of Supreme Reality according to Sikhism.

VI. Describe the purpose of Jiva according to Sikh ideology.

VII. Discuss five principles of Khalsa.

VIII. Express your views about the Sarbat Khalsa.

IX. What were the causes of Guru Arjun Dev Ji's Martyrdom?

X. Elaborate the concept of Miri and Piri.

XI. Discuss about the significance of Hukamnama.

SECTION—C

(Compulsory)

XII. Write brief answers :

1. How many Bhatt Sahiban belong to Guru Granth Sahib?
2. Bhai Mardana Ji.
3. Jaap Sahib.
4. Write about the writings of Bhai Gurdas Ji.
5. What is the meaning of Sachiara?
6. Zafarnama.
7. How many Saloks are in Sukhmani Sahib Bani?
8. Akal Purkh.
9. Write two causes of Martyrdom of Guru Teg Bahadur.
10. What is meaning of Brahm Giani?
11. What are the five Takhats?
12. First battle of Anandpur Sahib.
13. Bhai Mani Singh.
14. Who is the founder of Akal Takhat?
15. Meaning of Miri-Piri.

BD III 22 2018

Total Pages : 6

PC–3798/MH

C–2058

COMPUTER NETWORK AND INTERNET PROGRAMMING : BAP–303

(Semester–VI)

Time : Three Hours] [Maximum Marks : 60

Note : Attempt *two* questions each from Sections A & B carrying 12 marks each and the entire Section C consisting of 6 short answer type questions carrying 2 marks each.

SECTION—A

I. Write the working of the following types of transmission media :

(a) Fiber optics

(b) Radio transmission

(c) Infrared waves

(d) Cellular radio

(e) Communication satellite. 12

II. (a) Define Internet. What are the different application areas of internet? Explain.

(b) What are the various internet protocols? Write the purpose of each of them. 6,6

III. Discuss in detail the requirements and working of email system. 12

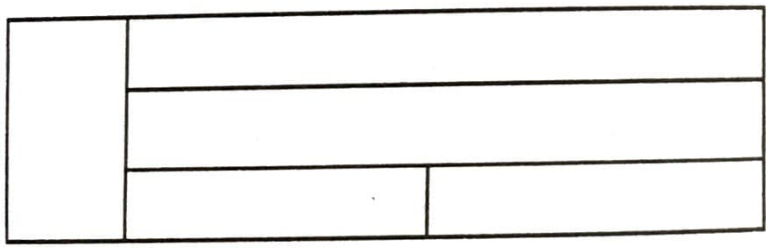
IV. (a) Define the architecture of email system.

(b) Write the format of an email message. 6,6

SECTION—B

V. What do you mean by HTML? What is the structure of a HTML document? Explain by giving suitable example. 12

VI. Write HTML code for creating the following type of table : 12



VII. Define the following :

(a) http

(b) ftp

(c) telnet

(d) mailto

(e) news. 12

VIII. (a) What are image maps? Which shapes can be used in image maps? Explain.

(b) Create a form in HTML for getting name, address and phone number of a user. 6,6

SECTION—C

(Compulsory)

IX. Attempt all questions : 6×2=12

1. Define metropolitan area network.
2. What are the properties of fiber optic cable?
3. How does infrared transmission work?
4. What do you mean by email privacy?
5. What are the main sections of an HTML document?
6. How anchor tags are defined in an HTML document?

Total Pages : 6

PC–3787/MH

C–2058

MUSIC (VOCAL)–A

(Semester–VI)

Time : Three Hours] [Maximum Marks : 38

Note : Attempt *two* questions each from Sections A & B carrying 6 marks each and the entire Section C consisting of 7 short answer type questions carrying 2 marks each.

SECTION—A

I. Write down the contribution of Educational institutions in Indian Music during the period of After Independence.

II. Write down the full detail of 'Raagmala Gayan Shailly'.

III. Write down the life sketch of Smt. Hira Bai Barodkar with their contribution towards Indian Music.

IV. Write an essay on the subject of 'Indian Music in Global Perspective'.

SECTION—B

V. What do you mean by 'Paudi' in the context of Gurmat Sangeet?

VI. Write the Notation of fast khayal of Raga Bhairavi with simple Alap and Taans.

VII. Give the brief introduction of Folk Singing style used in Gurmat Sangeet.

VIII. Give the full introduction of Raga Marva.

SECTION—C

(Compulsory)

IX. Write brief answers :

1. Write down the name of Gurus who composed Parhtal in Guru Granth Sahib.
2. Write the name of Resources for preaching of Indian music after the time of independence.

