Time : Three Hours]   [Maximum Marks : 80

Note :   Attempt all questions.

1.   Transcribe any *eight* words out of the given twelve :

Trees, Drink, View, Home, Obey, People, Station, Become, Spin, Grave, Mind, Battle.

8

2.   Answer any *four* questions in about 30 words each :

(a)   Discuss the relevance of the title 'Choosing Our Universe'.

(b)   Write about the positive side of rebelliousness.

(c)   How do symbols like 'Ganga' influence people ?

(Languange and National Identity)

(d)   According to Dr. Kalam, what influence does a story have on our mind ?

(e)   Discuss the difficulties faced by young students.

(The Responsibility of Young Men)

(f)   What were the problems faced by the peasants all over India ?

(Bharat Mata)

(4×2=8)

3. Answer any *five* questions in about 100 words each :

(a) What is the tone of the chapter 'Chossing Our Universe' ?

(b) Suggest some steps that can be taken to preserve biodiversity.

(c) What does the word 'identity' mean ?

(The Generation Gap)

(d) What is the result of the 'paralysing effect' ?

(Wounded Plants)

(e) What relation does the author establish between man and language ?   (Language and National Identity)

(f) Gandhiji decided to take lessons in various fields to make himself a perfect English gentleman. What were these field ?

(g) Discuss the negative aspects of story-telling.

(Great Book Born Out of Great Mind)

(h) Explain the statement : Loyalty to the country comes ahead of all other loyalties.   (5×4=20)

4. Read the passage given below and answer the questions that follow :

Language is the most efficient weapon of self-discovery or self-analysis. It is that invisible part of the human body, which gives man an inner sight. The link between language and self-awareness puts man in a separate and unique category from all other living beings. This consiousness of his own incompleteness makes him yearn for fulfilment.....Thus, the determination to attain it is also intrinsic or its realisation. No culture is limited only to its reality, but also reveals itself through its dreams, and that is why language plays a very significant role in the shaping of culture.

Questions :

(i) In what way does language help man ?

(ii) How does language make man different from other living things ?

(iii) What makes man yearn for fulfilment ?

(iv) What role does language play in the shaping of culture ?   4

5. (a) Write antonyms of the following (Any *two*) :

(i) Successful.

(ii) Superior.

(iii) Polite.

(b) Write synonyms of any *two* of the following :

    (i) For off.

    (ii) Ability.

    (iii) Entire.

(c) Give one-word for the following (Any *two*) :

    (i) An official announcement.

    (ii) One who knows many languages.

    (iii) Not completely dry.

(d) Make sentences of the following words (Any *two*) :

    (i) Knowledge.

    (ii) Foreign

    (iii) Complex.   (2×4=8)

6. (a) Fill in the blanks with the suitable form of verbs given in brackets (Any *twelve*) :

    (i) We now .... England.   (learn)

    (ii) You already .... three cups of tea. (drink)

    (iii) A thief .... into our house last night.   (break)

    (iv) He .... to see you but you were not at home.   (come)

    (v) I .... my work by tomorrow evening.   (finish)

    (vi) The baby .... because it is hungry.   (cry)

    (vii) Two thieves .... from the prison last night. (escape)

    (viii) The sun .... when you get up. (shine)

    (ix) I .... for her since noon, but she .... as yet.   (wait/not come)

    (x) The boy .... down while he ....   (fall/run)

    (xi) When I .... the post-office, it .... already.   (reach/close)

    (xii) I .... a letter from my brother.   (just receive)

    (xiii) We .... a Sports Day in our school every year.   (have)

    (xiv) India .... great progress in the coming years.   (make)

    (xv) It .... in the year 2006.   (happen)

(b) Do as directed (Any *twelve*) :

(A) Form Abstract nouns from the given adjectives :

   (i) Cruel.

   (ii) Brave.

   (iii) Great.

(B) Complete each sentence with a pronoun ending with -self or -selves :

   (i) He look at .... in the mirror.

   (ii) I picked up a very hot plate and burnt ....

   (iii) I'm not angry with you, I'm angry with ....

(C) Supply the proper form of the given adjective :

   (i) Her doll is .... than yours. (pretty)

   (ii) Honour is .... to us than life. (dear)

   (iii) He is the .... man in our town. (rich)

(D) Fill in the blanks with suitable prepositions :

   (i) Do you work .... Sundays ?

   (ii) The Red Fort is .... Delhi.

   (iii) My House is .... the end of the street.

(E) Choose the right word for the blank space :

   (i) This is a nice camera. Is it .... ? (your/yours)

   (ii) .... room is bigger than .... (My/Mine)(her/hers)

   (iii) They play chess daily. It is a favourite game of .... (their/theirs)

   12

7. Write one paragraph (in about 200 words) on any *one* of the following :

(a) The Crown and Glory of Life is Character.

(b) Noise Pollution.

(c) Indiscipline and Students.

(d) Science and Modern Warfare.

   8

GSE/D-16

704

Time : Three Hours]

HINDI (Compulsory)

[Maximum Marks : 80

नोट : निम्नलिखित प्रश्नों के निर्देशानुसार उत्तर दीजिए।

1. निम्न में से किन्हीं दो की सप्रसंग व्याख्या कीजिए :

(क) पानी ही ते हिम भया, हिम हैं गया बिलाई।
   जो कुछ था सोई भया, अब कछु कहा न जाई॥
   माया दीपक नर पतंग, भ्रमि भ्रमि इवैं पड़ंता।
   कहै कबीर गुरु ग्यान थैं, एक आध उबरंता॥

(ख) कान्हा चलत पग है है धरनी।
   जो मन में अभिलाष करत हौं, सो देखत नंदघरनी।
   रुनुक-झुनुक नूपुर बाजत पग, यह अति है मन हरनी।
   बैठ जात पुनि उठत तुरत ही, सो छवि जाय न बरनी।

(ग) कल कानन कुण्डल मोर पंखा,
   उर पे बनमाल बिराजति है।
   मुरलीकर में अधरा मुसकानि,
   तरंत महाछवि छाजति है।

(घ) प्रभु तो मिलण कैसे होय।
   पाँच पहर धन्धे में बीते, तीन पहर सोया।
   मानव जनम अमोलक पायो, सो ते डारयो खोया।
   मिसों के प्रभु गिरधर भजीये, होनी होय सो होय।

(6×2=12)

[P.T.O.

2. सूर अथवा रसखान में से किसी **एक** कवि का साहित्यिक परिचय दीजिए।   8

3. निम्न में से किन्हीं **चार** प्रश्नों के उत्तर लगभग 150 शब्दों में दीजिए :

(क) कबीर में समाज सुधार की दृष्टि को स्पष्ट करें।

(ख) सूर का वात्सल्य अनुपम है, प्रकाश डालिए।

(ग) बिहारी की अलंकार योजना पर संक्षिप्त टिप्पणी लिखिए।

(घ) मीरा की प्रेम भावना पर प्रकाश डालिए।

(ङ) घनानंद के विरह-वर्णन पर प्रकाश डालिए।

(च) तुलसी की भाषा शैली पर संक्षिप्त टिप्पणी लिखिए।

(4×4=16)

4. निम्न में से दो प्रश्नों के उत्तर दीजिए :

(क) आदिकाल की सामान्य प्रवृत्तियों का उल्लेख करो।

(ख) रासो काव्य परंपरा पर प्रकाश डालिए।

(ग) आदिकाल की परिस्थितियों का वर्णन कीजिए।

(घ) साहित्येतिहास की लेखन परंपरा का उल्लेख कीजिए।

(8×2=16)

5. निम्न में से किन्हीं दो प्रश्नों के उत्तर 150 शब्दों में दीजिए :

(क) पृथ्वीराज रासो की रस योजना को स्पष्ट करें।

(ख) रासो ग्रंथों की भाषा शैली पर प्रकाश डालिए।

(ग) 'बीसलदेव' नामकरण पर विचार-विमर्श कीजिए।

(घ) आदिकाल की सीमा निर्धारण पर समीक्षा कीजिए।

(5×2=10)

6. निम्न में से दो प्रश्नों के उत्तर दीजिए :

(क) प्रमुख काव्य तत्वों का वर्णन कीजिए।

(ख) वीर रस की परिभाषा एवं उदाहरण दीजिए।

(ग) श्लेष अलंकार की परिभाषा एवं उदाहरण दीजिए।

(घ) दोहा छन्द की परिभाषा एवं उदाहरण दीजिए।

(5×2=10)

7. सभी वस्तुनिष्ठ प्रश्नों के उत्तर दीजिए :

(क) रसखान का पूरा नाम लिखिए।

(ख) साहित्य लहरी के लेखक का नाम क्या है?

(ग) बिहारी किस राजा का दरबारी कवि था?

(घ) घनानंद की प्रेमिका का क्या नाम था?

(ङ) आदिकाल को 'बीजवपनकाल' किसने कहा?

(च) छन्द कितने प्रकार के होते हैं? नाम लिखिए।

(छ) शब्दशक्ति के कितने भेद हैं?

(ज) श्रृंगार रस का स्थायी भाव कौन-सा है?   8

GSE/D-16

HINDI (Elective)

705

Time : Three Hours]

[Maximum Marks : 80

नोट : सभी प्रश्न अनिवार्य हैं।

खण्ड-क

1. निम्नलिखित पद्यांशों में से किन्हीं दो की सप्रसंग व्याख्या कीजिए :

(क) प्रकृति की प्रच्छन्नता को जीत,
सिन्धु से आकाश तक सबको किये प्रकम्पित,
सृष्टि को निज बुद्धि से करता हुआ परिमेय,
चीरता परमाणु की सत्ता अटल, अजेय।

(ख) देह ही लड़की नहीं है जूझते मन-प्राण,
साथ होते क्षेम से इसके कला विज्ञान
इस मनुज के हाथ से विज्ञान के भी फूल
वज्र होकर छूटे शुभ धर्म अपना भूल।

(ग) नरमनता नित्य नूतन बुद्धि का त्योहार,
प्राण में करते दुःखी हो देवता चीत्कार
चाहिए उनको न केवल ज्ञान
देवता हैं माँगते कुछ स्नेह कुछ बलिदान।

(घ) विश्व-वाहक, मृत्यु-वाहक, सृष्टि का संताप
ज्ञान-पथ पर अन्य बढ़ते ज्ञान का अभिशाप
भ्रमित प्रज्ञा का कुछुक यह इन्द्रजाल विचित्र
श्रेय मानव के न आविष्कार वे अपवित्र।

(2×4=8)

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8. निम्नलिखित प्रश्नों में से किन्हीं दो का उत्तर लगभग 200 शब्दों में दीजिए:

(क) आदिकाल की प्रवृत्तियाँ स्पष्ट करें।
(ख) आदिकाल के नामकरण की समस्या का विवेचन करें।
(ग) मैथिलकोकिल विद्यापति भक्त या शृंगारी कवि का सोदाहरण विवेचन कीजिए।
(घ) आदिकाल की सामाजिक-सांस्कृतिक दशा का वर्णन कीजिए।

9. निम्नलिखित वस्तुनिष्ठ प्रश्नों के उत्तर दीजिए : (2×9=18)

(क) पृथ्वीराज रासो का प्रधान रस क्या है?
(ख) आदिकाल की प्रमुख भाषा क्या थी?
(ग) अमीर खुसरो के गुरु का नाम क्या था?
(घ) रामधारी सिंह दिनकर की तीन रचनाओं के नाम बताएँ।
(ङ) 'कुरुक्षेत्र' में कुल कितने सर्ग हैं?
(च) 'हानूश' की पत्नी एवं बेटी कौन-कौन थीं?
(छ) 'हानूश' के अतिरिक्त भीष्म साहनी की दो अन्य रचनाएँ कौन-कौन सी हैं?
(ज) रामधारी सिंह दिनकर कहाँ के उपकुलपति रहे थे? 8

2. नामकरण के आधार पर 'कुरुक्षेत्र' की समीक्षा कीजिए।

(अथवा)

'कुरुक्षेत्र' के काव्य-सौन्दर्य पर प्रकाश डालिए।

3. निम्नलिखित में से किन्हीं दो का लगभग 200 शब्दों में उत्तर दीजिए : 8

(क) श्रीमतिरामगढ़ की चारित्रिक विशेषताएँ लिखिए।

(ख) 'कुरुक्षेत्र' के उद्देश्य को स्पष्ट कीजिए।

(ग) 'कुरुक्षेत्र' के छठे सर्ग के आधार पर उसके कलापक्ष पर प्रकाश डालिए।

(घ) 'कुरुक्षेत्र' के काव्य स्वरूप पर प्रकाश डालिए। (2×3=6)

खण्ड-ख

4. निम्नलिखित गद्यांशों में से किन्हीं दो की सप्रसंग व्याख्या कीजिए :

(क) अपनी बच्ची को कैसे पालूँ? मुझे सभी उपदेश देते हैं। मेरा बेटा सर्दी में ठिठुर कर मर गया। जाड़े के दिनों में सारा दिन खाँसता रहता था घर में इतना ईंधन भी नहीं था कि मैं कमरा गर्म रख सकूँ।

(ख) यह उसके लिए मुश्किल के दिन हैं। अगर यह कामयाब हो गया तो तुम्हारी सब परेशानियाँ दूर हो जायेंगी। हानूश के हाथ से अगर घड़ी बन गई तो महाराज इसे मालामाल कर देंगे। दुनिया में इसकी शोहरत फैलेगी।

(ग) बादशाह की इसी में बादशाहत होती है उसके हाथ में भगवान ने तराजू दे रखा है जो भी पलड़ा भारी होता है राजा दूसरे पलड़े का वज़न बढ़ाकर फिर से एक जैसा कर लेता है। यही नीति है।

(घ) क्या गिरजे वालों ने दौलत इकट्ठी नहीं कर ली? क्या कोई दुनिया में ऐसा है जो पादरी लोग नहीं करते? अगर वे लोग अच्छे और नेक हों तो क्योंकर उन पर कोई ऊँगली उठायेगा? (2×4=8)

5. 'हानूश' नाटक के आधार पर हानूश की चारित्रिक विशेषताएँ लिखें। 8

अथवा

'हानूश' नाटक की तात्विक समीक्षा कीजिए।

6. निम्नलिखित में से किन्हीं दो के उत्तर लगभग 200 शब्दों में दीजिए :

(क) 'हानूश' के नामकरण की सार्थकता स्पष्ट कीजिए।

(ख) काव्य की चारित्रिक विशेषताएँ बताएँ।

(ग) हानूश की मंचनीयता पर प्रकाश डालिए।

(घ) हानूश के प्रतिपाद्य को स्पष्ट कीजिए। (2×4=8)

खण्ड-ग

7. निम्नलिखित प्रश्नों में से कोई दो प्रश्न कीजिए :

(क) अमीर खुसरो के हिन्दी काव्य की विशेषताएँ बताएँ।

(ख) पृथ्वीराज रासो की प्रामाणिकता की समीक्षा कीजिए।

(ग) आदिकाल की प्रमुख परिस्थितियों पर प्रकाश डालिए।

(घ) हिन्दी साहित्येतिहास लेखन परम्परा पर विस्तृत विवेचन कीजिए। 8

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GSE/D-16
PUNJABI (ELECTIVE)

Time : Three Hours]　　　　　　　　　[Maximum Marks : 80

1. ਭਾਈ ਵੀਰ ਸਿੰਘ ਜਾਂ ਪ੍ਰੋਫੈਸਰ ਸਾਹਿਬ ਜਾਂ ਦਿਆਲ ਦੀ ਜੀਵਨੀ
ਵਿਚ ਕਿਸੇ ਇਕ ਵਾਰੀ ਦੇ ਸਹਿਤ ਤੇ ਰਚਨਾ ਬਾਰੇ ਆਪਣੇ ਵਿਚਾਰ
250-300 ਸ਼ਬਦਾਂ ਵਿਚ ਕਰੋ।　　　　　　　5

2. ਹੇਠ ਲਿਖੇ ਕਾਵਿ-ਟੋਟਿਆਂ ਵਿਚੋਂ ਕਿਸੇ ਦੋ ਦੀ ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ
ਕਰੋ :

(ੳ)　ਵਿਦਿਆਰਥ ਅਖਰਾ ਅੰਦਰ
　　　ਤੂੰ ਮਿਨਤਰ ਲੁਕਾਈ
　　　ਅਸਲ ਨਾਮ ਬੁਝੇ ਤੇ ਵੇਖੀ,
　　　ਤੂੰ ਤੂੰ ਦਿਸਤੇਰੀ।

(ਅ)　'ਜੀਵ ਜੀਂਦ ਰਹੋ' ਬੁਲਾਈ
　　　ਆ ਵੇ ਵਤ ਤੇ ਮੇਰੀ ਬਾਤ,
　　　ਹਮ ਲਹਿਰਾ ਵਿਚ ਖੇਡੀ ਬਾਤ,
　　　ਤੇ ਘੁਲੀ ਘੁਲੀ ਨਾ ਸਾਰੇ ਸੰਨੇ ਪਾਵ,
　　　ਬੜੀ ਪੇੰਦਾਵ ਦੀ।

(ੳ) ਨਕਦ ਵਿਚ ਔਰਤ ਮਹਾ ਦੇਣਾ ਚਹੀ,
ਇਸ ਲਈ ਅੰਤਰ ਦੀ ਕੁਝ ਲਿਆਈ ਚਹੀ,
ਇਸ ਲਈ ਪੁਰਬ ਵੀ ਤੇ ਪ੍ਰਮੁਖ ਹੈ ਕੀ ?
ਹੁਣ ਦੀ ਵੇਰੀ ਵਰਤਾ ਨਹੀਂ।
ਮਾਰਦੇ ਜਨ ਇਸ ਨੂੰ ਜਮ ਦੇ ਦਾਅਣੇ।

(ਅ) ਅੰਦ ਸਮਾਜ ਦਰਖਤਾਂ ਨਹੀਂ ਕੋਣਾ।
ਅੰਦ ਸਮਾਜ ਸੰਦਾਨਕ ਨਹੀਂ ਮੰਗਦਾ।
ਦਰਖਤਾਂ ਹੈ ਹੋਰ ਆਧੀ ਪਾਉਣਦਾ।
ਕਿ ਹੁਣਾਂ ਸੇਵਦੀ ਫੀ-
ਮਾਣ ਲਈ ਮੁਖੀ ਬਧਾਵਾ।
ਨਹ ਲਈ ਦਿਨ ਦੇਵਾ,
ਮਾਪ ਬਿੱਧੂ ਧੁਰ ਪਏ ?　　　(5+5=10)

3. ਨਾਨਕ ਸਿੰਘ ਦੇ ਜੀਵਨ ਤੇ ਰਚਨਾ ਬਾਰੇ 250-300 ਸ਼ਬਦਾਂ ਵਿਚ ਟਿੱਪਣੀ ਲਿਖੋ।　　　5

4. 'ਪੰਜਾਬ ਪਾਰਟੀ ਨਾਵਲ ਦੇ ਕਿਸੇ ਪ੍ਰਮੁੱਖ ਪਾਤਰ ਦਾ ਚਰਿਤਰ ਚਿਤਰਨ ਕਰੋ।　　　10

5. ਕਿਸੇ ਪੰਜਾਬੀ ਦੇ ਅਖਬਾਰ ਦੇ ਸੰਪਾਦਕ ਨੂੰ ਆਪਣੇ ਸ਼ਹਿਰ ਵਿਚ ਹੋ ਰਹੇ ਪ੍ਰਦੂਸ਼ਣਾਂ ਬਾਰੇ ਧਿਆਨ ਦਿਵਾਉਣ ਸੰਬੰਧੀ ਪੱਤਰ/ਚਿੱਠੀ ਲਿਖੋ।
　　ਜਾਂ
　　ਤੁਹਾਡੇ ਪਿੰਡ ਵਿਚ ਨੇੜੇ-ਤੇੜੇ ਕੋਈ ਕ੍ਰਿਸ਼ਮੇਤੀ ਜਾਂ ਯਾਦਗਾਰ ਨਹੀਂ ਹੈ, ਇਹ ਜਿੰਦੀ ਲਿਖ ਦੇ ਆਪਣੇ ਪਿੰਡ ਵਿਚ ਕ੍ਰਿਸ਼ਮੇਤੀ ਵੇਚਣ ਦੀ ਲੋੜ ਬਾਰੇ ਪੈਨੇਗੀ-ਪੈਨੇਗੀ ਲਿਖੋ।　　　10