3. What do you mean by 'Alahuni' in the context of Gurmat Sangeet?
4. Write down the Aroh and Avroh of Raga Purvi.
5. To which Gharana did Ustad Bade Ghulam Ali Khan belong to?
6. What Ang is used to sing 'Pade' in Gurmat Sangeet?
7. Write Tali and Khali of Tal Tilwara.

Total Pages : 4

PC–3783/MH

C–2058

PUNJABI SAHIT (ELECTIVE)

(Semester–VI)

Time : Three Hours] [Maximum Marks : 75

ਭਾਗ—ਓ

I. ਕਿਸੇ *ਇੱਕ* ਪ੍ਰਸ਼ਨ ਦਾ ਉੱਤਰ ਲਿਖੋ :

(ਓ) ਗੁਰੂ ਨਾਨਕ ਕਾਲ ਵਿਚ ਉਪਜੀ ਸੂਫ਼ੀ ਕਾਵਿਧਾਰਾ ਬਾਰੇ ਜਾਣਕਾਰੀ ਦਿਓ।

(ਅ) ਸ੍ਰੀ ਗੁਰੂ ਗ੍ਰੰਥ ਸਾਹਿਬ ਦੀ ਸਾਹਿਤ ਵਿਸ਼ੇਸ਼ਤਾ ਤੇ ਸਮਾਜਿਕ ਮਹਾਨਤਾ ਬਾਰੇ ਆਪਣੇ ਵਿਚਾਰ ਪ੍ਰਗਟ ਕਰੋ। 12

II. ਹੇਠ ਲਿਖਿਆਂ ਵਿਚੋਂ ਕਿਸੇ *ਇੱਕ* ਬਾਰੇ ਚਰਚਾ ਕਰੋ :

(ਓ) ਸਾਹਿਤ ਤੇ ਸਮਾਜ

(ਅ) ਸਾਹਿਤ ਤੇ ਸਭਿਆਚਾਰ। 11

ਭਾਗ—ਅ

III. ਕਿਸੇ *ਇਕ* ਦੀ ਪਰਿਭਾਸ਼ਾ, ਪ੍ਰਕਿਰਤੀ ਤੇ ਤੱਤ ਲਿਖੋ :

(ੳ) ਸਫਰਨਾਮਾ

(ਅ) ਜੀਵਨੀ। 11

IV. 'ਮੇਰਾ ਪਾਕਿਸਤਾਨੀ ਸਫਰਨਾਮਾ' ਪੁਸਤਕ ਵਿਚ ਲੇਖਕ ਉਥੋਂ ਦੇ ਲੋਕਾਂ ਦੇ ਸੁਭਾ, ਜੀਵਨ ਤੇ ਸਭਿਆਚਾਰ ਬਾਰੇ ਕੀ ਜਾਣਕਾਰੀ ਦਿੰਦਾ ਹੈ?

ਜਾਂ

ਬਲਰਾਜ ਸਾਹਨੀ ਦੀ ਦਿੱਲੀ ਤੋਂ ਲਹੌਰ ਯਾਤਰਾ ਦਾ ਵਰਣਨ ਕਰੋ। 11

ਭਾਗ—ਏ

V. ਹੇਠ ਲਿਖੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਸੰਖੇਪ ਉੱਤਰ ਦਿਓ :

1. ਪੰਜਾਬੀ ਵਿਚ ਕਿਹੜੇ ਨਾਥ-ਜੋਗੀਆਂ ਦੀ ਰਚਨਾ ਮਿਲਦੀ ਹੈ? ਉਹਨਾਂ ਦੇ ਨਾਂ ਦੱਸੋ।

2. ਗੁਰੂ ਗ੍ਰੰਥ ਸਾਹਿਬ ਵਿਚ ਮਿਲਦੀ ਸ਼ੇਖ ਫਰੀਦ ਜੀ ਦੀ ਬਾਣੀ ਬਾਰੇ ਜਾਣਕਾਰੀ ਦਿਓ।

3. ਪੀਲੂ ਨੇ ਕਿਹੜਾ ਕਿੱਸਾ ਲਿਖਿਆ?

4. ਕਿੱਸਾ ਕਾਵਿ ਦਾ ਪਿਤਾਮਾ ਕਿਸ ਨੂੰ ਕਿਹਾ ਜਾਂਦਾ ਹੈ?

5. ਗੁਰੂ ਗ੍ਰੰਥ ਸਾਹਿਬ ਵਿਚ ਕਿਹੜੇ ਗੁਰੂ ਸਾਹਿਬਾਨ ਦੀ ਬਾਣੀ ਮਿਲਦੀ ਹੈ? ਉਹਨਾਂ ਦੇ ਨਾਂ ਲਿਖੋ।

6. 'ਮੇਰਾ ਪਾਕਿਸਤਾਨੀ ਸਫਰਨਾਮਾ' ਦੇ ਲੇਖਕ ਨੇ ਜੇਲ-ਘਰ ਵਿਚ ਰਾਤ ਕਿਸ ਤਰ੍ਹਾਂ ਗੁਜਾਰੀ?

7. ਲੇਖਕ ਨੂੰ ਲਹੌਰ ਨਾਲੋਂ ਰਾਵਲਪਿੰਡੀ ਕਿਉਂ ਚੰਗੀ ਲਗਦੀ ਸੀ?

8. ਅੰਮ੍ਰਿਤਸਰ ਪਹੁੰਚਣ ਤੇ ਲੇਖਕ ਦੁਆਰਾ ਪਾਕਿਸਤਾਨੀ ਕਰੰਸੀ ਬਦਲਣ ਵਾਲੇ ਤੋਂ ਕਰੰਸੀ ਲੈਣ ਦੀ ਘਟਨਾ ਨਾਲ ਉਸ ਦੇ ਮਨ ਵਿਚ ਕੀ ਵਿਚਾਰ ਉਠੇ?

9. ਭੇਰੇ ਪਹੁੰਚ ਕੇ ਲੇਖਕ ਨੂੰ ਆਪਣਾ ਘਰ ਕਿਸ ਤਰ੍ਹਾਂ ਲੱਭਾ?

10. ਲੇਖਕ ਨੂੰ ਝੰਗ ਦੇ ਲੋਕ ਕਿਹੋ ਜਿਹੇ ਲੱਗੇ?

11. ਸ਼ਾਲੀਮਾਰ ਬਾਗ ਵਿਚ ਲੇਖਕ ਨੂੰ ਕੀ ਕੁਝ ਚੇਤੇ ਆਇਆ?

12. ਸੰਮੀ ਧ੍ਰੀਸ ਨਾਚ ਬਾਰੇ ਤੁਸੀਂ ਕੀ ਜਾਣਦੇ ਹੋ?

13. ਲੇਖਕ ਨੇ ਟੈਕਸਿਲਾ ਦੇ ਅਜਾਇਬਘਰ ਵਿਚ ਕੀ ਕੁਝ ਵੇਖਿਆ?

14. ਸਾਹਿਤ ਦੇ ਤੱਤ ਲਿਖੋ।

15. ਸਾਹਿਤ ਦੀ ਪਰਿਭਾਸ਼ਾ ਲਿਖੋ। 15×2=30

Total Pages : 12

PC–3786/MH

C–2058

QUANTITATIVE METHODS–II

(Semester–VI)

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *two* questions each from Sections A & B carrying 12 marks each. Attempt any *nine* short answer type questions from Section C carrying 3 marks each.

SECTION—A

I. (a) Find the maximum and minimum values of the function :

$$x^3 - 2x^2 + x + 6.$$

(b) If $f(x) = \log \frac{1+x}{1-x}$, show that :

$$f\left(\frac{2x}{1+x^2}\right) = 2\, f(x).$$

6+6=12

II. (a) If $xy+\frac{x}{y}=x^2-y$, then find $\frac{dy}{dx}$.

(b) Find the derivative of

$$y=\frac{\sqrt{x+1}+\sqrt{x-1}}{\sqrt{x+1}-\sqrt{x-1}}.$$

6+6=12

III. (a) If $A=\begin{bmatrix}1 & -2 & 3\\ -4 & 2 & 5\end{bmatrix}$ and $B=\begin{bmatrix}2 & 3\\ 4 & 5\\ 2 & 1\end{bmatrix}$, show that

$AB \neq BA$.