6. ਹੇਠ ਲਿਖੇ ਮੁਹਾਵਰਿਆਂ ਵਿਚੋਂ ਕਿਸੇ ਦੇ ਅਰਥ ਸਪੱਸ਼ਟ ਕਰਕੇ ਲਈ ਦਾਖ ਵਿਚ ਵਰਤੇ :
ਇਮਤਿਹਾਨੀ ਵਰਤੋਂ, ਕੁਝ ਬਣਾਉਣਾ, ਅੰਦੋਂ ਵਿਚ ਵਰਕਣਾ, ਅੰਦ ਦੇ ਭਾਸ਼ ਨਾਲ ਦੇਖਣਾ, ਸਿਰੋ ਨੰਗੀ ਹੋਣਾ, ਇਕ ਨੇਖਰੀ, ਜੇਬ ਧੇ ਮਾਰਨਾ, ਕੰਨਾਂ ਹੈ ਹਥ ਲਾਉਣਾ, ਨੇੜੇ ਸਾਜ ਕਰਨਾ।　　　(1×10=10)

7. ਹੇਠ ਲਿਖੇ ਸ਼ਬਦਾਂ ਵਿਚੋਂ ਕਿਸੇ ਦੇ ਸ਼ਬਦ ਜੋੜ ਸ਼ੁੱਧ ਕਰੋ :
ਉਧਾਰ, ਅੰਬਰ, ਸਿਪਾਹੀ, ਧੀ, ਪੋਤਰਾ, ਜਬਾਨੇ, ਉਪਾਯ, ਵੀਰ, ਸੁਰਮ, ਪਰੀਤਮ।　　　(1×10=10)

8. ਹੇਠ ਲਿਖੇ ਅੰਗਰੇਜੀ ਦੇ ਸ਼ਬਦਾਂ ਵਿਚੋਂ ਕਿਸੇ ਦਾ ਪੰਜਾਬੀ ਰੂਪ ਕਿਸੇ ਗੁਣ ਵਿਚੋਂ ਲਿਖੋ :
Action, Allotment, Application, Arrears, Book-post, Branch, Capital, Circular, Copy, Day book, Document, Eligible, Estimate Dear Mr. Entry.　　　10

9. ਹੇਠ ਲਿਖੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਬਹੁਵਿਕਲਪੀ ਵਿਚੋਂ ਠੀਕ ਵਿਕਲਪ ਚੁਣੋ :
(i) 'ਬਾਲਵਰ ਚਰਿਤਰ ਕਿਸ ਦੀ ਰਚਨਾ ਹੈ ?
　　(ੳ) ਪ੍ਰੀਤਮ ਸਾਇਦ ਦੀ
　　(ਅ) ਪ੍ਰੋ ਪੂਰਨ ਸਿੰਘ ਦੀ
　　(ੲ) ਬਾਬਾ ਬਲਵੰਡ ਦੀ
　　(ਸ) ਭਾਈ ਕਾਹਨ ਸਿੰਘ ਦੀ

(ii) ਇਮਤਿਹਾਨੀ ਦੇ ਸ਼ਬਦ ਕਦੋਂ ਮਨਾਇਆ ਜਾਂਦਾ ਹੈ ?
　　(ੳ) ਸਵੇਰੀ ਮੁੰਦਰ ਤੇ
　　(ਅ) ਕਮਰਾ ਬੰਦ ਤੇ
　　(ੲ) ਗਰਮੀ-ਰੁਤ ਆਉਂਦ ਤੇ
　　(ਸ) ਦਰਵਾ-ਰੁਤ ਆਉਂਦ ਤੇ

(iii) ਮੋਹਨ ਸਿੰਘ ਕਿਸ ਪ੍ਰਭਾਵ ਦਾ ਵਿਰੋਧੀ ਹੈ ?
(ੳ) ਰੁਮਾਂਟਿਕ
(ਅ) ਅੰਗਰੇਜ਼ੀ
(ੲ) ਸਮਾਜਵਾਦੀ
(ਸ) ਸਹਿਜਤਾਈ

(iv) 'ਉੱਮ ਦਾ ਧਾਰੀ ਕਵਿਤਾ ਕਿਸ ਲੇਖਕ ਦੀ ਹੈ ?
(ੳ) ਡਾ. ਹਰਿਭਜਨ ਸਿੰਘ ਦੀ
(ਅ) ਬਾਬਾ ਫਰੀਦ ਦੀ
(ੲ) ਅੰਮ੍ਰਿਤਾ ਪ੍ਰੀਤਮ ਦੀ
(ਸ) ਹਰਭਜਨ ਸਿੰਘ ਕੋਮਲ ਦੀ

(v) 'ਬਟਾਲਵਾਂ ਕਵਿਤਾ ਦਾ ਲੇਖਕ ਕੌਣ ਹੈ ?
(ੳ) ਹਰਭਜਨ ਹਲਵਾਰਵੀ
(ਅ) ਹਰਭਜਨ ਸਿੰਘ ਕੋਮਲ
(ੲ) ਡਾ. ਹਰਭਜਨ ਸਿੰਘ
(ਸ) ਦਿਆਲ ਬੇਂ ਮਿਹਰਬਾਨੀ
(1×5=5)

10. 'ਪਹਿਲਾ ਪਾਕੀ' ਨਾਵਲ ਵਿਚੋਂ ਦਿੱਤੇ ਗਏ ਬਹੁਵਿਕਲਪੀ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਠੀਕ ਵਿਕਲਪ ਚੁਣੋ :

(i) ਸ. ਨਰੇਵ ਸਿੰਘ ਦਾ ਜਨਮ ਕਦੋਂ ਹੋਇਆ ?
(ੳ) 1896 ਈ.
(ਅ) 1897 ਈ.
(ੲ) 1898 ਈ.
(ਸ) 1899 ਈ.

(ii) ਪੈਨ ਸ਼ਾਲ ਦੇ ਸੀਤਲ ਦਾ ਸਹਾਰਾ ਕੌਣ ਬਣਿਆ ?
(ੳ) ਦੀਨਾ
(ਅ) ਬਿਨਾਰ
(ੲ) ਸਾਧੂਸ਼ਾਮ
(ਸ) ਅਤਰ ਸਿੰਘ

(iii) ਬਿਨਾਰ ਵੀਰਾ ਨਾਲ ਕਿਹੜੇ ਸ਼ਹਿਰ ਸੈਨਿਕ ਸਪਲਾਈ ਕਰਦਾ ਚਾਹੁੰਦਾ ਸੀ ?
(ੳ) ਡੇਟ-ਵਰਾ
(ਅ) ਸਿੰਗਵਾੜਾ
(ੲ) ਪਠੀਪਠਾਨੀ
(ਸ) ਹਿਨੀਅੀ

(iv) ਬਿਨਾਰ ਕਿਸ ਦੀਨ ਦਾ ਰਹੀਦ ਸੈਨਿਕ ਸੀ ?
(ੳ) ਸ਼ਰਾਬ ਦਾ
(ਅ) ਚੋਬਾਜ ਦਾ
(ੲ) ਅਫ਼ੀਮ ਦਾ
(ਸ) ਚਾਹ ਤੇ ਸਿਗਰਟਾਂ ਦਾ

(v) ਬਿਨਾਰ ਸਾਰੀ ਉਮਰ ਕਿਸ ਦੀ ਸੇਵਾ ਕਰਦਾ ਰਿਹਾ ?
(ੳ) ਮਾਪਿਆਂ ਦੀ
(ਅ) ਸਰਦਾਰ ਅਤਰ ਸਿੰਘ ਦੀ
(ੲ) ਦੀਨਾ ਦੀ
(ਸ) ਪੈਨ ਸ਼ਾਲ ਦੇ ਪਰਿਵਾਰ ਦੀ
(1×5=5)

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GSE/D-16

SANSKRIT (Compulsory)

Time : Three Hours]   [Maximum Marks : 80

1. निम्नलिखित सभी प्रश्नों के उत्तर दीजिए :

   (क) 'समुद्रवं चर' पाठ किस मूल ग्रन्थ से उद्धृत है?

   (ख) आर्दिकाव्य रामायण के लेखक कौन है?

   (ग) 'सद्वृत्तम्' पाठ के मूल ग्रन्थ का नाम लिखिए।

   (घ) 'पंचतन्त्र' के रचयिता कौन है?

   (ङ) 'बद्रु' में कौन-सा लकार और पुरुष प्रयुक्त हुए है?

   (च) 'कवय:' में कौन-सी विभक्ति और वचन है?

   (छ) सन्धि के मुख्य भेदों के नाम लिखिए।

   (ज) 'इत्यादि' कौन-सी सन्धि का उदाहरण है?   (8×2=16)

2. (क) किन्हीं दो श्लोकों का सरलार्थ कीजिए :

   (अ) भवतां भयं भीषणां भीषणानां

   गति: प्राणिनां पावनं पावनानां।

   महो्ऽसि पदानां नियन्तृ त्वमेकं

   परेषां पर रक्षणां रक्षणानाम्॥

   (ब) अकृतान्नमासाद्य राजानमनये रतम्।

   समुद्धतानि विनश्यन्ति राष्ट्राणि नगराणि च॥

(स) किं शोचमिहलोकेऽस्य गतस्त्वस्य सम्प्रति।
रणे राक्षसराड्ढते प्रमुदे इव पाण्डु॥

(ख) 'साधुवचनं' **अथवा** 'ईहस्त्वं' पाठ का सार लिखिए।

(द) अर्थं हि विविनस्ति पुरुषार्थम्यस्य

विच्छेदने क्रियाः सर्वाः प्रोक्ताः कुसरितो यथा॥

(2×5=10)

3. (क) किन्हीं दो का सन्दर्भ कीजिए :

(अ) सत्यास्मान प्रमदेवल्भ्यः प्रमदेन प्रमदेवल्भ्यः कुशलान
प्रमदेवल्भ्यः भूयो न प्रमदेवल्भ्यः देवविश्वकायाभ्यो न
प्रमदेवल्भ्यः माहूदेवो भव पितृदेवो भव आचार्यदेवो भव
अतिथिदेवो भव

(ब) तानी दिनेषु गच्छस्तु तनीरावहिष्ठानाः षुद्रशरका।ः गजपादाहिती-
मिश्रचूर्णिता। अन्नतरं शिलमिखो नाम राशकुंचिरन्तन्यामास-
अनेन गत्वर्थेन विपसाछुलितेन प्रत्यस्तू अत्र आगत्वल्भ्यः,
तनो विनद्स्ममस्कुलम्।

(स) न स्थालव्यं न मन्तव्यं दुर्जनेन समं क्वचित्।
काकसंगाढतो हंसस्तिष्ठन गच्छेच्च वतेक्ः॥ (2×5=10)

(ख) 'बुद्धिस्य बलं तस्य' **अथवा** 'नाउइच्छायोपदिश्यते' पाठ का
सार लिखिए। 6

4. (क) किन्हीं **दो** के यथानिर्दिष्ट विभक्तियों में रूप लिखिए :

(अ) कवि— तृतीया, पंचमी, सप्तमी।

(ब) पितृ— प्रथमा, तृतीया, पंचमी।

(द) फल— द्वितीया, चतुर्थी, षष्ठी। 8

(ख) निम्नलिखित में से किसी **एक** धातु के यथानिर्दिष्ट लकारों में
रूप लिखिए :

(अ) भू— लट् लकार, विधिलिङ् लकार।

(ब) दा(यच्छ)— लृट् कार, लोट् लकार। 8

5. (क) निम्नलिखित में से किन्हीं **चार** में सन्धि **अथवा** सन्धिच्छेद
कीजिए :

नर + ईश:, विद्या + आलय:, प्रति + एकम्, गौ + अक:,
सूक्ति:, सप्तर्षि:, स्वागतम्, गायक:। (4×2=8)

(ख) श्रीमद्भगवद्गीता के किन्हीं **चार** श्लोकों का शुद्ध लेखन
कीजिए। (4×2=8)

Roll No. ....

Total Pages : 4

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709

SANSKRIT (Elective)

Time : Three Hours]

[Maximum Marks : 80

1. निम्नलिखित सभी प्रश्नों के उत्तर दीजिए :

(क) 'मित्रलाभ' किस ग्रन्थ से लिया गया है?

(ख) 'हितोपदेश' के रचयिता का नाम लिखिए।

(ग) भर्तृहरि ने कितने शतकों की रचना की?

(घ) नीतिशतक के लेखक का नाम लिखिए।

(ङ) 'रामम्' पद किस विभक्ति और वचन का रूप है?

(च) 'गमिष्यामि' पद में कौन-सा लकार है?

(छ) 'अष्टाध्यायी' के लेखक का नाम लिखिए।

(ज) 'सन्धि' की परिभाषा लिखिए।

(8×2=16)

2. (क) किन्हीं दो का हिन्दी में सरलार्थ कीजिए :

(अ) कङ्कणस्य तुलोपेन मन: पूर्व सुदुस्तरा।
वृक्ष्णाङ्ग सम्बन्ध: परिधक: स: मूले यथा।।

(ब) लोभात् क्रोध: प्रभवति, लोभात् काम: प्रजायते।
लोभात् मोहश्च नाशश्च, लोभ: पापस्य कारणम्।।

(व) किन्हीं **चार** का सन्धि-विच्छेद कीजिए :

मेधालय: नरेन्द्र:

कवीश: इत्यादि

विद्यार्थी नमस्ते

परोपकार: सज्जन:।

(4×1=4)

(ख) प्रश्न-पत्र में पूछे गए श्लोकों से भिन्न किन्हीं **दो** श्लोकों का लेखन कीजिए।

(2×4=8)

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(स) तेन व्याधेन तण्डुलकणान् विकीर्य जालं विस्तीर्णम्।
स: च प्रच्छन्नो भूत्वा स्थितः, तस्मिन्नेव काले
चित्रग्रीवनामा कपोत- राज: सपरिवारो विचरति
विस्तस्तोभस्तण्डुलकणानवलोक्यमास। ततः
कपोतराजस्तण्डुलकणान्दृष्ट्वा कपोतान्

(ख) वृक्ष-व्याध और लालची-पक्षिक की कथा **अथवा** सिंह और
बिलाव की कथा का सार लिखिए।   6

3. (क) किन्हीं **दो** श्लोकों का ससन्दर्भ कीजिए :

(अ) अग्रे: सुखमाराध्य: सुखतरमाराध्यते विशेषज्ञ:।
ज्ञानलवदुर्विदग्धं ब्रह्मापि तं नरं न रञ्जयति॥

(ब) साहित्यसंगीतकलाविहीन: साक्षात्पशु: पुच्छविषाणहीन:।
तृणं न खादन्नपि जीवमानस्तद्भागधेयं परमं पशूनाम्॥

(स) कुसुमस्तबकस्येव द्वयी वृत्तिर्मनस्विन:।
मूर्ध्नि वा सर्वलोकस्य शीर्यते वने वा॥

(द) दानं भोगो नाशस्तिस्रो गतयो भवन्ति वित्तस्य।
यो न ददाति न भुङ्क्ते तस्य तृतीया गतिर्भवति॥   (2×5=10)

(ख) किन्हीं **एक** सूक्ति की सप्रसंग व्याख्या कीजिए :
"सत्संगति: कथय किम् न करोति पुंसाम्"?

अथवा

"सर्वे गुणा: काञ्चनमाश्रयन्ते"।   6

4. (क) किन्हीं **दो** के यथानिर्दिष्ट विभक्तियों में रूप लिखिए :
राम (तृतीया, पञ्चमी)।
लता (प्रथम, तृतीया)।
भानु (द्वितीया, तृतीया)।
पितृ (प्रथमा, द्वितीया)।   (2×4=8)

(ख) किन्हीं **दो** धातुओं के यथानिर्दिष्ट लकारों में रूप लिखिए :
भू (विधिलिङ्)।
नम् (लट् लकार)।
गम् (लृट् लकार)।
हस् (लोट् लकार)।   (2×4=8)

5. (क)(अ) किन्हीं **चार** की सन्धि कीजिए :

विद्या + आलय:	दिन + अङ्क:
मुनि + ईश:	यदि + अपि
हित + उपदेश:	सुर + इन्द्र:
सु + आगतम्	जगत् + ईश:।

   (4×1=4)

GSE/D-16

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HISTORY

[Ancient India (From Earliest Times to Gupta Age)]

Paper-I

Opt. (i)

Time : Three Hours]   [Maximum Marks : 80

Note : The question paper consists of *nine* questions. The candidate is required to attempt *five* questions in all. The Question No. 1 is compulsory containing eight questions of equal marks (i.e., 2 marks each). The candidate is required to attempt remaining *four* questions selecting *one* question from each Unit. The Map Question will be carrying 10 marks for map work and 6 marks for explanatory note. For visually disabled candidates, the part relating to the explanatory note will carry full marks.

नोट : प्रश्न-पत्र में कुल **नौ** प्रश्न दिए गए हैं। परीक्षार्थियों को कुल पाँच प्रश्न करने हैं। प्रश्न क्रमांक 1 अनिवार्य है जिसमें **आठ** प्रश्न हैं तथा सभी के अंक समान हैं। प्रत्येक भाग में से एक प्रश्न चुनते हुए शेष किन्हीं **चार** प्रश्नों के उत्तर दें। नेत्रहीन परीक्षार्थियों के लिए मानचित्र सम्बन्धी प्रश्न में टिप्पणी वाले भाग के पूरे अंक होंगे।

(e) Which one of the following Harappan site is situated in Haryana?

(i) Kalibangan

(ii) Lothal

(iii) Mitathal

(iv) Ropar

निम्न में से कौन-सा पुरास्थल हरियाणा में स्थित है?

(अ) कालीबंगा

(ब) लोथल

(स) मिताथल

(द) रोपड़।

(f) Where the Great Buddha delivered his first sermon.

(i) Kushinagar

(ii) Gaya

(iii) Sarnath

(iv) Rajgrhaih.

महात्मा बुद्ध ने अपना प्रथम उपदेश कहाँ दिया था?

(अ) कुशीनगर

(ब) गया

(स) सारनाथ

(द) राजगृह।

(g) Who was the greatest ruler of the Satvahana dynasty?

(i) Simuk

(ii) Vashisthipura Pulumavi

(iii) Gautmiputra Satkarni

(iv) Yajshri Satkarni.

सातवाहन वंश का सबसे महान शासक कौन था?

(अ) सिमुक

(ब) वाशिष्ठिपुत्र पुलुमावी

(स) गौतमीपुत्र सातकर्णी

(द) यज्ञश्री सातकर्णी।

(h) Gupta-Samvat was started in

(i) 78 A.D.

(ii) 58 A.D.

(iii) 320 A.D.

(iv) 622 A.D.

गुप्त-संवत् आरम्भ हुआ?

(अ) 78 ई. में

(ब) 58 ई. में

(स) 320 ई. में

(द) 622 ई. में।

UNIT–I (इकाई–I)

2. Define history. Discuss its meaning and scope.

   इतिहास को परिभाषित कीजिए। इसके अर्थ और क्षेत्र का विवेचन कीजिए।

3. Highlight the salient feature of town-planning of Harappan Civilization.

   हड़प्पा सभ्यता की नगर योजना की प्रमुख विशेषताओं पर प्रकाश डालिए।

UNIT–II (इकाई–II)

4. Highlight the Indian social system on the basis of the references evidenced in Later-Vedic literature.

   उत्तर-वैदिक साहित्य में प्राप्त सन्दर्भों के आधार पर भारतीय समाज-व्यवस्था पर प्रकाश डालिए।

5. Write an essay on the origin and development of caste system in Ancient India.

   प्राचीन भारत में जाति व्यवस्था की उत्पत्ति एवं विकास पर एक निबन्ध लिखिए।

UNIT–III (इकाई–III)

6. Highlight the salient feature of Mauryan administration.

   मौर्य कालीन प्रशासनिक व्यवस्था की प्रमुख विशेषताओं पर प्रकाश डालिए।

7. Write an essay on trade and commerce during the Gupta period.

   गुप्तकालीन व्यापार तथा वाणिज्य पर एक निबन्ध लिखिए।

UNIT–IV (इकाई–IV)

8. Show the important Harappan sites of Haryana in the map of India and write a short note on the same.

   भारत के मानचित्र में हरियाणा के प्रमुख हड़प्पा कालीन पुरास्थलों को दर्शाइए तथा उन पर एक लघु टिप्पणी लिखिए।

9. Show the Ashokan edicts in the map of India and write a short note on the same.

   भारत के मानचित्र में अशोक के अभिलेखों के प्राप्ति स्थलों को दर्शाइए तथा उन पर एक लघु टिप्पणी लिखिए।

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POLITICAL SCIENCE

(Indian Constitution)

Option–I

Time : Three Hours]　　　　　　　　[Maximum Marks : 80

Note : Attempt any *five* questions in all. All questions carry equal marks.

नोट : किन्हीं **पाँच** प्रश्नों के उत्तर दीजिए। सभी प्रश्नों के अंक समान हैं।

UNIT–I (इकाई–I)

1. Discuss various sources of Indian Constitution.

   भारतीय संविधान के विभिन्न स्रोतों की चर्चा कीजिए।

2. Write a note on the Preamble of the Indian Constitution.

   भारतीय संविधान की प्रस्तावना पर एक टिप्पणी लिखिए।

UNIT–II (इकाई–II)

3. What are the Emergency powers of President of India?

   भारत के राष्ट्रपति की आपातकालीन शक्तियाँ क्या हैं?

4. Kindly highlight the Importance of Chief Minister.

मुख्य मंत्री के महत्व को उजागर कीजिए।

UNIT-III (इकाई-III)

5. What are the powers and role of Speaker of Lok Sabha.

लोकसभा के अध्यक्ष की शक्तियाँ तथा भूमिकाएँ क्या हैं?

6. Highlight the role of Panchayati Raj after 73वें संशोधन के पश्चात् पंचायती राज की भूमिका को उजागर कीजिए।

UNIT-IV (इकाई-IV)

7. What are the powers and functions of Supreme Court of India?

भारत के सर्वोच्च न्यायालय की शक्तियाँ तथा कार्य क्या हैं?

8. What is the importance of Judicial review in India?

भारत में न्यायिक समीक्षा का क्या महत्त्व है?

9. Objective type questions (multiple choice) :

वस्तुनिष्ठ प्रश्न (बहुविकल्पीय) :

(i) When did constituent assembly meet for the first time?

(a) 9 Dec. 1946

(b) 10 Dec. 1947

(c) 15 Aug. 1947

(d) 26 Jan. 1950.

संविधान सभा की पहली बैठक कब हुई थी?

(क) 9 दिसम्बर, 1946

(ख) 10 दिसम्बर, 1947

(ग) 15 अगस्त, 1947

(घ) 26 जनवरी, 1950.

(ii) Supreme court of India is situated in which city ?

(a) Chennai

(b) Mumbai

(c) Kolkatta

(d) Delhi.

भारत का सर्वोच्च न्यायालय किस शहर में स्थित है?

(क) चेन्नई

(ख) मुम्बई

(ग) कोलकाता

(घ) दिल्ली।

(iii) Who appoint Governer in India ?

  (a) Cabinet

  (b) Vice-President

  (c) President

  (d) Prime Minister.

भारत में राज्यपाल की नियुक्ति कौन करता है?

  (क) मंत्रिमण्डल

  (ख) उप-राष्ट्रपति

  (ग) राष्ट्रपति

  (घ) प्रधानमंत्री

(iv) Which part of Indian Constitution deals with directive principles of state policy ?

  (a) 1st

  (b) IInd

  (c) IIIrd

  (d) IVth.

संविधान में कौन-से भाग निर्देशात्मक सिद्धांतों से संबंध रखते हैं?

  (क) प्रथम

  (ख) द्वितीय

  (ग) तृतीय

  (घ) चतुर्थ।

(v) Who can remove president of India?

  (a) Parliament

  (b) Cabinet

  (c) Prime Minister

  (d) None of these.

भारत के राष्ट्रपति को कौन हटा सकता है?

  (क) संसद

  (ख) मंत्रिमण्डल

  (ग) प्रधानमंत्री

  (घ) इनमें से कोई भी नहीं

(vi) Provision relating to amend itself lies in which article of Indian constitution?

  (a) Article 370

  (b) Article 248

(c) Article 268

(d) None of the above.

भारतीय संविधान में स्वयं के संशोधन के प्रावधान से संबंधित कौन-सा अनुच्छेद है?

(क) अनुच्छेद 370

(ख) अनुच्छेद 248

(ग) अनुच्छेद 268

(घ) उपरोक्त में से कोई नहीं

(vii) Which Article of Indian Constitution Makes provision of special status to state of Jammu & Kashmir?

(a) 270

(b) 370

(c) 271

(d) 371.

भारतीय संविधान का कौन-सा अनुच्छेद जम्मू एवं कश्मीर राज्य को विशेष राज्य का दर्जा देने के प्रावधान से संबंधित है?

(क) 270

(ख) 370

(ग) 271

(घ) 371.

(viii) Right to religious freedom is mentioned in which Article of Indian Constitution?

(a) Article 25 to 28

(b) Article 23 to 24

(c) Article 19 to 22.

धार्मिक स्वतंत्रता के अधिकार का उल्लेख भारतीय संविधान के किस अनुच्छेद में हैं?

(क) अनुच्छेद 25 से 28

(ख) अनुच्छेद 23 से 24

(ग) अनुच्छेद 19 से 221

Roll No. ....

Total Pages : 7

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MICRO ECONOMICS

Paper-I

Time : Three Hours]   [Maximum Marks : 80

Note : Attempt *five* questions in all. Question No. 1 and 2 are compulsory. Attempt the remaining *three* questions selecting *one* question each from any three of the four units.

नोट : कुल **पाँच** प्रश्नों के उत्तर दीजिए। प्रश्न संख्या 1 तथा 2 अनिवार्य हैं। बाकी तीन प्रश्नों के लिए **चार** इकाइयों में से किन्हीं तीन में से **एक-एक** प्रश्न चुनें।

Compulsory Questions (अनिवार्य प्रश्न)

1. Raman goes to market having ₹ 100 in his pocket. If price of coke is ₹ 5 and samosa is ₹ 10 then answer the following questions :

   (a) Show various combinations that he can purchase with ₹ 100.

   (b) Draw the Budget line.

   (c) What is the slope of Budget line ?

   (d) If price of coke falls from ₹ 5 to ₹ 2, how budget line will change ?   (4×4=16)

यदि रमन जेब में ₹ 100 लेकर बाजार जाता है, जहाँ कोक की कीमत ₹ 5 तथा समोसे की कीमत ₹ 10 है तो निम्न प्रश्नों के उत्तर दें :

(क) वह ₹ 100 में किन संयोगों को खरीद सकता है?

(ख) बजट रेखा बनाएं।

(ग) बजट रेखा का ढलान बतायें।

(घ) यदि कोक की कीमत ₹ 5 से कम होकर ₹ 2 हो जाती है तो बजट रेखा पर क्या प्रभाव पड़ेगा?

2. (A) Choose the correct answer.

(a) Consumer wants to maximise
   (i) Wealth
   (ii) Sales
   (iii) Satisfaction
   (iv) Profit.

(b) The slope of supply curve is normally
   (i) Negative
   (ii) Positive
   (iii) Horizontal
   (iv) None.

(c) At break even point
   (i) TR = TC
   (ii) TR > TC
   (iii) TR< TC
   (iv) None.

(d) Sale-purchase of a commodity is known as
   (i) Demand
   (ii) Production
   (iii) Exchange
   (iv) None.

(e) Measurement of utility in numbers is called
   (i) Cardinal
   (ii) Ordinal
   (iii) Both
   (iv) None.

(5×1=5)

सही उत्तर का चुनाव करें।

(क) उपभोक्ता क्या अधिकतम करना चाहता है?
   (i) धन
   (ii) बिक्री
   (iii) संतुष्टि
   (iv) लाभ।

(ख) सामान्यतः पूर्ति वक्र का ढलान होता है
   (i) ऋणात्मक
   (ii) धनात्मक
   (iii) समानान्तर
   (iv) कोई नहीं।

(ग) समविच्छेद बिन्दु पर

  (i) TR = TC

  (ii) TR > TC

  (iii) TR< TC

  (iv) कोई नहीं

(घ) किसी वस्तु की खरीद-बेच कहलाती है

  (i) मांग

  (ii) उत्पादन

  (iii) विनिमय

  (iv) कोई नहीं

(ङ) संख्याओं में उपयोगिता का माप कहलाता है

  (i) गणनावाचक

  (ii) क्रमवाचक

  (iii) दोनों

  (iv) कोई नहीं

(B) Match the following :

  (a) Adam Smith   (1) Capitalism

  (b) Price Mechanism   (2) Less Elastic Demand

  (c) Necessities   (3) Wealth of Nations

  (d) Law of Diminishing Maginal Utility   (4) Marshall

  (e) Principles of Economics   (5) Gossen's First Law

                                      (5×1=5)

निम्न का मिलान करें :

  (क) एडम स्मिथ   (1) पूंजीवाद

  (ख) कीमत तन्त्र   (2) कम लोचशील मांग

  (ग) अनिवार्यताएं   (3) राष्ट्रों का धन

  (घ) घटती सीमान्त उपयोगिता का नियम   (4) मार्शल

  (ङ) अर्थशास्त्र के नियम   (5) गोसेन का प्रथम नियम

(C) Define the following :

  (a) Production possibility curve.

  (b) Contraction of demand.

  (c) Cross elasticity of demand.

                         (3×2=6)

निम्न की परिभाषा लिखें :

  (क) उत्पादन संभावना वक्र।

  (ख) मांग का संकुचन।

  (ग) मांग की आड़ी लोच।

UNIT-I (इकाई-I)

3.   Whether Economics is a social or natural science ? Give argument in favour and against.   16

अर्थशास्त्र एक सामाजिक विज्ञान है या प्राकृतिक विज्ञान? इसके पक्ष व विपक्ष में तर्क दें।

4. Define Law of Demand. Why Demand curve slopes down-wards ? 16

माँग के नियम की व्याख्या करें। माँग वक्र का ढलान ऋणात्मक क्यों होता है?

UNIT-II (इकाई-II)

5. What are Indifference curves ? Discuss their properties. 16

तटस्थता वक्र क्या हैं? उनकी विशेषताएं बताएं।

6. Explain Consumer's surplus. How is it measured ? 16

उपभोक्ता की बचत की परिभाषा दें। इसे कैसे मापते हैं।

UNIT-III (इकाई-III)

7. Explain Law of Returns to scale. 16

उत्पादन के पैमाने के नियमों की व्याख्या करें।

8. What is Producer's equilibrium ? Discuss it with the help of isoquants. 16

उत्पादक के संतुलन की व्याख्या करें। सम-उत्पाद वक्रों की सहायता से इसकी व्याख्या करें।

UNIT-IV (इकाई-IV)

9. Explain Short-run Cost curves as per traditional theory of cost. 16

लागत के परम्परावादी सिद्धान्त के अनुसार अल्पकालीन लागत वक्रों की व्याख्या करें।

10. What are AR, MR and TR ? Discuss their relation. 16

AR, MR तथा TR की व्याख्या करें। इनमें क्या सम्बन्ध है?

———————

(छ) आन्तरिक सम्पर्क के लिए प्रयोग की जाने वाली योग क्रियाओं के नाम लिखो (कोई दो)।

(ज) किन्हीं दो शारीरिक संस्थानों के नाम लिखो।

(झ) कोशिका की कोई दो विशेषताएं लिखो।

(ञ) अंग क्या है?

_____

Roll No. ....

HEALTH AND PHYSICAL EDUCATION

Time : Three Hours]   [Maximum Marks : 60

Note : Attempt *five* questions in all, selecting *one* question from each Unit (Unit-I to IV). Question No. 9 of Unit-V is compulsory.

नोट : इकाई I से इकाई IV तक प्रत्येक इकाई में से **एक** प्रश्न का चयन करते हुए कुल **पाँच** प्रश्नों के उत्तर दीजिए। प्रश्न संख्या 9 (इकाई V) अनिवार्य है।

UNIT–I (इकाई–I)

1. Explain in detail about aim, objectives and importance of Physical Education in Modern Society.   10

   शारीरिक शिक्षा का लक्ष्य, उद्देश्य एवं महत्त्व का विस्तार से वर्णन करो।

2. Explain in detail about misconceptions regarding Physical Education.   10

   शारीरिक शिक्षा के बारे में फैली भ्रान्तियों का विस्तार से वर्णन करो।

UNIT–II (इकाई–II)

3. Define Health and its importance in detail.   10

   स्वास्थ्य की परिभाषा लिखो तथा महत्त्व का विस्तार से वर्णन करो।

4. What do you mean by Personal hygiene ? Explain its importance in detail.

व्यक्तिगत स्वच्छता से क्या अभिप्राय है? इसके महत्त्व का विस्तार से वर्णन करें।

UNIT-III (इकाई-III)

5. Explain in detail about meaning of Yoga and its importance for healthy life. 10

योग का अर्थ एवं स्वस्थ जीवन के लिए इसके महत्त्व का विस्तार से वर्णन करें।

6. Write in detail about Pranayama-its meaning, types and their benefits. 10

प्राणायाम का अर्थ, प्रकार एवं लाभ का विस्तार से वर्णन करें।

UNIT-IV (इकाई-IV)

7. Explain in detail about Structure of Cell with diagram. 10

कोशिका की संरचना का सचित्र, विस्तार से वर्णन करें।

8. Define Anatomy and Physcology and explain in detail about its importance in Physical Education. 10

मानव रचना विज्ञान एवं शरीर क्रिया विज्ञान की परिभाषा लिखो तथा शारीरिक शिक्षा में इसके महत्त्व का विस्तार से वर्णन करें।

UNIT-V (इकाई-V)

Compulsory Question
(अनिवार्य प्रश्न)

9. (a) What do you mean by Recreational activities ?

(b) Name any *two* self-defensive Exercises.

(c) Define health according to World Health Organisation (W.H.O.)

(d) Name *three* factors affecting Health.

(e) Define Yoga according to Patanjali.

(f) How Yoga helps in removing mental tension.

(g) Name Yogic Kriyas used for internal cleanliness (any *two*)

(h) Name any *two* systems of Body.

(i) Write down *two* characteristics of Cell.

(j) What is Organ ? 2×10=20

(क) मनोरंजनदायक क्रियाओं से क्या तात्पर्य है?

(ख) किन्हीं दो आत्मरक्षक क्रियाओं के नाम लिखो।

(ग) विश्व स्वास्थ्य संगठन ने स्वास्थ्य की क्या परिभाषा दी है?

(घ) स्वास्थ्य को प्रभावित करने वाले किन्हीं **तीन** कारकों के नाम लिखो।

(ङ) पतञ्जलि ने योग की क्या परिभाषा दी है?

(च) योग किस प्रकार मानसिक तनाव को दूर करने में सहायता करता है?

MUSIC (INSTRUMENTAL)

Paper : I (Theory)

Time : Three Hours] [Maximum Marks : 40

Note : Attempt *five* questions in all, selecting *one* question from each unit. All questions carry equal marks.

नोट : प्रत्येक इकाई में से केवल **एक** प्रश्न चुनते हुए, कुल **पाँच** प्रश्नों के उत्तर दीजिए। सभी प्रश्नों के अंक समान हैं।

UNIT-I (इकाई-I)

1. Write the notation of any Razakhani Gat of your syllabus with two Toras. 8

    अपने पाठ्यक्रम के किसी एक राग की रज़ाखानी गत की स्वरलिपि दो तोड़ों सहित लिखिए।

2. Write the notation of any Maseet Khani Gat of your syllabus with two Toras. 8

    अपने पाठ्यक्रम के किसी एक राग की मसीतखानी गत की स्वरलिपि दो तोड़ों सहित लिखिए।

3. Describe Rag Alhaiya-Bilawal with its Aroh, Avroh and Pokar. 8

    राग अल्हैया बिलावल का वर्णन उसके आरोह-अवरोह तथा पकड़ सहित लिखिए।

4. Write in detail about Rag Yaman and Bhupali. (4+4=8)

राग 'यमन' तथा राग भूपाली के विषय में विस्तारपूर्वक लिखिए।

UNIT-II (इकाई-II)

5. Write in detail about Shruti and Gat. (4+4=8)

श्रुति तथा गत के विषय में विस्तारपूर्वक लिखिए।

6. Write short notes on any *two* of the following :

   (a) Toda.

   (b) Jhala.

   (c) Sangeet.

   (d) Nad (4+4=8)

निम्नलिखित में से किन्हीं दो पर टिप्पणी लिखिए :

   (क) तोड़ा

   (ख) झाला

   (ग) संगीत

   (घ) नद

7. Discuss the structure of Sitar and its techniques. 8

सितार की बनावट तथा उसके बजाने की तकनीक पर चर्चा करें।

UNIT-III (इकाई-III)

8. Differentiate between Folk and Classical music. 8

लोक संगीत तथा शास्त्रीय संगीत में अंतर स्पष्ट कीजिए।

9. Write down the contribution of Ustad Allauddin Khan in the field of music. 8

उस्ताद अलाउद्दीन खाँ का संगीत के क्षेत्र में योगदान लिखिए।

10. Write the notation of Chautal and Ektal with Ekgun and Dugun Laykaries. (4+4=8)

चौताल तथा एकताल को उनकी एकगुण तथा दुगुन लयकारियों में लिपिबद्ध कीजिए।

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GSE/D-16

735

OFFICE MANAGEMENT

Time : Three Hours]

[Maximum Marks : 80

Note : Attempt any *five* questions. All questions carry equal marks.

नोट : किन्हीं **पाँच** प्रश्नों के उत्तर दीजिए। सभी प्रश्नों के अंक समान हैं।

1. What do you mean by Office Management ? State the functions of Office management.

   कार्यालय प्रबन्ध से आपका क्या अभिप्राय है? कार्यालय प्रबन्ध के कार्य बताइए।

2. Who is an Office Manager ? Outline his functions, qualities and qualifications.

   कार्यालय प्रबन्धक कौन होता है? उसके कार्य, खूबियाँ एवं योग्यताओं का वर्णन कीजिए।

3. What is Office Organisation ? Briefly state the basic principles of Office organisation.

   कार्यालय संगठन से क्या तात्पर्य है? कार्यालय संगठन के आधारभूत सिद्धांतों का संक्षेप में बताइए।

4. State briefly the factors to be considered in selecting the site for an office accommodation.

   कार्यालय भवन हेतु स्थान के चुनाव में ध्यान देने वाले तत्वों को संक्षेप में बताइए।

5. "Layout is very important for Office operations." Critically examine this statement.

'कार्यालय संचालन हेतु कार्यालय विन्यास बहुत महत्वपूर्ण है' इस धारणा का आलोचनात्मक रूप से अवलोकन करें।

6. Explain the importance of a good working environment for the office staff. Discuss the consideration you will take into account while planning for office lighting, ventilation and furnishing.

कार्यालय स्टाफ हेतु अच्छे कार्य वातावरण के महत्व की व्याख्या करें। कार्यालय में रोशनी, हवा एवं साजो-सामान हेतु नियोजन में आप के द्वारा ध्यान देने योग्य बातों की व्याख्या करें।

7. What do you understand by Communication ? What factors would you keep in mind while choosing various media of communication for a modern office ?