(b) Find the adjoint and inverse of the following matrix :

$$A=\begin{bmatrix}1 & 3 & 0\\ -2 & 3 & 3\\ 1 & 1 & 4\end{bmatrix}.$$

6+6=12

IV. (a) Explain the merits and demerits of arithmetic mean and median.

(b) Calculate Karl Pearson's coefficient of skewness from the data given below :

Age :	10-20	20-30	30-40	40-50	50-60
No. of Persons :	18	20	30	22	10

6+6=12

SECTION—B

V. (a) Discuss in brief the various methods of studying correlation.

(b) Calculate Karl Pearson's coefficient of correlation between expenditure on advertisement and sales from the following data :

Advertisement Costs (in thousand rupees)	Sales (in lakh rupees)
39	47
65	53
62	58
90	86
82	62
75	68
25	60
98	91
36	51
78	84

6+6=12

VI. (a) Explain the relationship between correlation and regression analysis.

(b) Calculate the two regression equations from the following data and also estimate X when Y = 26 :

X :	10	12	13	17	18	20	24	30
Y :	5	6	7	9	13	15	20	21

6+6=12

VII. (a) Discuss the main problems faced in the construction of index numbers.

(b) Calculate Fisher's Ideal Index from the following data and prove that it satisfies both the time and factor reversal tests :

Commodity	Price	Quantity	Price	Quantity
A	6	50	10	56
B	2	100	2	120
C	4	60	6	60
D	10	30	12	24
E	8	40	12	36

6+6=12

VIII. (a) Discuss briefly the various components of time series. 2

(b) Fit a straight line by using the method of least squares and also estimate X when Y = 26 :

X :	10	12	13	17	18	20	24	30
Y :	5	6	7	9	13	15	20	21

6+6=12

SECTION—C

(Compulsory)

IX. Write short notes on any *nine* of the following :

1. Distinguish between equal and equivalent sets.
2. Explicit and implicit functions.
3. Identity matrix.
4. Define mode.
5. Standard deviation.

6. Rank correlation.

7. Limitations of index numbers.

8. Weighted index numbers.

9. Importance of time series.

10. Moving average method. 9×3=27

BA III 2018

Total Pages : 6

PC–3815/MH

C–2058

DRAMATIC ART

(Semester–VI)

Time : Three Hours] [Maximum Marks : 48

Note : Attempt *two* questions each from Sections A & B carrying 8 marks each and the entire Section C consisting of 8 short answer type questions carrying 2 marks each.

SECTION—A

I. Improvisation plays an important role in production process. Discuss.

II. Discuss the play Jin Sach Palley Hoe by keeping in view its interpretation.

III. What is the importance of composition in a production?

IV. What is the difference between Grand Rehearsal and Stage Performance?

SECTION—B

V. Write a note on the play Rishtian Da Ki Rakhiye Naam.

VI. Discuss any two characters of the play Rishtian Da Ki Rakhiye Naam.

VII. Discuss the plot of the play Rata Salu.

VIII. Discuss the characterization of the play Rata Salu.

SECTION—C

(Compulsory)

IX. Write brief answers :

1. Write names of the female characters of the play Jin Sach Palley Hoe.
2. What is the name of the protagonist of the play Jin Sach Palley Hoe?
3. What is the role of audience in theatre?
4. Write the name of the antagonist of the play Rata Salu.

5. Write the names of any two male characters of the play Rata Salu.
6. What is the name of the protagonist of the play Rishtian Da Ki Rakhiye Naam?
7. The play Rishtian Da Ki Rakhiye Naam is based on which story?
8. What is the relationship between Sahadat Hassan Manto and the play Rishtian Da Ki Rakhiye Naam?

Total Pages : 4

PC-3773/MH

C-2058

MATHEMATICAL METHODS–II

Opt. (iii)

(Semester–VI)

Time : Three Hours] [Maximum Marks : 36

Note : Attempt *two* questions each from Section A and B carrying 5½ marks each, and the entire Section C consisting of 7 short answer type questions carrying 2 marks each.

SECTION–A

I. (a) If $\bar{f}(p)$ is the Fourier transform of the function $f(x)$ which satisfies the Dirichlet conditions in every finite interval $(-a, a)$ and is such that $\int_{-\infty}^{\infty} |f(x)|\,dx$ is convergent, then $f(x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\infty} \bar{f}(p) e^{-ipx} \, . \, dp$ at every point of continuity of $f(x)$.