संदेशवाहन से आपका क्या अभिप्राय है? एक आधुनिक कार्यालय हेतु संदेशवाहन के विभिन्न मीडिया का चयन करते समय आप किन तत्वों को ध्यान में रखेंगे?

8. What do you mean by Office Correspondence ? Explain the role of Internet in Office correspondence.

कार्यालय पत्राचार से आप क्या समझते हैं? कार्यालय पत्राचार में इंटरनेट की भूमिका की व्याख्या कीजिए।

9. State and explain the principles of Office organisation.

कार्यालय संगठन के सिद्धांतों की व्याख्या कीजिए।

10. Explain the factors that affect the degree of decentralisation of authority in an office. Why is it needed ?

एक कार्यालय में अधिकारों के विकेन्द्रीकरण के स्तर को प्रभावित करने वाले तत्वों का वर्णन करें। इसकी क्या आवश्यकता है?

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GSE/D-16

MATHEMATICS

(Algebra)

Paper : BM-111

Time : Three Hours] [Maximum Marks : 27

Note : Attempt *five* questions in all. Question No. 1 is compulsory. Select *one* question from each section.

Compulsory Question

1. (a) If A and B are symmetric matrices, show that AB + BA is symmetric and AB – BA is skew-symmetric. (1½)

    (b) Find the rank of the matrix $A = \begin{bmatrix} 2 & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & 4 \end{bmatrix}$. (1½)

    (c) If α is the eigen value of a non-singular matrix A, then prove that $\dfrac{|A|}{\alpha}$ is an eigen value of adj A. (1½)

    (d) If α, β, γ are the roots of the equation $x^3 + qx + r = 0$, then show that $\sum \dfrac{1}{\alpha} = \dfrac{-q}{r}$. (1½)

    (e) Solve the equation $x^3 - 4x^2 + 6x - 4 = 0$, given that $1 + i$ is one of the roots. (1)

SECTION-I

2. (a) Every square matrix A can be expressed in one and only one way as P + iQ, where P and Q are Hermitian matrices. (2½)

(b) Find the rank of the matrix

$$A = \begin{bmatrix} 1 & 2 & -1 & 3 \\ -2 & -4 & 4 & -7 \\ 1 & 2 & 1 & 2 \end{bmatrix}$$ by reducing it to Normal form. (2½)

3. (a) Verify Cayley-Hamilton Theorem for the matrix

$$A = \begin{bmatrix} 0 & 0 & 1 \\ 3 & 1 & 0 \\ -2 & 1 & 4 \end{bmatrix}$$ and hence compute A^{-1}. (2½)

(b) Prove that any *two* characteristic vectors corresponding to two distinct characteristic roots of a Hermitian matrix are orthogonal. (2½)

SECTION-II

4. (a) For what value of λ, does the system

$$\begin{bmatrix} 1 & -2 & -1 \\ 3 & -1 & 2 \\ 0 & 1 & \lambda \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} -1 \\ 1 \\ 1 \end{bmatrix}$$

has (i) no solution, (ii) unique solution, (iii) more than one solution ? (2½)

(b) Solve completely the following system of equations :

$$x + 2y + 3z = 0$$
$$2x + 3y + 4z = 0$$
$$7x + 13y + 19z = 0.$$ (2½)

5. (a) If A is a real skew-symmetric matrix such that $A^2 + I = 0$, show that A is orthogonal and is of even order. (2½)

(b) Prove that $9x^2 + y^2 + 4z^2 + 6xy - 12xz - 4yz$ is positive semi-definite. (2½)

SECTION-III

6. (a) Form an equation of lowest degree with rational co-efficients, one of whose roots is $\sqrt{2} + \sqrt{-3}$. (2½)

(b) Find the condition that the roots of the equation $x^3 + 3px^2 + 3qx + r = 0$ are in (i) A.P., (ii) G.P. (2½)

7. (a) Solve the equation $15x^4 - 8x^3 - 14x^2 + 8x - 1 = 0$, given that roots are in H.P. (2½)

(b) Find the equation of squared differences of the roots of the equation $x^3 - 7x + 6 = 0$. (2½)

SECTION-IV

8. (a) Solve the equation $x^3 - 3x^2 + 12x + 16 = 0$ by Cardon's method. (2½)

(b) Apply Descarte's method to solve the equation $x^4 - 3x^2 - 42x - 40 = 0$. (2½)

9. (a) Solve the equation $x^4 - 4x^3 - 4x^2 - 24x + 15 = 0$ by Ferrari's method. (2½)

(b) Apply Descarte's rule of sign to prove that all the roots of the equation $x^4 - 3x^3 - 5x^2 + 2x - 1 = 0$ are real. (2½)

GSE/D-16

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MATHEMATICS

(Calculus)

Paper : BM-112

Time : Three Hours] [Maximum Marks : 26

Note : Attempt *five* questions in all. Question No. 1 is compulsory. Select *one* question from each section.

Compulsory Question

1. (a) Evaluate $\underset{x \to 0}{\text{Lt}} \dfrac{x}{|x|}$. 2

   (b) If $y = ae^{mx} + be^{-mx}$, prove that $y_2 - m^2 y = 0$. 1

   (c) Define Radius of curvature. 1

   (d) Evaluate $\displaystyle\int_0^{\pi/2} \sin^6 \theta \, d\theta$. 1

   (e) Define Quadrature. 1

SECTION-I

2. (a) Using ε–δ definition, prove that $|x|$ is a continuous function. 2½

   (b) If $y = \dfrac{\sin^{-1} x}{\sqrt{1-x^2}}$, prove that

   $(1 - x^2)y_{n+2} - (2n + 3)xy_{n+1} - (n + 1)^2 y_n = 0$. 2½

3. (a) State and prove Maclaurin's theorem with Lagrange's form of remainder after n terms.   2½

    (b) If $f(x) = x^3 + 8x^2 + 15x - 24$; calculate the value of

$$f\left(\frac{11}{10}\right)$$

by the aplication of Taylor's series.   2½

SECTION-II

4. (a) Find all the asymptotes of the curve

$$x^3 + 3x^2y - 4y^3 - x + y + 3 = 0.$$ 2½

    (b) Find the asymptotes of the curve $r = \dfrac{2a}{1 + 2\cos\theta}$.   2½

5. (a) If ρ_1 and ρ_2 are the radii of curvature at the extremities of a focal chord of a parabola whose semi latus-rectum is l, prove that $(\rho_1)^{-2/3} + (\rho_2)^{-2/3} = (l)^{-2/3}$.   2½

    (b) Find the radius of curvature at the origin for the curve

$$2x^4 - 4x^3y + xy^2 + 6y^3 - 3x^2 - 2xy + y^2 - 4x = 0.$$ 2½

SECTION-III

6. (a) If $u_n = \int_0^{\pi/2} x^n \sin x \, dx$ and $n > 1$, show that

$$u_n + n(n-1)u_{n-2} = n\left(\frac{\pi}{2}\right)^{n-1}.$$ 2½

    (b) Evaluate the integral

$$\int_0^\infty \frac{x^4}{(a^2 + x^2)^4} \, dx.$$ 2½

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7. (a) Show that the length of the loop of the curve

$$3ay^2 = x(x - a)^2 \text{ is } \frac{4a}{\sqrt{3}}.$$ 2½

    (b) Show that the intrinsic equation of the parabola $y^2 = 4ax$ is

$$s = a \cot\psi \operatorname{cosec}\psi + a \log(\cot\psi + \operatorname{cosec}\psi).$$ 2½

SECTION-IV

8. (a) Find the area common to the parabola $y^2 = 4ax$ and $x^2 = 4ay$.   2½

    (b) Find the area inside the circle $r = \sin\theta$ and outside the cardioid $r = 1 - \cos\theta$.   2½

9. (a) The circle $x^2 + y^2 = a^2$ is revolved about the x-axis. Find the volume of the sphere so formed.   2½

    (b) Find the volume of the solid generated by revolving one loop of the lemniscate $r^2 = a^2 \cos 2\theta$ about the line

$$\theta = \frac{\pi}{2}.$$ 2½

Time : Three Hours]   [Maximum Marks : 80

Note : Attempt all questions.

1. Explain with reference to the context :

    Death be not proud, though some have called thee

    Mighty and dreadful, for thou art not so,

    For those whom thou think'st thou dost overthrow

    Die not, poor Death, nor yet canst thou kill me.

    OR

    A people starved and stabbed in the untilled field,—

    An army, which liberticide and prey

    Makes as a two-edged sword to all who wield,—

    Golden and sanguine laws which tempt and saly.   8

2. Read the following extract and answer the questions that follow :

    When I consider how my light is spent

    Ere half my days, in this dark world and wide

    And that one talent which is death to hide

    Lodged with me useless, though my soul more bent

    To serve therewith my maker, and present

    My true account, lest he returning chide.

(i) Name the poem and the poet.

(ii) What happened with the poet before half of his life ?

(iii) Which talent did the poet have ?

(iv) What did he think about his talent ?

OR

What you think of prospects of world peace ?

Pakistan behaving like this,

China behaving like that.

It is making me very sad, I am telling you.

Really most harassing me.

(i) Name the poem and the poet.

(ii) What question does the speaker ask his listeners ?

(iii) How does Pakistan and China behaving, according to the speaker ?

(iv) How does the speaker express his feelings of patriotism ?　　8

3. Answer any *four* of the following questions :

(i) Why does the poet compare true love to the Pole Star in 'Let Me Not to the Marriage of True Minds' ?

(ii) What do you understand by 'City of Palm Trees' ?

(iii) Who was Flecknoe ?

(iv) Where was the little black boy born ?

(v) How does the speaker interpret : 'Sparrows' good-night twitter' ?

(vi) Where is God found, according to the poet in 'Leave She Chanting' ?

(vii) Explain : 'Good fences make good neighbours'.　　8

4. Attempt a critical appreciation of the poem 'When You Are Old'.

OR

Consider "Shadwell" as a satire.　　8

5. Do as directed (Attempt any *twenty*).

(a) Fill in the blank spaces using appropriate articles, wherever necessary :

(i) .... oranges are grown in Spain, South Africa, Brazil and Israel.

(ii) He had always hoped that his son would go to .... University.

(iii) .... water in that stream is not suitable for drinking.

(iv) I understand he is to marry .... heiress.

(v) When do you have .... breakfast ?

(b) Fill in the blanks with correct form of the verb :

(i) A new car .... a lot of money.　(cost)

(ii) Jet aeroplanes .... very fast.　(fly)

(iii) Ten miles .... a long way to walk.　(be)

(iv) Her uncle and aunt .... a house in the country.　(have)

(v) I want a briefcase that .... me until I retire from business.　(last)

OGSE/D-16

764

ECONOMICS

(Micro Economics – I)

Paper : I

Time : Three Hours]   [Maximum Marks : 80

Note : Attempt *five* questions in all. Question No. 1 is compulsory. Select *one* question from any of three units and the fourth question may be attempted from any unit.

नोट : कुल **पाँच** प्रश्न कीजिए। प्रश्न संख्या 1 अनिवार्य है। किन्हीं तीन इकाइयों से **एक-एक** प्रश्न का चुनाव कीजिये तथा चौथा प्रश्न किसी भी इकाई से किया जा सकता है।

Compulsory Question

(अनिवार्य प्रश्न)

1. Write brief notes on the following :   (8×2=16)

   निम्नलिखित पर संक्षिप्त टिप्पणियाँ कीजिए :

   (i)   What is Economic Problem ?

         आर्थिक समस्या क्या है ?

   (ii) Explain *two* determinants of demand.

         माँग के दो निर्धारकों का वर्णन कीजिये।

UNIT-IV (इकाई-IV)

8. Explain the concepts of total cost, average cost and marginal cost in short period with the help of tables and diagrams. Also explain the relationship between average cost and marginal cost.   16

   कुल लागत, औसत लागत तथा सीमान्त लागत की अल्पकालीन अवधारणाओं की तालिका व रेखाचित्रों द्वारा व्याख्या कीजिये। औसत तथा सीमान्त लागत के सम्बन्ध की भी व्याख्या कीजिये।

9. Explain the following :

   निम्नलिखित की व्याख्या कीजिये :

   (i)   Concepts of TR and MR and their Relationship.

         TR तथा MR की अवधारणाएँ तथा इनका सम्बन्ध।

   (ii) Break-even analysis.

         सम-विच्छेद विश्लेषण।   8, 8

(iii) Explain the Law of Demand.

माँग के नियम का वर्णन कीजिये।

(iv) What is income elasticity of demand ?

माँग की आय लोच क्या होती है ?

(v) Explain the difference between Explicit cost and Implicit cost.

स्पष्ट व निहित लागतों में अन्तर स्पष्ट कीजिये।

(vi) What are internal and external economies ?

आन्तरिक व बाहरी बचतें क्या होती हैं ?

Fill in the blanks with appropriate answers :

उपयुक्त उत्तर द्वारा रिक्त स्थान भरिये :

(vii) When total utility is maximum, marginal utility is ....
(zero/positive/negative)

जब कुल उपयोगिता अधिकतम होती है, तो सीमान्त उपयोगिता .... होती है। (शून्य/धनात्मक/ऋणात्मक)

(viii) .... economies are shared in by all firms. (internal/external).

.... बचतें सभी फर्मों को प्राप्त होती हैं (आन्तरिक/बाहरी)।

UNIT–I (इकाई–I)

2. What is Capitalism ? How are the economic problems in a Capitalist System solved ? 16

पूँजीवाद से क्या अभिप्राय है ? पूँजीवाद में आर्थिक समस्याओं का समाधान कैसे होता है ?

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3. What is price elasticity of demand ? Explain any three methods for the measurement of price elasticity of demand. 16

माँग की कीमत लोच से क्या अभिप्राय है ? माँग की कीमत लोच के माप की कोई तीन विधियाँ लिखिये।

UNIT–II (इकाई–II)

4. Explain the Law of Equi-marginal utility with the help of table and diagram. Also explain the importance of the law of equi-marginal utility. 16

सम-सीमान्त उपयोगिता के नियम की तालिका व रेखाचित्र द्वारा व्याख्या कीजिये। सम-सीमान्त उपयोगिता के नियम का महत्व भी बताइये।

5. Explain – Price effect, income effect and substitution effect. Also explain that price effect is a combination of income and substitution effects. 16

कीमत प्रभाव, आय प्रभाव तथा प्रतिस्थापन प्रभाव को स्पष्ट कीजिये। यह भी स्पष्ट कीजिये कि कीमत प्रभाव आय तथा प्रतिस्थापन प्रभाव का संयोग है।

UNIT–III (इकाई–III)

6. Explain the Law of Variable proportions with the help of table and diagram. Also explain the stage of decision-making. 16

घटते-बढ़ते अनुपात के नियम की तालिका व रेखाचित्र द्वारा व्याख्या कीजिये। निर्णय लेने की अवस्था का भी वर्णन कीजिये।

7. What are Iso-quants ? What are their properties ? 16

सम-उत्पाद वक्र क्या होते हैं ? इनकी विशेषताओं का वर्णन कीजिये।

GSE/D-16

772

MATHEMATICS

(Algebra)

Paper : BM-111

Time : Three Hours]　　　　　　　　　[Maximum Marks : 40

Note : Attempt *five* questions in all. Question No. 1 is compulsory. Select *one* question from each section.

Compulsory Question

1. (a) Show that diagonal elements of a Hermitian matrix are all real. 　　　　　　　　　　　　　　1½

   (b) Define Linear dependence and Linear independence of vectors. 　　　　　　　　　　　　　1½

   (c) Prove that eigen values of A² are squares of the eigen values of A. 　　　　　　　　　　1½

   (d) Find the value of a in order that the roots of the equation $2x^3 + 6x^2 + 5x + a = 0$ are in A.P. 　　2

   (e) State Descarte's rule of sign. 　　　　　　　1½

SECTION-I

2. (a) Show that every square matrix A can be expressed in one and only one way as P + iQ, where P and Q are Hermitian matrices. 　　　　　　　　　　4

   (b) Find inverse of $A = \begin{bmatrix} 1 & 3 & 2 \\ 0 & 4 & 1 \\ 5 & 2 & 3 \end{bmatrix}$ by using elementary operations. 　　　　　　　　　　　　　　4

3. (a) State and prove Cayley-Hamilton Theorem. 4

   (b) Prove that any two charateristic vectors corresponding to two different characteristic roots of a Hermitian matrix are orthogonal. 4

SECTION-II

4. (a) Solve the equations :

   $x - y + 2z - 3w = 0$

   $3x + 2y - 4z + w = 0$

   $4x - 2y + 9w = 0.$ 4

   (b) If A and B are two non-singular matrices of same order such that $AA' = BB'$, show that there exists an orthogonal matrix P such that $A = BP$. 4

5. (a) Obtain the linear transformation which reduces the bilinear form $X' \begin{bmatrix} 3 & 2 & -1 \\ 2 & 2 & -3 \\ -1 & 3 & 1 \end{bmatrix} Y$ to canonical form. 4

   (b) Diagonalize the quadratic form

   $x_1^2 - 2x_2^2 + 3x_3^2 - 4x_2x_3 + 6x_3x_1.$

   Also find rank, index, signature and equations of transformation. 4

SECTION-III

6. (a) Solve the equation $x^4 - 8x^3 + 23x^2 - 28x + 12 = 0$, given that the difference of two of the roots is equal to the difference of other two. 4

   (b) Solve the equation $3x^2 - 19x^2 + 33x - 9 = 0$ which has repeated roots. 4

7. (a) If α, β, γ are roots of the equation $x^3 - ax^2 + bx - c = 0$, form an equation whose roots are β+γ, γ+α, α+β.

   Also express $\dfrac{1}{\beta+\gamma} + \dfrac{1}{\gamma+\alpha} + \dfrac{1}{\alpha+\beta}$ in terms of $a, b, c.$ 4

   (b) Find the equation of the squared difference of the roots of the equation $x^3 + 3x^2 - 3x + 1 = 0.$ 4

SECTION-IV

8. (a) Using Cardon's method, show that the roots of the equation $x^3 - 3x + 1 = 0$ are

   $2 \cos \dfrac{2\pi}{9}, \ 2 \cos \dfrac{8\pi}{9}, \ 2 \cos \dfrac{14\pi}{9}.$ 4

   (b) Solve the equation $x^4 - 2x^3 - 5x^2 + 10x - 3 = 0$ by Descarte's method. 4

9. (a) Solve the equation $x^4 - 10x^3 + 26x^2 - 10x + 1 = 0$ by Ferrari's method. 4

   (b) Show that for all values of c, the equation $x^5 + 5x^2 + 3x + c = 0$ has at least two imaginary roots. 4

Roll No. ....

Total Pages : 3

GSE/D-16

CALCULUS

Paper : BM-112

Time : Three Hours]   [Maximum Marks : 40

Note : Attempt *five* questions in all. Question No. 1 is compulsory. Select *one* question from each section.