(b) Find the Fourier transform of

$$f(x) = \begin{Bmatrix} 1 - x^2, & |x| \le 1 \\ 0, & |x| > 1 \end{Bmatrix}$$

and hence evaluate $\int_0^{\infty} \frac{x \cos x - \sin x}{x^3} \cos (x/2)\, dx$.

(3+2½=5½)

II. (a) If $\bar{f}_s(p)$ is the Fourier sine transform of the function $f(x)$, then Fourier sine transform of $f(ax)$ is $\frac{1}{a}\bar{f}_s\left(\frac{p}{a}\right)$.

(b) Find the Fourier sine transform of function of e^{-x} and using the inversion formula recover the original function. (3+2½=5½)

III. (a) If $\bar{f}_c(p)$ and $\bar{f}_s(p)$ are the Fourier cosine transform and sine transform of the function $f(x)$ respectively, then show that

$$F_c(f(x)\sin ax) = \frac{1}{2}\left[\bar{f}_s(p+a) - \bar{f}_s(p-a)\right].$$

(b) Let $f(x) = e^{-ax}$, and $g(x) = 1$, for $0 < x < a$ and 0 for $x > a$. Find $F_c(f(x))$, $F_c(g(x))$ and using Parseval's identity, prove that $\int_0^\infty \frac{\sin ax\, dx}{(a^2+x^2)x} = \frac{\pi(1-e^{-a^2})}{2a^2}$. (3+2½=5½)

IV. (a) State and prove Parsevel's identity for Fourier transform.

(b) Find Finite Fourier sine transform of $f(x) = x^2,\ 0 < x < a$. (3+2½=5½)

SECTION–B

V. (a) Using Laplace transform, solve $\frac{d^2y}{dt^2} + y = e^{-2t}\sin t$ where $y(0) = y'(0) = 0$.

(b) Using Lapalce transform, solve

$$t\frac{d^2y}{dt^2} + (1-2t)\frac{dy}{dt} - 2y = 0$$

where $y(0) = 1$, $y'(0) = -2$. (3+2½=5½)

VI. (a) Solve $\left(\frac{dx}{dt} - 2x\right) - \left(\frac{dy}{dt} - y\right) = 6e^{3t}$;

$$\left(2\frac{dx}{dt} - 3x\right) + \left(\frac{dy}{dt} - 3y\right) = 6e^{3t},$$

by using Laplace transform, where $x(0) = 3$ and $y(0) = 0$.

(b) Using Laplace transform, solve

$$\frac{\partial^2 y}{\partial x^2} = \frac{\partial^2 y}{\partial t^2},\ 0 < x < a,\ t > 0,$$

where $y(x, 0) = 0$, $y_t(x, 0) = \sin(\pi x/a)$ and $y(0, t) = 0$, $y(a, t) = 0$. (3+2½=5½)

VII. A slab of homogeneous material has ends $x = 0$ and $x = a$. It has initial temperature V_0. Find the temperature $V(x, t)$ in the solid after the face $x = 0$ is insulated and temperature of the face $x = a$ becomes zero. (5½)

VIII. Find the solution of Laplace equation for U inside the semi-infinite strip; $x > 0$, $0 < y < \beta$ where $U = F(x)$ at $y = 0$ and $x > 0$; $U = 0$; at $y = \beta$ and $x > 0$; $U = 0$ at $x = 0$ and $0 < y < \beta$. (5½)

SECTION–C

IX. (a) Attempt all the following :

Show that $e^{-x}\cos x = \frac{2}{\pi}\int_0^{\infty} \frac{(p^2+2)\cos px}{p^2+4}\,dp$ where $x \geq 0$, using Fourier cosine integral transform.

(b) Explain Dirichlet's conditions.

(c) If $F_s(f(x)) = \bar{f}_s(p)$ is the Fourier sine transform of $f(x)$ then $F_s(f(ax)) = \frac{1}{a}\bar{f}_s\left(\frac{p}{a}\right)$.

(d) Show that

$$F_c(tf(t)) = \frac{d}{dp}\bar{f}_s(p), \text{ where } \bar{f}_s(p) = F_s(f(x)).$$

(e) Find Finite Fourier sine and cosine transform of $f(x) = 1$ in $(0, \pi)$.

(f) Solve, using Lapalce transform, $\frac{d^2y}{dt^2} + \pi^2 y = 0$, where $y(0) = 0$, $y(1) = 0$.

(g) Write a short note on the choice of Infinite sine or cosine Fourier transform to solve Partial differential equation. (7×2=14)

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Total Pages : 4

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हिन्दी साहित्य

(Semester–VI)

Time : Three Hours] [Maximum Marks : 75

नोट : निर्देशानुसार उत्तर दीजिए।

खण्ड-क

I. किसी **एक** प्रश्न का उत्तर विस्तार में दीजिए :

(क) रामा के चरित्र की विशेषताएँ स्पष्ट कीजिए।

(ख) 'सुभद्रा कुमारी चौहान' शीर्षक का सार लिखिए। 9

II. किसी **एक** गद्यांश की सप्रसंग व्याख्या कीजिए :

(क) तब मैंने तीसरे पहर से सन्ध्या तक वहाँ रहने का निश्चय किया, परन्तु पता चला, घीसा किस-किसाती आँखों को मलता और पुस्तक की बार-बार धूल झाड़ता हुआ दिन भर वहीं पेड़ के नीचे बैठा रहता है।

(ख) बीमारी के सम्बन्ध में रामा से अधिक सेवापरायण और सावधान व्यक्ति मिलना कठिन था। एक बार जब छोटे भाई के चेचक निकली, तब वह शेष को लेकर ऊपर के खण्ड

में इस तरह रहा कि हमें भाई का स्मरण ही नहीं आया। रामा की सावधानी के कारण ही मुझे कभी चेचक नहीं निकली। 5

III. किसी **एक** प्रश्न का उत्तर विस्तार में दीजिए :

(क) जयशंकर प्रसाद का लेखकीय परिचय दीजिए।

(ख) 'ध्रुवस्वामिनी' नाटक के उद्देश्यों की विवेचना कीजिए। 9

IV. किसी **एक** गद्यांश की सप्रसंग व्याख्या कीजिए :

(क) मैं महादेवी ही हूँ न? यदि यह सत्य है तो क्या तुम मेरी आज्ञा से कुमार चन्द्रगुप्त को यहाँ बुला सकती हो? मैं चाहती हूँ कि अमात्य के साथ ही कुमार से भी कुछ बातें कर लूँ।

(ख) और आप लोग कुबड़ों, बौनों और नपूंसकों का नृत्य देखेंगे। मैं जानना चाहती हूँ कि किसने सुख-दुख में मेरा साथ न छोड़ने की प्रतिज्ञा अग्नि-वेदी के सामने की है? 5

खण्ड-ख

V. किसी **एक** प्रश्न का उत्तर विस्तार में दीजिए :

(क) हिन्दी आलोचना के इतिहास पर प्रकाश डालिए।

(ख) हिन्दी आत्मकथा के इतिहास पर विचार कीजिए। 9

VI. किसी **एक** प्रश्न का उत्तर विस्तार में दीजिए :

(क) निबन्ध का स्वरूप स्पष्ट कीजिए।

(ख) संस्मरण के तत्त्वों पर प्रकाश डालिए। 8

खण्ड-ग

VII. निम्नलिखित लघु प्रश्नों के उत्तर अति संक्षेप में दीजिए :

(क) लेखिका चीनी फेरीवाला से कुछ खरीदना क्यों नहीं चाहती थी?

(ख) लेखिका को चीनी फेरीवाला ने किस सम्बोधन से सम्बोधित किया?

(ग) महादेवी वर्मा ने लछमिन का नामकरण किस आधार पर भक्तिन कर दिया?

(घ) भक्तिन की जेठानियाँ उसे तंग क्यों करती थीं?

(ङ) सास ने भक्तिन को पिता की मृत्यु की सूचना क्यों नहीं दी?

(च) लड़के घीसा से कुछ खिंचे-खिंचे क्यों रहते थे?

(छ) लेखिका रामा से क्यों प्रभावित होती है?

(ज) रामा निष्ठावान् कैसे है?

(झ) जीवनी क्या है?

(ञ) रेखाचित्र क्या है?

(ट) निबन्ध क्या है?

(ठ) शकराज कौन है?

(ड) ध्रुवस्वामिनी क्या चाहती हैं?

(ढ) ध्रुवस्वामिनी रामगुप्त को क्लीव एवं कापुरुष क्यों कहती हैं?

(ण) चन्द्रगुप्त के मन में रामगुप्त के प्रति कैसे भाव हैं?

(15×2=30)