Compulsory Question

1. (a) Prove that $|\sin x|$ is continuous.   2

    (b) If $y = e^{m\sin^{-1}x}$, prove that $(1 - x^2)y_2 - xy_1 = m^2 y$.   2

    (c) Define Radius of Curvature.   1

    (d) What is the Point of Inflexion ?   1

    (e) Prove that

    $$\int_0^{\pi/2} \sin^5 x \sin^6 x \, dx = \frac{8}{693}.$$ 2

SECTION-I

2. (a) Prove that the function f defined by

    $$f(x) = \begin{cases} x^2 \sin \dfrac{1}{x} & \text{if } x \neq 0 \\ 0 & \text{if } x = 0 \end{cases}$$

    is continuous and derivable at $x = 0$ but its derivative is not continuous at $x = 0$.   4

(b) If $f(x) = x^3 - 2x + 5$, then by Taylor's theorem evaluate $f(2.01)$ to four places of decimal. 4

3. (a) If $y = \dfrac{\sin^{-1} x}{\sqrt{1 - x^2}}$, prove that

$$(1 - x^2)y_{n+2} - (2n + 3)xy_{n+1} - (n + 1)^2 y_n = 0.$$ 4

(b) Expand $\tan x$ in powers of $\left(x - \dfrac{\pi}{4}\right)$ upto four terms. 4

SECTION-II

4. (a) Find all the asymptotes of the curve

$$x^3 - 6x^2 y + 11xy^2 - 6y^3 + x + y + 1 = 0.$$ 4

(b) Show that for the curve $y = \log x$, the least value of $|\rho|$ is $\dfrac{3\sqrt{3}}{2}$. 4

5. (a) Find the radius of curvature at the origin for the curve

$$2x^4 + 4x^3 y + xy^2 + 6y^3 - 3x^2 - 2xy + y^2 - 4x = 0.$$ 4

(b) If C_x, C_y be the chord of curvature parallel to co-ordinate axis at any point of the curve

$$y = C \cosh \dfrac{x}{C},$$ prove that $4C^2(C_x^{\,2} + C_y^{\,2}) = C_y^{\,4}$. 4

SECTION-III

6. (a) Trace the curve $y(x^2 + 4a^2) = 8a^3$. 4

(b) Prove that

$$\int_0^{\pi/2} \sin^{2n} x\, dx = \frac{2n!}{[2^n(n!)]^2} \cdot \frac{\pi}{2}.$$ 4

7. (a) Find the length of the arc $x^2 + y^2 - 2ax = 0$ in the first quadrant. 4

(b) Find the intrinsic equation of the curve $y = a \log \sec \dfrac{x}{a}$; s being measured from the origin. 4

SECTION-IV

8. (a) Find the area between the curve $x^2 y^2 = a^2(y^2 - x^2)$ and its asymptote. 4

(b) Find the area of one loop of the curve $r = a \sin 3\theta$. 4

9. (a) Find the volume of the solid generated by revolving the ellipse $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} = 1$ about the x-axis. 4

(b) Find the centroid of the area bounded by $y^2 = 4ax$, the x-axis and the ordinate $x = b$. 4

GSE/D-16

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PHYSICS

(Classical Mechanics and Theory of Relativity)

Paper–I

Time : Three Hours]   [Maximum Marks : 40

Note : Question No. 1 is compulsory. Attempt *four* more questions selecting *one* question from each unit.

Compulsory Question

1. (a) What are Conservative and Non-conservative forces ? Explain with example.

   (b) What is Configurational space ? Explain.

   (c) What are Fictitious forces ? Explain with example.

   (d) Show that no body can travel with a velocity greater than the velocity of light 'c'. (2×4=8)

UNIT–I

2. State and prove Law of Conservation of energy for a single particle system.   8

3. (a) State and prove Law of Conservation of angular momentum for a single particle system.   4

   (b) What is Centre of mass of a body ? Derive expression for centre of mass of a two-particle system.   4

UNIT–II

4. (a) What are Generalised coordinates ? What are the advantages of using them ?   4

   (b) What is Atwood's machine ? Obtain its Lagrangian and hence obtain expressions for its accelerations.   4

5. (a) Explain Generalised velocity and Generalised acceleration.   5

   (b) Show that constraints imposed on the systems reduce the minimum no. of coordinates required to describe the systems.   3

UNIT–III

6. What are Galilean Transformations ? Show that Law of Conservation of energy and momentum are invariant under Galilean Transformation.   8

7. (a) What is Cariolis force ? Discuss the effect of Cariolis force on the motion of an object on the surface of earth.   5

   (b) What is the importance of Michelson and Morley expt. ? What conclusions can be drawn from it ?   3

UNIT–IV

8. State the fundamental postulates of Special theory of relativity. Deduce Lorentz Transformations from them.   8

9. (a) What is the meaning of Mass-Energy equivalence ? Obtain Einstein's mass-energy relation
   $$E = mc^2.$$ 5

   (b) Find the velocity at which the mass of a particle becomes two times of its rest mass.   3

GSE/D-16

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PHYSICS

(Electricity, Magnetism and Electromagnetic Waves)

Paper–II

Time : Three Hours]   [Maximum Marks : 40

Note : Attempt *five* questions in all, selecting *one* question from each unit. Question No. 1 is compulsory

Compulsory Question

1. (a) Explain scalar and vector fields with examples. 2

    (b) Explain the meaning of solenoidal nature of magnetic field $\vec{B}$. 2

    (c) Explain the concept of Poynting Vector. 2

    (d) Write down the uses of series and parallel resonant circuits. 2

UNIT-I

2. (a) What do you mean by divergence of a Vector field ? Derive an expression for its Cartesian co-ordinates. Also show that div grad φ is a Laplacian, where φ is a scalar. 5

    (b) Using Gauss's law, derive an expression for the electric field intensity at a point near an infinite plane sheet of charge. 3

3. (a) Derive Poisson's and Laplace's equations. 4

 (b) Prove that the electric field inside a conductor is absent. 4

UNIT-II

4. (a) Prove that 5

  (i) $\vec{\nabla} \cdot \vec{B} = 0$ and

  (ii) $\vec{\nabla} \times \vec{B} = \mu_0 \vec{J}$.

 (b) Give the comparison between Electrostatic field and Magnetic field. 3

5. (a) Explain the domain theory of Ferromagnetism. 4

 (b) Discuss the importance of Hysteresis curves. 4

UNIT-III

6. (a) Derive *four* Maxwell's equations in the Integral form. 4

 (b) Explain the concepts of Scalar and Vector potentials. 4

7. (a) Explain the concept of Displacement current in detail. 4

 (b) Explain the Boundary conditions for $\vec{B}$ and $\vec{E}$ at the interface between the two media. 4

UNIT-IV

8. (a) Discuss the charging and discharging of a capacitor through an inductor and also show that it is oscillatory. 5

 (b) A resistance of 40 ohm, inductance of 3 mH and a capacitance of 2 μF are connected in series with 110 volt, 5000 Hz a.c. source. Calculate the current in the circuit. 3

9. (a) Define the bandwidth and sharpness of resonance in a series resonant circuit. Derive a relation between these two. 5

 (b) In a circuit a 50 ohm resistor, 0.3 Henry inductor and a 60 μF capacitor are connected in series with a 120 volt, 60 Hz source of alternating emf. Calculate the impedance of the circuit. 3

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GSE/D-16

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CHEMISTRY

[Inorganic Chemistry (Theory)]

Paper-I

Time : Three Hours]   [Maximum Marks : 32

Note : Attempt *five* questions in all. Question No. 1 is compulsory. Select *two* questions from each section.

Compulsory Question

1. Answer the following :

   (a) Write electronic configuration of Pd (Z = 46).

   (b) Arrange the following in decreasing order of their electron affinity :

   B, C, N and O.

   (c) In a close packed array of N spheres, predict the number of octahedral and tetrahedral holes.

   (d) What is coordination number in three-dimensional cubic close packed structure ?

   (e) Which is more stable between CO and CO$^+$?

   (f) What is the relationship between Pauling scale and Mulliken concept of electronegativity ?

   (g) Which has more bond angle between NH$_3$ and NF$_3$? Explain.

   (h) What is Madelung constant ?   (1×8=8)

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9. (a) What is Proton affinity ? Calculate proton affinity of ammonia using Born-Haber cycle from the following thermodynamic data :

   (i) $NH_3(g) + HCl(g) \rightarrow NH_4Cl(s) + 144.1 \text{ kJ mol}^{-1}$.

   (ii) $HCl(g) + 430.9 \text{ kJ mol}^{-1} \rightarrow H(g) + Cl(g)$.

   (iii) $H(g) + 1311.6 \text{ kJ mol}^{-1} \rightarrow H^+(g) + e^-$.

   (iv) $Cl(g) + e^- \rightarrow Cl^-(g) + 347.2 \text{ kJ mol}^{-1}$.

   (v) $NH_4^+(g) + Cl^-(g) \rightarrow NH_4Cl(s) + 648.5 \text{ kJ mol}^{-1}$.   2½
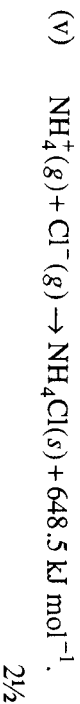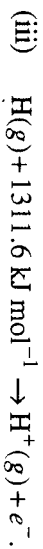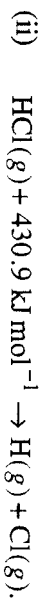
   (b) Sodium chloride has fcc structure. How many Na$^+$ and Cl$^-$ ions are present in the unit cell ?   1½

   (c) What should be the coordination number of M$^+$ in MX if ionic radii of M$^+$ and X$^-$ are 1.69Å and 1.81Å respectively ?   2

———————

SECTION-A

2. (a) Why energy level of orbitals is different for hydrogen and other multi-electron atoms ? 2

   (b) Calculate effective nuclear charge for an electron in $3d$ orbital of Zinc, (Z = 30). 2

   (c) What are Normal and Orthogonal wave functions ? 2

3. (a) Calculate the ratio between the wavelength of an electron and proton if the proton is moving with half the velocity of the electron.
   (Mass of proton = 1.67×10^{-24} g, mass of electron = 9.11×10^{-28} g) 2½

   (b) Write the mathematical expression for the radial part of wave function for $2s$ orbital. 2

   (c) What is orbital angular momentum for a d-electron ? 1½

4. (a) The Internuclear distance in KCl is 3.14Å. Calculate the ionic radii of K^+ and Cl^- ions, using Pauling method. 2

   (b) Give the trend of electron affinity of the second period elements. 2

   (c) Why first ionisation energy of magnesium is higher than sodium but second ionisation energy of sodium is higher than magnesium ? 2

5. (a) Discuss various factors on which ionisation energy depends. Which element has highest Ionisation energy ? 2½

   (b) What are Slater's rules and their utility ? 1½

   (c) What are Isoelectronic species ? Arrange the following in order of increasing radii :
   S^{2-}, K^+, Ca^{+2}, Cl^-. 2

SECTION-B

6. (a) Give the geometry of sulphur tetrafluoride SF_4 on the basis of hybridisation. 2

   (b) Explain the formation of sigma and pi covalent bonds. 2

   (c) Draw the shape of perchlorate ion ClO_4^- on the basis of hybridisation. 2

7. (a) Explain the stability and magnetic nature of helium molecule He_2 and helium molecule ion He_2^+, on the basis of molecular orbital theory. 2

   (b) Calculate percentage of ionic character in HBr molecule from the following data :
   Bond length = 1.41Å, Dipole moment = 0.78 D. 2

   (c) Calculate the %age of ionic character in HF molecule. Electronegativities of H and F are 2.1 and 4.0 respectively. 2

8. (a) Draw a neat diagram and discuss the structure of CaF_2. 2

   (b) Give differences between Schottky and Frenkel defects. 2

   (c) What is Born-Haber cycle ? Give its applications also. 2

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CHEMISTRY

(Physical Chemistry)

Paper–II

Time : Three Hours]   [Maximum Marks : 32

Note : Attempt *five* questions in all. Question No. 1 is compulsory. Select *two* questions from each section. Log tables are available.

Compulsory Question

1. (a) Define Co-efficient of viscosity. Describe briefly the effect of temperature on viscosity. 3

   (b) What is Boyle's temperature ? 1

   (c) At what temperature the root mean square velocity of chlorine gas will be equal to that of SO_2 at NTP ? 2

   (d) What are the crystallographic dimensions of their unit cells if some solids belong to the following crystal systems ?

   (i) Tetragonal.

   (ii) Triclinic. 2

9. (a) Define Law of symmetry. Explain with a suitable example to support your answer. 3

   (b) Using X-rays of wavelength 154.1 pm and starting from the glancing angle, the reflection from silver crystal was found to occur at θ = 22.20°. Calculate the spacing between the planes of silver atoms that gave rise to the above reflection. (sin 22.20° = 0.3778) 2

   (c) Which type of crystalline solids have highest melting point, and why ? 1

2. (a) Describe Andrew's experiment on critical phenomena. 4

   (b) Explain diagrammatically how the molecular velocities change with increase of temperature. 2

3. (a) Derive expressions for critical constants in terms of Vander Waal's constants, and hence derive the relationship between them. 5

   (b) Why are the gases helium and hydrogen not liquified at room temperature by applying high pressure ? 1

4. (a) Define the following terms :

   (i) Mean Free Path.

   (ii) Collision Number.

   (iii) Collision Frequency.

   Discuss the effect of temperature and pressure on Collision frequency. 3½

   (b) Calculate the root mean square velocity, average velocity and most probable velocity of sulphur dioxide molecules at 427°C. (R = 8.314 × 10⁷ ergs/deg/mol) 2½

5. (a) Derive reduced equation of state and define Law of Corresponding states. 4

   (b) Calculate the collision frequency of oxygen molecules at 273 K and one atmospheric pressure, given that the molecular diameter of oxygen molecules is 2 × 10⁻⁸cm. (R = 8.314 × 10⁷ ergs K⁻¹ mol⁻¹) 2

6. (a) Define Surface tension. Describe one method for determining surface tension of a liquid. 3

   (b) Calculate the molar refraction of acetic acid at temperature at which its density is 1.046 g cm⁻³. The experimentally observed value of refractive index at this temperature is 1.3715. 2

   (c) What is Dunstan's rule ? 1

7. (a) What are the elements of symmetry in crystallography ? Describe each of them briefly. 4

   (b) The value of $[\alpha]_D^{20}$ for lactose is 55.4°. What is the concentration in grams per litre of a solution of lactose which gives a rotation of 7.24° in a 10 cm cell at 20°C with sodium D light ? 2

8. (a) The intercepts made by the unit plane on the crystallographic axes X, Y, Z are 'a', 'b' and 'c' respectively. A particular face of a crystal makes intercepts 2a, 2b and 3c on the same axes. What are the Miller indices of this face ? 2

   (b) What are the factors on which optical rotation depends ? Derive an expression for specific rotation. 2

   (c) Both NaCl and KCl have similar structures, yet their X-ray diffraction patterns are remarkably different. Why ? 2

Total Pages : 4

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GSE/D-16

CHEMISTRY

(Organic Chemistry)

(Theory)

Paper–III

Time : Three Hours] [Maximum Marks : 32

Note : Attempt *five* questions in all. Question No. 1 is compulsory. Attempt *two* questions each from Section-A and Section-B.

Compulsory Question

1. Attempt any *eight* parts.
   (a) Out of the following which possesses delocalised chemical bond ?
      (i) Conjugated dienes.
      (ii) Non-conjugated dienes.
   (b) The presence of heteroatom is necessary in which of the following effects ?
      (i) Inductive effect.
      (ii) Electromeric effect.
   (c) Arrange the following groups in order of increasing priority (Lowest first) :
      I, Br, –CH$_3$, –OH.
   (d) Whether CH$_3$–CH=CH$_2$ will show geometrical isomers or not ?

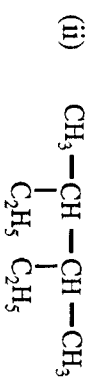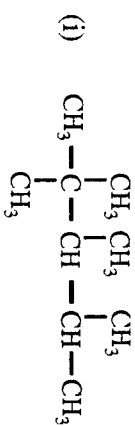7. (a) Define the following :
      (i) Rearrangement reaction.
      (ii) Condensation reactions. 2
   (b) Define Nucleophile. Give their types. 2
   (c) What are Carbocations ? Give *two* methods of preparation of carbocations. 2

8. (a) Give IUPAC names of following alkanes :
      (i)

$$CH_3—\underset{CH_3}{\overset{CH_3}{C}}—CH—\overset{CH_3}{CH}—CH_3$$

      (ii)

$$CH_3—\underset{C_2H_5}{CH}—\underset{C_2H_5}{CH}—CH_3$$
      2

   (b) Give preparation of alkanes by Corey-House synthesis. What are the advantages of this method ? 2
   (c) Complete the following reactions :
      (i) $CH_3COONa + ? \xrightarrow{?} CH_4 + Na_2CO_3$
      (ii) $CH_3–\underset{Cl}{CH}–CH_3 + ? \longrightarrow CH_3–CH_2–CH_3 + HCl$
      2
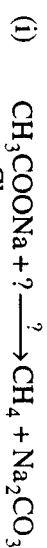
9. (a) Give evidences in favour of free radical halogenation of alkane. 2
   (b) Give *two* methods of preparation of cycloalkanes. 2
   (c) Give the percentage of *n*-butyl and sec-butyl bromide formed by monobromination of *n*-butane when the relative reactivity of 1°, 2° and 3° hydrogen atoms in bromination is 1 : 82 : 1600. 2

(e) Out of staggered and eclipsed conformation of ethane which is more stable, and why ?

(f) What does half-headed arrow represent in a molecule ?

(g) Write the type of hybridisation and structure of alkyl carbanion.

(h) What is Plane of symmetry ?

(i) Mark the secondary carbon atom in the following alkane :

$$CH_3-CH_2-\underset{\underset{CH_3}{|}}{CH}-CH_3$$

(j) Sacse proposed to explain the stability of cyclohexane and higher cycloalkane which type of structures ?
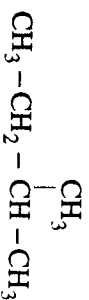
(8×1=8)

SECTION-A

2. (a) What is delocalised chemical bond ? Explain taking example of 1,3-butadiene. 2

   (b) Explain low reactivity of vinyl halides on the basis of resonance. 2

   (c) What are Vander Waal's forces ? How do they depend on the size of molecule ? 2

3. (a) What is Electromeric effect ? Give its types with suitable example. 2

   (b) What is Resonance ? State *four* conditions which must be fulfilled by resonating structures. 2

   (c) What type of isomerism is shown by CH₃CH₂OH and CH₃OCH₃ ? Define and give *one* more example. 2

4. (a) Explain the cause of Optical activity. 2

   (b) What is Resolution ? Give mechanical and biochemical method of resolutions. 2

   (c) Assign R and S configuration to the following : 2

   (i) $$CH_3-\underset{\underset{H}{|}}{\overset{\overset{I}{|}}{C}}-OH$$ (ii) $$CH_3-\underset{\underset{NH_2}{|}}{\overset{\overset{Br}{|}}{C}}-H$$
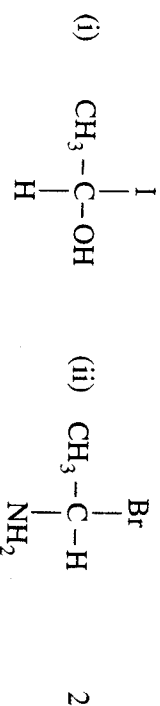
5. (a) Draw various conformations of *n*-butane. Give order of their relative stability. 2

   (b) Why glyceraldehyde was selected as standard for assigning D and L configuration to the compound ? 2

   (c) Assign E and Z configuration to the following : 2

   (i) $$\underset{I}{\overset{CH_3CH_2}{}}C=C\overset{H}{\underset{OH}{}}$$

   (ii) $$\underset{H}{\overset{CH_3}{}}C=C\overset{OH}{\underset{H}{}}$$
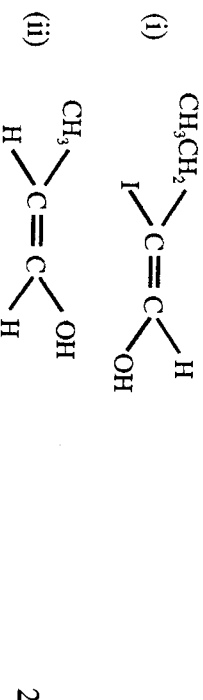
SECTION-B

6. (a) What are Homolytic and Heterolytic fissions ? Name the species formed in each case. 2

   (b) What are Carbenes ? Give structure of singlet and triplet carbenes. 2

   (c) What are Free radicals ? Explain the order of alkyl free radicals on the basis of hyperconjugation. 2

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ENGLISH
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Time : Three Hours] [Maximum Marks : 40

Note : Attempt all questions.

1. Read the passage given below and answer the questions that follow :

From rest and sleep, which but thy picture be
Much pleasure then from thee much more must flow,
And soonest our best men with thee go
Rest of their bones, and soul's deliver.

Questions :
(i) What are the pictures of death according to the poet ?
(ii) What do we get from rest and sleep ?
(iii) Who would meet death at the earliest ?
(iv) What happens to those who meet death ?
(v) Who is the writer of these lines ?

OR

Three years she grew in sun and shower;
Then nature said. 'A lovelier flower
On earth was never sown;
This child I to myself will take;
She shall be mine, and I will make
A lady of my own

reading is a task, a lesson. It is the fun he gets out of reading that needs to be emphasized. Let him enjoy reading—let it be a treasured part of his daily life. There is hardly an activity – a dream or ambition – that reading will not help.

(i) What is the most valuable gift we can give to a child ?
(ii) What should the child be made to learn ?
(iii) What will become a valuable part of his daily life ?
(iv) In what way will reading help a child ? 4

6. Write a paragraph of about 250 words on any *one* of the following :
(i) Corruption in Public Life.
(ii) Present Examination System.
(iii) Environment Pollution.
(iv) Students and Politics.
(v) Hostel Life. 6

7. Use the following phrasal verbs in your own sentences :
(a) (i) Deal with.
(ii) Run out of.
(iii) Back out. 3

(b) Fill in the blanks with suitable prepositions :
(i) I prefer tea .... coffee.
(ii) The Principal was angry .... the students.
(iii) He fell .... a ditch. 3

(c) Correct the following sentences :
(i) What are the news ?
(ii) Each of the students should do their best.
(iii) The music is the food of the love.
(iv) I wish I can do something for you. 4

Questions :

(i) Name the poem and the poet.

(ii) Who grew in sun and shower for three years ?

(iii) What did nature remark about Lucy ?

(iv) What did nature decide about Lucy ?

(v) How will nature make Lucy ?   (1×5)

2. Explain with reference to the context :

Sunset and evening star

And one clear call for me !

And may there by no moaning of the bar.

When I put out to sea.

OR

Know then thyself, presume not God to scan:

The proper study of mankind is man.

Placed on this isthmus of a middle state.

A being darkly wise and rudely great.

3. Attempt the following in about 30 words each :

(i) What do you understand by 'City of Palm Trees' ?   3

OR

(ii) Why does the poet compare true love to the Pole-star ?

OR

(iii) Why should death be not proud of its power ?

OR

Where was the little black boy born ?

OR

The Princes are the 'dregs of their dull race'. Explain.

Explain the metaphor of Ship, used in the poem

'Crossing the Bar'.

(iv) Why is the King George III despised ?

OR

Who was Flecknoe ?   6

4. How does Shakespeare define true love ?

OR

How does the poet justify the ways of God to man in the

sonnet 'On His Blindness' ?   6

5. Translate the following passage into English :   4

विद्वान जीवन मनुष्य के जीवन का महत्वपूर्ण समय है। इस

समय का यदि हम सदुपयोग करते हैं तो आगे जीवन में सुख

प्राप्त करते हैं। बहुत से विद्यार्थी शिक्षा प्राप्त करने में रुचि

नहीं रखते हैं। आगे चलकर ऐसे विद्यार्थी को पश्चाताप करना

पड़ता है। जो विद्यार्थी जीवन के मूल्य को समझते हैं वे युक्त

में ही अध्ययन में दिलचस्पी लेते हैं। अच्छे विद्यार्थी हरेक चीज

को न्यूनतम की कोशिश करते हैं। इसके विपरीत कमजोर

विद्यार्थी किसी वस्तु को समझने में पीछा अनुभव करते हैं।

यह अच्छे और कमजोर विद्यार्थियों में मुख्य भेद होता है।

OR

(For Non-Hindi Speaking/Foreign Candidates only)

Read the following passage and answer the questions given

at the end :

Among all the gifts you can gift to a child, there is none

more likely to add richness than a book. Not a book but the

habit of reading. Give him the habit of reading and that too

with discrimination and you have done something for which

he may be thankful to you for all his life. Books should be

the daily companions of the child's life. And they ought not

to be associated with the school. Don't make him feel that

Time : Three Hours] [Maximum Marks : 40

Note : Attempt *five* questions in all. Question No. 1 is compulsory. Select *two* questions from each unit. All questions carry equal marks. Draw well-labelled diagrams where they are necessary.

Compulsory Question

1. Define the following terms :
   (a) Aerobic Bacteria.
   (b) Conjugation in Bacteria.
   (c) Triphasic life-cycle.
   (d) Plurilocular sporangia.
   (e) Lysogenic life-cycle.
   (f) Somatogamy in Agaricus.
   (g) Acervulus.
   (h) Apothecium. (1×8=8)

UNIT-I

2. Briefly explain the following :
   (a) Transformation in Bacteria.
   (b) Differences between Bacteria and Cyanobacteria. (4+4)

3. What is Isomorphic Alternation of generations. Explain it with reference to an Alga studied by you. 8

4. Write notes on the following :
   (a) Daughter colony formation in Volvox.
   (b) Vegetative thallus structure in Polysiphonia. (4+4)

5. Briefly discuss the following :
   (a) Sex organs in Nannandrous species of Oedogonium.
   (b) Synzoospore in Vaucheria. (4+4)

UNIT-II

6. Write notes on the following :
   (a) Structure of Bacteriophage.
   (b) Symptoms of Plant Viral Diseases. (4+4)

7. Briefly explain the following :
   (a) Asexual reproduction in Mucor.
   (b) Gill structure in Agaricus. (4+4)

8. Write notes on the following :
   (a) Stages of Puccinia on Barberry.
   (b) Sexual reproduction in Penicillium. (4+4)

9. Briefly discuss the following :
   (a) Reproduction in Colletotrichum.
   (b) Economic Importance of Lichens. (4+4)

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BOTANY

(Cell Biology)

Paper : II

Time : Three Hours] [Maximum Marks : 40

Note : Attempt *five* questions in all, selecting *two* questions from each unit. Question No. 1 is compulsory and short answer type. All questions carry equal marks. Draw neat and well labelled diagrams where they are necessary.

Compulsory Question

1. (i) What are Suicidal bags ?

 (ii) Name the cell organelle involved in Photorespiration.

 (iii) At which stage synapsis occurs during prophase I of Meiosis.

 (iv) What are Duplications ?

 (v) Differentiate between Smooth endoplasmic reticulum and Rough endoplasmic reticulum.

 (vi) Define the term Cytokinesis.

 (vii) What kind of enzymes are present in Mitochondrion.

 (viii) What is the function of Peroxisomes. (1×8=8)

UNIT-I

2. Give

 (a) Structure and chemical nature of Cell Wall.

 (b) Functions of Nuclear Envelope. (4,4)

3. Explain the following briefly :

 (a) Endoplasmic Reticulum.

 (b) Functions of Chloroplast. (4,4)

4. Why mitochondrion is called Power House of Cell. Give its structure and functions in detail. 8

5. Write short notes on the following :

 (a) Lysosomes.

 (b) Peroxisomes.

 (c) Vacuoles. (3,3,2)

UNIT-II

6. Discuss the prophase-1 of meiosis in Plant Cell. 8

7. Describe the following :

 (a) Translocations.

 (b) Duplications. (4,4)

8. Explain the following :

 (a) Role of polyploidy in crop improvement.

 (b) Aneuploidy and its types. (4,4)

9. Describe the structural organization and chemical composition of Chromosomes. 8

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ZOOLOGY

(Life & Diversity from Protozoa to Porifera

and Cell Biology – I)

Paper-I

Time : Three Hours]   [Maximum Marks : 40

Note : (i)   Attempt *five* questions in all.

(ii)   Question No. 1 is compulsory.

(iii)   Attempt *two* questions from Section A and *two* from

Section B.

(Compulsory Question)

1.   (i)   Define parasite.

(ii)   Name the class and order of *Scypha*.

(iii)   Which Endoplasmic Reticulum is concerned with

detoxification ?

(iv)   Name any *two* types of intercellular junctions.

(v)   Where does fertilization occurs in *Plasmodium* ?

(vi)   Differentiate between Cilia and Flagella.

(vii)   Where do Kreb's Cycle enzymes occur in

mitochondria ?

(viii)   Name the phenomenon that prevents self-fertilization

in Sycon.

(ix) At what stage of Life Cycle of *Plasmodium*, malaria fever occurs ?

(x) Acrosome of the sperm is formed from which organelle ?

(1×10=10)

SECTION-A

2. (a) Describe Life cycle, disease caused and prophylaxis of *Entamoeba histolytica*.

5½

(b) Write symptoms, prevention and therapy of Kala-azar.

2

3. (a) Write a note on Erythrocytic Schizogony of the Life Cycle of *Plasmodium*.

3½

(b) Write notes on Oocyst in *Anopheles* and Alternation of generation in *Plasmodium*.

(2+2)

4. Write peculiar features of Phylum Porifera. Classify its class Demospongiae upto orders giving characters and examples of each order.

7½

5. (a) Write a note on choanocyte of a sponge.

3

(b) With the help of diagrams explain Leuconoid Canal System in sponges.

4½

SECTION-B

6. (a) Describe the Na⁺-K⁺-ATPase active transport system.

5

(b) Enumerate chemical composition of plasma membrane.

2½

7. (a) Describe ultrastructure of Golgi Body.

3

(b) Give functions of Rough ER.

3

(c) Explain role of Golgi Body in the recycling and transformation of membrane.

1½

8. (a) Write a note on autolysosomes.

2

(b) 'Mitochondria are semiautonomous organelles'. Comment on the statement.

2½

(c) Enlist enzymes of Electron Transport Chain and ATP synthesis in mitochondria.

3

9. (a) Discuss biogenesis of ribosomes in eukaryotes.

3½

(b) Describe ultrastructure of Centriole.

4

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ELECTRONICS

Paper-I

(Electronic Devices and Circuits-I)

Time : Three Hours] [Maximum Marks : 40

Note : Attempt *five* questions in all. Question No. 1 is compulsory. Select *one* question from each unit.

Compulsory Question

1. (a) Define P.I.V. Elaborate its importance. (2)
   (b) Explain how Doping modifies band gap. (2)
   (c) Why is it not possible to construct a transistor by connecting two diodes back-to-back ? (2)
   (d) Drive the relation between Current gain α and β. (2)

UNIT-I

2. (a) Explain V-I characteristics of p-n junction diode. (3)
   (b) With the help of circuit diagram, explain the working of positive clamper. (5)

3. (a) Explain Shunt Clipping with the help of circuit diagram. (4)
   (b) Explain how Zener diode acts as voltage regulator. (4)

UNIT-II

4. (a) Draw circuit diagram and wave shapes of Half wave, Full wave and Bridge wave rectifiers. (4)
   (b) Derive expression for ripple factor and rectification efficiency of Full Wave Rectifier (FWR). (4)

5. (a) Explain the working of Inductor (L) filter and find expression for its rectification efficiency. (5)
   (b) Explain the working of Voltage multiplier circuit. (3)

UNIT-III

6. (a) Draw and explain the shapes of unbiased and biased potential curves in a transistor. (4)
   (b) Draw the output characteristics of C-E configuration of PNP transistor. Explain why these curves bear some slope. (4)

7. (a) Discuss Transistor as an Amplifier. (3)
   (b) Write short note on Transistor current components. (5)

UNIT-IV

8. (a) Draw *h*-parameter model of C-B and C-E configuration of transistor. (3)
   (b) Explain Ebber's and Moll model of transistor. (5)

9. (a) Compare transistor configurations, i.e., C-B, C-E and C-C. Out of these three which configuration is widely used ? (5)
   (b) Explain Emitter follower circuit. Discuss its advantages. (3)

Total Pages : 2

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ELECTRONICS
(Digital Electronics – I)

Paper–II

(Theory)

Time : Three Hours]　　　　　　　　　[Maximum Marks : 40

Note : Attempt *five* questions in all, selecting *one* question from each Unit. Question No. 1 is compulsory.

Compulsory Question

1. (a) Define Parity bit and explain its applications.

   (b) Show that Distributive Law holds good in Binary Number System.

   (c) What do you mean by Noise Margin ? Why it should be large ?

   (d) Why ECL gates are fastest ?　　　　　　　(2×4)

UNIT-I

2. (a) Convert $(33)_{10}$ into Binary, Octal and Hexadecimal Number System.　　　　　　　　　(3)

   (b) Discuss ASCII codes in detail.　　　　　　(5)

3. (a) Add $(25)_{10}$ and $(16)_{10}$ using 2's Complement method.　　　　　　　　　　　　(3)

   (b) Discuss Sequential Codes using suitable example.　(5)

UNIT–II

4. (a) Design logic circuit to perform AND, OR and NOT operations using NAND gates only.　　　　(3)

   (b) Simplify the following using K-map and implement using NOR gates only :

   $$f(A, B, C, D) = \sum_{1}(0, 2, 4, 8, 10, 12) + \sum_{\Phi}(1, 7, 11).\quad(5)$$

5. (a) Discuss postulates of Boolean Algebra.　　　(5)

   (b) Define and discuss XOR gate.　　　　　　(3)

UNIT–III

6. (a) Define and discuss :
   (i) Fan-in
   (ii) Propagation Delay.　　　　　　　　(1½×2)

   (b) Explain the operation of ECL OR/NOR gate.　(5)

7. (a) Discuss DCTL NOR gates.　　　　　　　(4)

   (b) Explain characteristics of Digital IC's.　　　(4)

UNIT–IV

8. Discuss TTL NAND gate with Totem-Pole output in detail.　　　　　　　　　　　　　　(8)

9. (a) Explain the operation of CMOS NOR.　　　(4)

   (b) Discuss Fan-out of CMOS Logic gates.　　　(4)

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COMPUTER SCIENCE

(Computer and Programming Fundamentals)

Paper-I

Time : Three Hours]   [Maximum Marks : { B.A. : 25 / B.Sc. : 40

Note : Attempt *five* question in all. Question No. 1 is compulsory. Select *one* question from each unit.

Compulsory Question

1. (a) Name *one* Sequential and *one* Direct Access device. 1(1)

   (b) Define Hardware and Software. 1(2)

   (c) Write symbols used in flow chart for Decision-making, Read, Stop and Processing. 1(2)

   (d) What is Flash Memory. 1(1)

   (e) Differentiate ROM and RAM. 1(2)

UNIT-I

2. Make a block diagram of Computer, and explain its essential parts. 5(8)

3. (a) Define Memory and its types. 5(8)

   (b) Write note on Magnetic Disk and its working. 5(8)

UNIT-II

4. (a) Define Software and its types. Differentiate between Application and System software. 3(5)

   (b) Write note on the major parts of Motherboard. 2(3)

5. (a) Define Operating system, and prove how it works as Resource manager.

   (b) Write notes on the following :

   (i) Multiprogramming vs. Multiprocessing.

   (ii) Real Time vs. Time Sharing. 5(8)

UNIT-III

6. (a) Define Algorithm, and write an algorithm to find average of any 10 numbers.

   (b) Make Decision Table to find layout of 3 numbers. 5(8)

7. (a) Discuss Errors and types of errors in Programming.

   (b) Discuss Top-Down and Bottom-up approach in Programming. 5(8)

UNIT-IV

8. (a) Explain Bubble Sort.

   (b) Discuss Binary Search. 5(8)

9. Write notes on the following :

   (a) Machine Language vs. Assembly Language.

   (b) Compiler vs. Interpreter.

   (c) HLL vs. LLL. 5(8)

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COMPUTER SCIENCE

(PC Software)

Paper-II

Time : Three Hours]   [Maximum Marks : $\begin{cases} \text{B.Sc.} : 40 \\ \text{B.A.} : 25 \end{cases}$

Note : (i) Attempt *five* questions in all.

(ii) Question No. 1 is compulsory.

(iii) Select *one* question from each unit.

(iv) All questions carry equal marks.

Compulsory Question

1. (a) What do you mean by Windows clipboard ?

   (b) Write the steps to change the Date/Time of your system.

   (c) What do you mean by Office Automation ?

   (d) Distinguish between Relative and Absolute references in Excel.

UNIT-I

2. Write short notes on the following Windows accessories :

   (a) Paint.

   (b) Word Pad.

   (c) Sound Recorder.

   (d) Windows Media Player.

3. (a) What is Wallpaper ? Write steps to change the wallpaper of the Desktop.

(b) What is the purpose of Start button ? Explain various options under Start menu.

UNIT-II

4. (a) What do you mean by Style in MS-Word ? Write the steps to create a new style.

(b) Explain various steps to add a Header and Footer in your document.

5. (a) What do you mean by Auto-Fit in MS-Word ? Write various steps to use Auto-Fit feature in your document.

(b) Write the steps to create and use a Mcro in MS-Word.

UNIT-III

6. Explain following functions by using example :

(a) AVERAGE()

(b) SQRT()

(c) IF()

(d) ROUND().

7. (a) Explain validation features in MS-Excel by using example.

(b) What is Data Table ? Explain steps to create the one-variable data table by using suitable example.

UNIT-IV

8. (a) Write steps to add ClipArt in your presentation.

(b) Write steps to insert a chart in your presentation.

9. (a) Write steps to insert in-built sound effect in a slide.

(b) What do you mean by Animation ? Explain steps to apply Custom animation effects.

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Roll No. ....

Total Pages : 3

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COMPUTER APPLICATIONS

(Fundamentals of Computer & Window Operating System)

Paper–I

Time : Three Hours]

[Maximum Marks : 40

Note : Attempt *five* questions in all. Question No. 1 is compulsory. Select *one* question from each unit.

Compulsory Question

1. (i) Explain the limitations of computer.   (2)

   (ii) What is Digitizer ?   (1)

   (iii) Differentiate between Primary memory & Secondary memory.   (2)

   (iv) Define Seek time & Latency time.   (2)

   (v) Define Operating system.   (1)

UNIT-I

2. (a) What are the differences between Analog & Digital computers ?   (3)

   (b) Draw a block diagram to illustrate the basic components of a computer system, and also explain the functions of various units.   (5)

[P.T.O.

3. (a) Convert the following :

    (i) $(127.54)_8 \rightarrow (\quad)_{10}$

    (ii) $(1245.32)_{10} \rightarrow (\quad)_8$ (3)

  (b) Write short notes on ASCII and EBCDIC code.   (5)

UNIT–II

4. What are Data scanning devices ? Explain how they help in improving input data accuracy as compared to keyboard devices.   (8)

5. What is an Output device ? Explain the following output devices :

    (i) Dot Matrix Printer.

    (ii) Laser Printer.

    (iii) Plotter.   (1+2+2+3)

UNIT–III

6. (a) Explain RAM and various types of RAM.   (4)

  (b) Write short note on CPU Registers.   (4)

7. (a) Distinguish between a sequential access, a direct access and a random access storage device.   (2)

  (b) Explain Magnetic Tape. Also write advantages and disadvantages of Magnetic Tape.   (6)

UNIT–IV

8. (a) Explain various functions performed by Operating system.   (4)

  (b) Write short note on Desktop.   (4)

9. (a) What are the various features of Window ?   (4)

  (b) Write short note on Control Panel.   (4)

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COMPUTER APPLICATIONS

(Office Automation Tools)

Paper : II

Time : Three Hours]　　　　　　　　[Maximum Marks : 40

Note : Question No. 1 is compulsory. In addition to compulsory question, attempt *four* more questions, selecting one question from each Unit.

Compulsory Question

1.　(i)　What is default name assigned to a new presentation ?

　　(ii)　What is default name assigned to a new workbook ?

　　(iii)　What do you mean by Autotext option in word ?

　　(iv)　How can you freeze rows and columns in a worksheet ?

　　(v)　What do you mean by MID function in Excel ?

　　(vi)　State *four* types of charts available in Excel.

　　(vii)　What do you mean by Transition effect in PowerPoint ?

　　(viii)　Why we need Mailmerge ?　　　　　　　(1×8=8)

UNIT-I

2.　Explain the following terms related to PowerPoint :

　　(i)　Slide Sorter View

　　(ii)　Animating an Object

　　(iii)　Rehearse Timing

　　(iv)　Slide View.　　　　　　　　　　(2×4=8)

3. (a) Write steps to perform following PowerPoint activities :
   (i) Inserting recorded sound effect.
   (ii) Inserting video clips.
   (b) Briefly describe various features of Outlook Express.
   (4+4=8)

UNIT-II

4. Explain the following terms related to MS-Word :
   (i) Inserting Symbols.
   (ii) Spell Check.
   (iii) Mailing Labels.
   (iv) Thesaurus.
   (2×4=8)

5. (a) Distinguish between the following :
   (i) Footers and Footnotes.
   (ii) Save and Save As.
   (2×2=4)
   (b) Write steps to perform following in MS-Word :
   (i) Create a table.
   (ii) Insert headers and footers.
   (2×2=4)

UNIT-III

6. Write steps to perform following Excel activities :
   (i) Renaming a Worksheet in a Workbook.
   (ii) Splitting Excel Window.
   (iii) Rotating text in a Cell.
   (iv) Applying Autofill Option.
   (2×4=8)

7. Explain the following terms related to Excel :
   (i) AutoFormat
   (ii) AutoFilter
   (iii) Macros
   (iv) AutoSum.
   (2×4=8)

UNIT-IV

8. (a) Briefly describe the following Excel functions giving suitable examples :
   (i) MOD
   (ii) REPT
   (iii) FLOOR
   (iv) NOW.
   (b) Distinguish between SUM and SUMIF function.
   (6+2=8)

9. (a) Briefly describe the following chart elements :
   (i) Origin
   (ii) Legend.
   (b) What are basic rules for creating chart with Chart Wizard ?
   (c) Is it possible to change chart type of an existing chart ? If yes, how ?
   (3+3+2=8)

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BIOTECHNOLOGY

(Introduction to Biotechnology)

Paper : I

Time : Three Hours]   [Maximum Marks : 40

Note : Attempt *five* questions in all, selecting *two* questions from each Unit and Question No. 1 is compulsory.

Compulsory Question

1. (a) Write brief notes on the following :

    (i)   Bioremediation.

    (ii) Apoptosis.

    (iii) Embryo Transfer Technology.

    (iv) Solid-state Fermentation.

    (v)   Somatic Hybridization.

    (vi) Patent.

    (vii) Proteome.   (1×7)

    (b) Who coined the term Biotechnology.   1

UNIT-I

2. (a) Give basic requirements for establishing animal cell culture laboratory.

    (b) Define Biotechnology and give its scope.

3. Describe the major discoveries which made genetic engineering possible.

4. Write short notes on the following :

    (a) Hybridoma technology.

    (b) DNA finger printing.

UNIT-II

5. Write short notes on Application of Biotechnology in

    (a) Agriculture.

    (b) Pharmaceutical industry.

6. (a) Explain safety guidelines for release of genetically modified organism.

    (b) Write a short note on Ethics in Biotechnology.

7. Write short notes on the following :

    (a) Biotechnology in waste water treatment.

    (b) Biotechnology Research in India.

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BIOTECHNOLOGY

(Biochemistry–I)

Paper-II

Time : Three Hours]   [Maximum Marks : 40

Note : Attempt *five* questions in all. Question No. 1 is compulsory. Select *two* questions from each unit. All questions carry equal marks.

Compulsory Question

1. (a) Write down the names of *four* nitrogenous bases of DNA.

    (b) Give full forms of NAD and TAG.

    (c) What are Essential fatty acids ?

    (d) Give names of any *two* aeromatic amino acids.

    (e) What are Zwitterions ?

    (f) Write down the structure of Glucose and Lactose.

    (g) Define Monosaccharides.

    (h) Define T_m value.   (1×8=8)

UNIT-I

2. (a) Define Amino acids. Briefly describe the chemical properties of amino acids.   4

    (b) Define Monosaccharides. Discuss different families of monosaccharides giving suitable examples.   4

3. (a) Write short notes on the following :

        (i) Peptide bond.

        (ii) Heteropolysaccharides.   (2×2=4)

    (b) Define Polysaccharides. Describe their biological significance.   4

4. (a) Give structures of the following :

        (i) Galactose.

        (ii) Glutamic acid.

        (iii) Lactose.

        (iv) Sucrose.   (1×4=4)

    (b) Briefly discuss important features of biomolecules.   4

UNIT-II

5. (a) Differentiate between DNA and RNA. Briefly discuss different types of RNA molecules found in the living cell.   4

    (b) Briefly discuss any *two* methods employed for amino acid sequencing of a protein molecule.   4

6. (a) Classify proteins on the basis of their structure and function.   4

    (b) Define Lipids. Differentiate between Saturated and Unsaturated fatty acids.   4

7. (a) Explain the double helical structure of a DNA molecule. Differentiate between A, B and Z-DNA.   4

    (b) Write short notes on the following :

        (i) α-helix and β-pleats.

        (ii) Forces stabilizing protein structures.   (2×2=4)

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CHEMISTRY

(Inorganic Chemistry)

Paper – 1, CH-101

Time : Three Hours]

[Maximum Marks : 27

Note : Attempt *five* questions in all, selecting at least *two* questions from each section.

SECTION-A

1. (a) Calculate uncertainty in velocity of an electron if uncertainty in position is 1 Å.

   Given $m = 9.1 \times 10^{-31}$ kg,

   $h = 6.6 \times 10^{-34}$ kg m^2 s^{-1}.   2

   (b) Explain Hund's rule of maximum multiplicity.   2

   (c) Calculate number of unpaired electrons in Ni^{+2} (Z = 28).   1

2. (a) Draw shapes of 1s and 2s orbitals. What is the basic difference between their shapes ?   2

   (b) What do you mean by Radial and Angular wave functions ?   2

   (c) An electron is present in 3d orbital. Write down the possible values of n, l, m, s.   1½

3. (a) How does atomic size change on moving down the group in the periodic table? 2

(b) Why Ionisation energy of noble gases are very high whereas their electron affinity are zero? 2

(c) What are Inner transition elements? Write down electronic configuration of d-block elements. 1½

4. (a) Discuss Mulliken scale of electronegativity. Give its disadvantages. 2

(b) What do you understand by Successive ionisation energies? 2

(c) How does Electron affinity differ from Electronegativity? 1½

SECTION-B

5. (a) What are the postulates of VSEPR Theory? 2

(b) Discuss structure of SF_6 on the basis of hybridisation. 2

(c) What are the limitations of VB Theory? 1½

6. (a) What are the conditions for atomic orbitals to form molecular orbitals? 2

(b) Draw molecular orbital energy level diagram for Nitric oxide 'NO' molecule. Calculate its bond order. 2

(c) Calculate Percentage Ionic character of HBr molecule from the following data:

Bond distance = 1.41Å, Dipole moment = 0.78 D. 1½

7. (a) Draw neat diagram and discuss structure of Sodium chloride. 2

(b) Write note on p-type semiconductors. 2

(c) Why Li_2CO_3 is unstable while Na_2CO_3 is quite stable? 1½

8. (a) Write down Fajan's rules. 2

(b) What are Frenkel defects? 2

(c) Why Silver halides are insoluble in water? 1½

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OGSE/D-16

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CHEMISTRY
(Physical Chemistry)
Paper – II

Time : Three Hours]　　　　　　　　[Maximum Marks : 26

Note : Attempt *five* questions in all, selecting at least *two* questions from each Section.

SECTION-A

1. (a) Explain the terms :
    Collision diameter, collision number and mean free path. 2½

   (b) Calculate the Root mean square velocity, Average velocity and most Probable velocity of CO_2 at 37°C. 3

2. (a) Using Vander Waal's equation, derive an expression for Boyle's temperature in terms of Vander Waal's constants. 3

   (b) Prove that $V_c = 3b$. 2

3. (a) Give and Explain Cinde's method for liquefaction of gases. 2½

   (b) Given that the Vander Waal's constant for 1 gm CO_2 are $a = 3.609 \times 10^4$ and $b = 42.75$ (volume in ml and Pressure in Atm.). Calculate the value of critical constants. 3

4. (a) Derive the relationship between Vander Waal and Critical constants. 3

   (b) What do you understand by continuity of state ? 2

SECTION-B

5. (a) Explain Surface Tension. Describe one method for the determination of Surface Tension. 2½

   (b) What is Boiling Point ? Why the Boiling point of water changes in Pressure cooker and cooking becomes fast ? 2½

6. (a) Derive Bragg's equation for X-Ray diffraction in crystals. 3

   (b) At what angles will X-Rays of wavelength 1.542×10^{-10} m undergo First order and Second order reflections by planes separated by 3.5×10^{-10} m ? 2½

7. (a) Define and explain the following :
    (i) Viscosity.
    (ii) Optical Relation.
    (iii) Heat of Vaporisation.
    (iv) Surface Tension
    (v) Boyle's Temperature. 2½

   (b) What is Principles of Liquid Crystals Display (L.C.D.) ? Give their types and uses. 3

8. (a) Define and explain with example :
    (i) Plane of Symmetry.
    (ii) Axis of Symmetry.
    (iii) Centre of Symmetry. 1×3

   (b) Explain the Law of rational Indices. 2

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821

CHEMISTRY

[Organic Chemistry (Theory)]

Paper–III

Time : Three Hours]   [Maximum Marks : 27

Note : Attempt *five* questions in all, selecting at least *two* questions from each section.

SECTION–A

1. (a) What is delocalized chemical bond ? Explain with suitable example.   2

    (b) Define Van der Waals interactions. Give their types.   2

    (c) Explain the cause of low reactivity of Vinyl halides.   1½

2. (a) Define the groups having I effect. Give examples.   2

    (b) What are the differences between Inductive and Electromeric effects ?   2

   (c) What is meant by Plane of symmetry ?   1½

3. (a) What are Functional isomers ? Give *two* examples.   2

    (b) Assign R and S configuration to the following :

    (i)

    H
    |
    I — C — OH
    |
    CH₃

    (ii)

    Br
    |
    CH₃ — C — COOH
    |
    H

    2
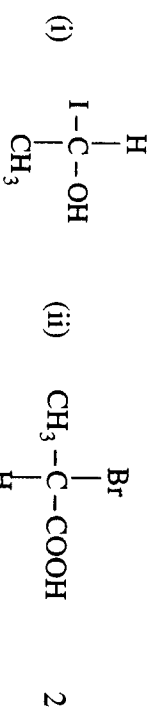
    (c) Give the properties of Enantiomers.   1½

4. (a) $CH_3-CH_2=CH-CH_3$ shows geometrical isomers, whereas $CH_3-CH_2-CH_2-CH=CH_2$ does not show geometrical isomers. Explain. 2

   (b) Assign E and Z configuration to the following : 2

   (i)

   $$\underset{CH_3}{\overset{HO}{}}C=C\underset{I}{\overset{H}{}}$$

   (ii)

   $$\underset{I}{\overset{Br}{}}C=C\underset{I}{\overset{CH_3}{}}$$ 2
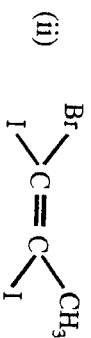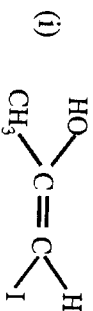
   (c) What are Axial and Equitorial bonds ? 1½

SECTION-B

5. (a) What does half-headed and double-headed arrows represent ? 2

   (b) Define Electrophiles. Give their types. 2

   (c) Identify free radicals out of the following : 2

   (i) NH_3 (ii) $\dot{C}l$

   (iii) $\dot{C}H_3$ (iv) H_2O

   (v) $\overline{O}H$ (vi) $\dot{B}r$.

6. (a) What are (i) Addition reaction, and (ii) Elimination reactions ? 2

   (b) Explain the structure of Methyl carbocation ($\overset{+}{C}H_3$). 2

   (c) What are the differences between Singlet and Triplet carbenes ? 1½

7. (a) Complete the reactions :

   (i) $2CH_3Cl + 2Na \xrightarrow{\text{Dry ether}} ?+?$

   (ii) $CH_3COONa + NaOH \xrightarrow{CaO} ?+?$ 2

   (b) Define Primary and Secondary carbon atoms in alkanes with suitable examples. 2

   (c) Calculate the percentage of n-butyl bromide and sec-butyl bromide formed by monobromination of n-butane. (Reactivity in bromination is 1600 : 82 : 1 for 3°, 2°, 1° hydrogens) 1½

8. (a) Write IUPAC names of the following compounds :

   (i) $CH_3-CH-CH-CH_3$ with $\overset{CH_3}{|}$ and $\overset{CH_3}{|}$

   (ii)

   2
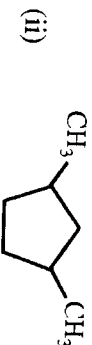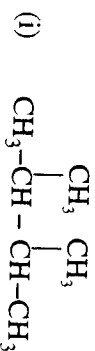
   (b) What are the main postulates of Baeyer's Strain theory ? 2

   (c) How will you prepare cycloalkanes using calcium salts of dicarboxylic acids ? 1½

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GSE/D-16

836

HYGIENE AND PROMOTIVE HEALTH

(Course No. 102)

Time : Three Hours]　　　　[Maximum Marks : 40

Note : Attempt *five* questions in all. Question No. 1 is compulsory. Select *one* question from each unit. All questions carry equal marks.

नोट : प्रथम प्रश्न अनिवार्य है। कुल **पाँच** प्रश्न करें। प्रत्येक इकाई में से कम-से-कम **एक** प्रश्न अवश्य चुनें। सभी प्रश्नों के अंक समान हैं।

Compulsory Question
(अनिवार्य प्रश्न)

1. Define and explain any *eight* of the following :

   निम्नलिखित में से किन्हीं **आठ** को परिभाषित करे तथा समझाइए :

   (i) Incubation Period.

   उद्भवन।

   (ii) Habit.

   आदत।

   (iii) Sleep.

   निद्रा।

   (iv) Physical Health.

   शारीरिक स्वास्थ्य।

UNIT-IV

8. "A healthy mind resides in health body." Explain.

   "स्वस्थ शरीर में ही स्वस्थ मन निवास करता है।" विस्तृत वर्णन करें।

9. Why is it essential to have periodic health check-up of children in schools ? Explain in detail.

   स्कूलों में बच्चों के आवधिक स्वास्थ्य की जांच करना क्यों आवश्यक है ? विस्तृत जानकारी दें।

(v) Diarrhoea.

दस्त।

(vi) Positive Health.

सकारात्मक स्वास्थ्य।

(vii) Polio Drops.

पोलियो की खुराक।

(viii) Dengue.

डेंगू।

(ix) Tuberculosis.

यक्ष्मा।

(x) Periodic health check-up.

आवधिक स्वास्थ्य जाँच।

UNIT-I (इकाई-I)

2. Describe in detail the mode of spread, symptoms, prevention and treatment of disease spread by insect bite, i.e., Malaria.

मच्छर के काटने से होने वाले रोग मलेरिया के फैलने के ढंग, लक्षण, बचाव तथा उपचार की विस्तृत विवेचना करो।

3. Describe the causes, mode of spread, prevention and treatment of Measles occurring in children.

बच्चों में होने वाले रोग खसरे के कारणों, फैलने के ढंग, लक्षणों, रोकथाम तथा उपचार की विस्तृत जानकारी दें।

UNIT-II (इकाई-II)

4. What are the various causes, mode of spread, prevention and treatment of Leprosy ?

कुष्ठ रोग (कोढ़) के कारण, फैलाव, रोकथाम तथा उपचार कौन-कौन से हैं ?

5. How the disease Cholera is spread ? Give its symptoms, mode of spread, prevention and treatment.

हैजा किस प्रकार फैलता है ? इसके लक्षण, फैलाव, रोकथाम, तथा उपचार की विस्तृत जानकारी दें ?

UNIT-III (इकाई-III)

6. What is Immunity. Classify immunity and give Vaccination schedule for human life.

रोग निरोधक क्षमता क्या है ? रोग निरोधक क्षमता का वर्गीकरण बताएं। तथा मानव जीवन के लिए टीकाकरण की अनुसूची तैयार करो।

7. Write short notes on any *two* of the following :

निम्नलिखित में से किन्हीं दो पर संक्षिप्त टिप्पणी करें :

(i) WHO.

डब्ल्यू.एच.ओ.।

(ii) Physical Health.

शारीरिक स्वास्थ्य।

(iii) National Health Programmes.

राष्ट्रीय स्वास्थ्य कार्यक्रम।

GSE/D-16

837

INTRODUCTION TO TEXTILES

Paper : Course No.–103

Time : Three Hours]   [Maximum Marks : 40

Note : Attempt *five* questions in all, selecting *two* questions from each unit as well as compulsory question.

नोट : अनिवार्य प्रश्न के साथ, प्रत्येक इकाई से दो प्रश्नों का चयन करते हुए, कुल पाँच प्रश्नों के उत्तर दीजिए।

Compulsory Question

(अनिवार्य प्रश्न)

1. Write short notes on the following :   8

   (a) Natural Fibres.

   (b) Yarn Count.

   (c) Knitting.

   (d) Bonding.

   निम्न पर संक्षिप्त टिप्पणी लिखिए :

   (क) प्राकृतिक रेशा।

   (ख) धागे की गिनती।

   (ग) बुनाई।

   (घ) बंधन लगाना।

UNIT-I (इकाई-I)

2. What is Fibre ? Explain its classification. 8

रेशा क्या है? इसके वर्गीकरण को समझाइए।

3. Explain the manufacturing process of Cotton in detail. 8

कपास के निर्माण की प्रक्रिया को विस्तार से समझाइए।

4. Differentiate between the properties of : 8

(a) Cotton and Wool.

(b) Silk and Nylon.

निम्न के गुणों के बीच अंतर स्पष्ट कीजिए :

(अ) कपास तथा ऊन

(ब) सिल्क और नायलॉन

5. How the Synthetic fibres are important to the consumer ?
Write in detail. 8

ग्राहकों के लिए कृत्रिम रेशे कैसे महत्वपूर्ण हैं? विस्तार से लिखिए।

UNIT-II (इकाई-II)

6. Explain various methods of Spinning in detail. 8

कताई की विभिन्न विधियों को विस्तार से समझाइए।

7. Write short notes on the following : 8

(a) Yarn Twist.

(b) Crimp.

निम्नलिखित पर संक्षिप्त टिप्पणी लिखिए :

(अ) धागा घुमाना

(ब) क्रिम्पिंग

8. What is Weaving ? Explain its type. 8

बुनाई क्या है? इसके प्रकारों को समझाइए।

9. Differentiate between : 8

(a) Felting and Braiding.

(b) Plain Weave and Twill Weave.

निम्न के बीच अंतर स्पष्ट कीजिए :

(अ) फेल्टिंग (भराई) तथा ब्रेडिंग

(ब) सादा बुनाई तथा ट्वील बुनाई

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9. Write in brief about the following :

(a) Food Supplementation.

(b) Microwave Cooking. (4×2=8)

निम्नलिखित का संक्षेप में उत्तर दीजिए :

(अ) अनुपूरक खाद्य पदार्थ।

(ब) माइक्रोवेव द्वारा खाना बनाना।

Roll No. ....

Total Pages : 4

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GSE/D-16

FOOD SCIENCE

Paper : Course No. 104

Time : Three Hours] [Maximum Marks : 40

Note : Attempt *five* questions in all, selecting at least *two* questions from each unit. Question No. 1 is compulsory. All questions carry equal marks.

नोट : प्रत्येक इकाई में से कम-से-कम दो प्रश्न चुनते हुए, कुल **पाँच** प्रश्न कीजिए। प्रश्न संख्या एक अनिवार्य है। सभी प्रश्नों के अंक समान हैं।

Compulsory Question
(अनिवार्य प्रश्न)

1. Answer the following in 3-5 lines :

केवल 3-5 पंक्तियों में उत्तर दीजिए :

(i) Balanced Diet.

संतुलित आहार।

(ii) Saffron.

केसर।

(iii) Mutual Supplementation.

आपसी अनुपूरक आहार।

(iv) Effect of Soaking treatment on Food grains.

अनाज एवं दालों पर भिगोने की प्रक्रिया का प्रभाव।

(v) Classification of Fruits.

फलों का वर्गीकरण कीजिए।

(vi) Egg Protein.

अण्डे में पाई जाने वाली प्रोटीन।

(vii) Caramelization of Sugar.

चीनी का कैरेमलाइजेशन (शुष्क शर्करा)।

(viii) What is Fortification ?

पौष्टिक गुणवता फोर्टिफिकेशन किसे कहते हैं ? (1×8=8)

UNIT-I (इकाई-I)

2. Classify FOOD into various groups based on its nutritional contribution. 8

पौष्टिक योगदान के आधार पर खाद्य पदार्थों को विभिन्न समूहों में वर्गीकरण कीजिए।

3. Discuss the nutritional contribution of pulses to the Diet. 8

दालों का हमारे भोजन में क्या पौष्टिक योगदान है, विस्तृत वर्णन कीजिए।

4. Describe the following :

निम्नलिखित का वर्णन कीजिए :

(a) Nutritive value of Fish.

मछली की भोजन में पौष्टिक गुणवता।

(b) Parboiling of Rice.

चावल की परिस्वयलिंग (Parboiling)। (4×2=8)

5. Answer the following :

निम्नलिखित का उत्तर दीजिए :

(a) Toxic constituents of Pulses and how these can be destroyed ?

दालों में पाई जाने वाली अपौष्टिक तत्व एवं इन्हें नष्ट कैसे किया जाता है ?

(b) Different types of Processed Milk.

विभिन्न प्रकार के प्रसंस्कृत दूध। (4×2=8)

UNIT-II (इकाई-II)

6. Explain the effect of cooking on nutritive value of carbohydrates and proteins. 8

कार्बोज एवं प्रोटीन पर पकाने की विभिन्न क्रियाओं पर पड़ने वाले प्रभाव की व्याख्या कीजिए।

7. Describe the advantages and disadvantages of any *three* methods of cooking in which moist heat is used. 8

खाना बनाने की किन्हीं **तीन** विधियों के लाभ एवं हानियों सहित वर्णन कीजिए जिसमें नमी एवं ताप द्वारा खाना बनाया जाता है।

8. How nutritive value of foods can be improved by using the method of Fermentation ? Discuss about various fermented products. 8

खमीरीकरण द्वारा भोज्य पदार्थों के पौष्टिक तत्व कैसे बढ़ाए जा सकते हैं ? विभिन्न खमीरीकृत खाद्य पदार्थों का वर्णन कीजिए।

Roll No. ....

GSE/D-16

839

HOME SCIENCE

(Introductory Chemistry)

Paper : Course No – 105

Time : Three Hours] [Maximum Marks : 40

Note : Question No. 1 is compulsory. Attempt *five* questions in all, selecting at least *two* questions from each Unit as well as compulsory question.

नोट : प्रश्न संख्या 1 अनिवार्य है। प्रत्येक इकाई में से कम-से-कम दो प्रश्नों का चयन करते हुए, अनिवार्य प्रश्न सहित कुल **पाँच** प्रश्न कीजिए।

Compulsory Question
(अनिवार्य प्रश्न)

1. (a) Calculate the No. of moles present in 4.0 gm of NaOH. 2

   (b) Calculate atomic mass of Na (Given : No. of electrons = 11, protons = 11 and neutrons = 12 in sodium). 2

   (c) Write the chemical formula of butan-2-ol. 2

   (d) Write the main components of talcum powder. 2

---

9. (a) Write a note on composition and uses of paints. 3

   (b) Write chemical composition and uses of creams and shampoo. 3

   (c) Write any *two* uses of varnishes. 2

   (अ) पेंट्स के घटक और उपयोग पर एक नोट लिखें। 3

   (ब) क्रीम और शैम्पू की रासायनिक रचना और उपयोग लिखें। 2

   (स) वार्निश के कोई दो उपयोग बताओ। 2

(अ) ज्ञात कीजिये की 4.0 ग्राम NaOH में मोलों की संख्या कितनी होगी।

(ब) Na की परमाणु संख्या ज्ञात कीजिये (इलेक्ट्रॉन की संख्या 11, प्रोटोन की 11, और न्यूट्रॉन 12 हो)

(स) ब्यूटेन-2-ऑल का रासायनिक सूत्र लिखो।

(द) दाल्भ पाउडर के मुख्य घटक लिखो।

UNIT-I (इकाई-I)

2. (a) If pH of a solution is 4.2. tell whether it is acidic or basic. **2.5**

(b) Either molarity or normality of sulphuric acid is same or different. Why ? **3**

(c) Define mass percentage with suitable example. **2.5**

(अ) यदि किसी घोल की pH 4.2 हो तो बताएं ये अम्लीय है या क्षारीय ?

(ब) क्या सल्फ्यूरिक अम्ल की मोलरी और नोर्मलिटी समान या अलग होती है, क्यों ?

(स) मास प्रतिशत को एक उदाहरण के साथ परिभाषित कीजिये।

3. (a) According to Bohr's model of an atom
   (i) What are orbits ?
   (ii) Whether energy of orbits is continuous ? **3**

(b) According to modern periodic table, which atom has lowest atomic weight ? **1.5**

(c) Write a note on modern periodic table in terms of groups, periods, atomic Nos. and atomic weight. **3.5**

(अ) बोहर के मॉडल के अनुसार
   (i) ऑर्बिट्स क्या हैं ?
   (ii) क्या इनकी ऊर्जा लगातार होती है ?

(ब) मॉडर्न पिरयोडिक सारणी में किस परमाणु का भार सबसे कम है ?

(स) ग्रुप, पीरियड, परमाणु संख्या, और परमाणु भार को ध्यान में रखते हुए, मॉडर्न पिरयोडिक सारणी पर टिप्पणी लिखो।

4. (a) Write electronic configuration of Oxygen with atomic No. 8 and Cl with atomic No. 17. **3**

(b) Differentiate Ionic bond, Covalent bond and Co-ordinate covalent bond. **4**

(c) How many groups are present in modern periodic table ? **1**

(अ) ऑक्सीजन और क्लोरीन का इलेक्ट्रॉनिक कन्फ्यूग्रेशन लिखो (ऑक्सीजन और क्लोरीन की परमाणु संख्या क्रमशः 8 और 17 है)

(ब) आयोनिक, कोवलेंट और को-ओर्डिनेट कोवलेंट बॉन्ड में अंतर लिखो।

(स) मॉडर्न पिरयोडिक सारणी में कितने ग्रुप हैं ?

5. (a) What is the pH of 10^{-3} molar HCl solution ? **2**

(b) Define buffer solution with suitable example. **2.5**

(c) What is the position of noble gases in periodic table ? **1.5**

(d) What are Lewis acids ? **2**

(अ) 10^{-3} मोलर HCl घोल की pH क्या होगी ?

(ब) बफर घोल को एक उदाहरण के साथ परिभाषित कीजिए।

(स) नोबल गैसों का मार्डन पिरयोडिक सारणी में स्थान कहाँ है ?

(द) लेविस अम्ल क्या है ?

UNIT-II (इकाई-II)

6. (a) What do you mean by Catenation property ?   2

   (b) What do you mean by isomerism ? Give an example of any type of isomerism ?   3

   (c) In alkenes (C=C) there are two bonds and tell which is stronger bond ?   3

   (अ) केटीनेशन प्रॉपर्टी से आप क्या समझते हैं ?

   (ब) आइसोमेरिज्म से आप क्या समझते हैं ? उदाहरण सहित बताइए।

   (स) एल्कीन्स में कार्बन-कार्बन के बीच में दो बन्ध होते हैं, इनके नाम बताएं और बताएं कि कौन-सा मजबूत बन्ड है ?   3

7. (a) What are aromatic compounds ?   1.5

   (b) Write IUPAC name of following :

      (i) $H_3C–CH=CH_2$

      (ii) $H_3C–CH_2CO–CH_3$.   3

   (c) Name the functional group in following :

      (i) $H_3C–CH_2OH$.

      (ii) $H_3C–CH_2COOH$.

      (iii) C_2H_2.   3.5

   (अ) एरोमैटिक यौगिक क्या होते हैं ?

   (ब) निम्नलिखित के नाम लिखिए :

      (i) $H_3C–CH=CH_2$

      (ii) $H_3C–CH_2CO–CH_3$.

   (स) निम्नलिखित में फंक्शनल ग्रुप के नाम बताओ :

      (i) $H_3C–CH_2OH$.

      (ii) $H_3C–CH_2COOH$.

      (iii) C_2H_2.   3.5

8. (a) Is detergents are preferred over soaps ? Give reasons.   3

   (b) Write a short note on polyesters.   2.5

   (c) What do you mean by cosmetics ? Give chemical composition of perfumes.   3

   (अ) क्या डिटर्जेंट, साबुन से ज्यादा उपयोग किये जाते हैं ? कारण बताओ।

   (ब) पॉलिएस्टर पर संक्षेप में लिखें।

   (स) कॉस्मेटिक्स से आप क्या समझते हैं ? परफ्यूम का रासायनिक मिलाप बताइए।

(iv) .... is a method of child study.

(a) Case Study

(b) Photography

(c) Biography

(d) Telegraphy.

.... बच्चे के अध्ययन की विधि है।

(क) केस स्टडी

(ख) फोटोग्राफी

(ग) बायोग्राफी

(घ) टेलीग्राफी।

4

GSE/D-16

840

HOME SCIENCE

(Introduction to Human Development)

Paper : Course No. 106

Time : Three Hours]　　　　　　[Maximum Marks : 40

Note : Attempt *five* questions in all, selecting *two* questions from each unit. Question No. 9 is compulsory. All questions carry equal marks.

नोट : प्रत्येक इकाई में से कम-से-कम दो प्रश्न चुनते हुए, कुल **पाँच** प्रश्न कीजिए। प्रश्न संख्या 9 अनिवार्य है। सभी प्रश्नों के अंक समान हैं।

UNIT-I (इकाई-I)

1. Define 'Human Development' and what is the scope of Human development?　　8

'मानव विकास' को परिभाषित करें व मानव विकास के क्षेत्र क्या हैं बताएं ?

2. What is Development and explain principles of Human Development ?　　8

विकास क्या है ? मानव विकास के सिद्धांतों की व्याख्या करें।

3. How Heredity and Environment are important in Human Development ?　　8

'मानव विकास' में आनुवंशिकी व वातावरण का क्या महत्व है ?

4. Discuss physical and emotional development of an Infant. **8**

शिशु की शारीरिक व मानसिक विकास की व्याख्या करें।

UNIT-II (इकाई-II)

5. Describe any *two* methods of Child Study. **8**

बाल अध्ययन की किन्हीं दो विधियों का वर्णन करें।

6. Explain Old Age in Human Development. **8**

मानव विकास में वृद्ध अवस्था के विषय में बताएं।

7. What are the factors which are responsible for Prenatal Development. **8**

वे कौन-से कारक हैं जो प्रसव-पूर्व विकास को प्रभावित करते हैं ?

8. Give characteristics of Early Childhood Stage. **8**

प्रारम्भिक बाल्यावस्था की विशेषताएं दें।

Compulsory Question

9. Objective Types Questions :

(i) Babbling starts at the age of .... month. **2**

   (a) 6-8 month
   (b) 2-3 month
   (c) 4-5 month
   (d) 0-2 month.

बच्चा बबलाना शुरू करता है .... मास में।

   (क) 6-8 मास
   (ख) 2-3 मास
   (ग) 4-5 मास
   (घ) 0-2 मास।

(ii) Adolescence word is derived from : **2**

   (a) Adult
   (b) Adolecere
   (c) Adolesome
   (d) None of them.

Adolescence शब्द की व्युत्पत्ति हुई है :

   (क) Adult से
   (ख) Adolecere से
   (ग) Adolesome से
   (घ) इनमें से कोई नहीं।

(iii) At the time of birth, infant's length is **2**

   (a) 45 to 45 cm
   (b) 72-75 cm
   (c) 10-12 cm
   (d) 90-100 cm.

जन्म के समय बच्चे की लम्बाई .... होती है।

   (क) 45-50 सेमी.
   (ख) 72-75 सेमी.
   (ग) 10-12 सेमी.
   (घ) 90-100 सेमी.।

BCA/D-16

853

COMPUTER AND PROGRAMING FUNDAMENTALS

Paper : BCA-III

Time : Three Hours]   [Maximum Marks : 80

Note : Attempt *five* questions in all. Question No. 1 is compulsory. Select *one* question from each unit.

Compulsory Question

1. (a) Differentiate between Primary and Secondary Memory.

   (b) What are the symbols used for Input, Decision, Processing, Start in Flow-chart ?

   (c) Differentiate between Machine Language and Assembly Language.

   (d) Define Computer, Interpreter and their difference.

   (4×4=16)

UNIT-I

2. Explain the block diagram of Computer and its essential parts.   16

3. (a) What is Primary Memory ? Discuss types of Primary Memory.

   (b) Write the working of Magnetic Disk.   16

UNIT-II

4. (a) Define Software and types of software.

   (b) Define Operating system and differentiate between Single User and Multi-user Operating system.   16

5. Write notes on the following :

   (a) Multiprogramming *vs.* Multiprocessing.

   (b) Real Time *vs.* Time Sharing Operating system.   16

UNIT-III

6. (a) What is Debugging ? Discuss the various types of Errors.

   (b) Discuss Programming Methodologies.   16

7. (a) Make a Flow-chart to find average of 10 numbers.

   (b) Write an Algorithm to search an element.   16

UNIT-IV

8. What is Sorting ? Discuss Selection and Bubble Sort with example.   16

9. Write notes on the following :

   (a) HLL and LLL.

   (b) Characteristics of a good Programming Language.   16

Total Pages : 3

BCA/D-16

854

WINDOWS AND PC SOFTWARE

Paper : BCA-112

Time : Three Hours]   [Maximum Marks : 80

Note : Attempt *five* questions in all, selecting *one* question from each unit in addition to Question No. 1 which is compulsory.

Compulsory Question

1. Attempt all the following questions :

   (i)   Recycle Bin.

   (ii)   Taskbar.

   (iii)   DVD.

   (iv)   Expand WYSIWYG.

   (v)   Disk Defragmentation.

   (vi)   Formula Bar.

   (vii)   Workbook.

   (viii) Pivot Chart.   (2×8)

UNIT–I

2. Explain the following :

   (i)   My Computer and My Documents.

   (ii)   Media players and Volume control.

   (iii)   GUI and CUI.

   (iv)   CD and Pen Drive.   (4×4)

[P.T.O.

3. (a) What is Windows ? What are various hardware and software requirements for installing windows ? 8

   (b) Explain steps of coping, deleting and renaming of any file. 8

UNIT-II

4. Explain the following with concern to window operating system :

   (i) Sharing Folders and Drives.

   (ii) Scandisk and Disk Cleanup.

   (iii) Changing user password.

   (iv) Using Scanner and Web Camera. (4×4)

5. (a) What is control panel ? Explain various steps to Add/ Romove programs. 8

   (b) What is Window update ? Explain the importance and steps of updating Windows. 8

UNIT-III

6. (a) What is Worksheet ? Explain steps of insert, delete and rename a worksheet. 8

   (b) What is Range ? Explain with example. 8

7. (a) Explain various methods of inserting, deleting and hiding a rows & columns from a worksheet by giving suitable example. 12

   (b) Explain cell formatting in detail. 4

UNIT-IV

8. (a) What is cell reference ? Explain absolute and relative cell reference. 8

   (b) What is Function ? Explain any four Mathematical/ Statistical functions. 8

9. (a) What is Macro ? Describe various steps of record and run of Macro. 8

   (b) Explain the steps of creating charts in Excel. 8

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BCA/D-16

855

MATHEMATICAL FOUNDATION – I

Paper : BCA-113

Time : Three Hours]   [Maximum Marks : 80

Note : Attempt *five* questions in all. Select *one* question from each section in addition to Question No. 1 which is compulsory.

Compulsory Question

1. (a) Prove that the following sets are equal :

   Set A = {x : x − 5 = 0}

   Set B = {x : x is a positive integral root of

   $$x^2 - 2x - 15 = 0\}.$$ 3

   (b) Define Supremum and Infimum of a set.   3

   (c) Prove that $\underset{\theta \to 0}{\text{Lt}} \dfrac{3 \sin \theta - \sin 3\theta}{\theta^3} = 4.$ 3

   (d) If $y = \dfrac{2bt}{1+t^2}$, $x = \dfrac{a(1-t^2)}{1+t^2}$, find $\dfrac{dy}{dx}$.   4

   (e) Find the value of n if

   $$^{n}P_4 : {}^{n-1}P_3 = 9 : 1.$$ 3

SECTION-I

2. (a) A survey shows that 63% of Indians like cheese whereas 76% like apples. If $x\%$ of Indians like both cheese and apples, find the value of x.   8

   (b) Define Boolean Algebra as an algebraic structure.   8

3. (a) (i) How many different numbers of six digits can be formed with the digits 3, 1, 7, 0, 9, 5 ?   8

   (ii) How many of them are divisible by 10 ?   8

   (b) A man has 7 friends. In how many ways can he invite one or more of them to a party ?   8

SECTION-II

4. (a) Find the value of a if function

   $$f(x) = \begin{cases} 2x-1 \;,& x < 2 \\ a \;,& x = 2 \\ x+1 \;,& x > 2 \end{cases}$$

   is continuous at $x = 2$.   8

   (b) If $\sin y = x \sin (a + y)$, prove that $\dfrac{dy}{dx} = \dfrac{\sin^2 (a + y)}{\sin a}$.   8

5. (a) Find nth derivative of $e^{ax} \sin (bx + c)$.   8

   (b) If $x^y = e^{x-y}$, prove that $\dfrac{dy}{dx} = \dfrac{\log x}{(1+\log x)^2}$.   8

SECTION-III

6. (a) Find Differential equation of family of curves $(x - h)^2 + (y - k)^2 = a^2$, where h and k are arbitrary constants.   8

   (b) Solve the Differential equation

   $$\frac{dy}{dx} = (4x + y + 1)^2.$$ 8

7. (a) Solve $\dfrac{dy}{dx} - 2y \tan x = y^2 \tan^2 x$.   8

   (b) Verify that the Differential equation

   $$(x^4 - 2xy^2 + y^4)\,dx - (2x^2y - 4xy^3 + \sin y)\,dy = 0$$

   is exact and hence solve it.   8

SECTION-IV

8. (a) Solve $\dfrac{d^2y}{dx^2} + \dfrac{dy}{dx} - 2y = x + \sin x$.   8

   (b) Solve $\dfrac{d^2y}{dx^2} - 2\dfrac{dy}{dx} + y = xe^x \sin x$.   8

9. (a) Solve $x^2 \dfrac{d^2y}{dx^2} + 8x \dfrac{dy}{dx} + 13y = \log x$.   8

   (b) Solve $(x+1)^2 \dfrac{d^2y}{dx^2} + (x+1)\dfrac{dy}{dx} = (2x+3)(2x+4)$.   8

BCA/D-16

856

LOGICAL ORGANISATION OF COMPUTER – I

Paper : BCA-114

Time : Three Hours]   [Maximum Marks : 80

Note : Attempt any *five* questions. Question No. 1 is compulsory. Attempt remaining *four* questions selecting *one* from each unit. All questions carry equal marks.

Compulsory Question

1. (i)   Explain Minterm.

    (ii) Define Involution law of Boolean Algebra.

    (iii) Prove Distributive law using Venn Diagram.

    (iv) $(1100.001)_2 = (?)_{10}$.

    (v)   What is NAND gate ?

    (vi) What is Combinational circuit ?

    (vii) What is Multiplexer ?

    (viii) Why computer system uses binary number system ?

                                        (2×8=16)

UNIT-I

2. (i)   What is Number system ? Explain two positional number systems.   8

    (ii) $(FA)_{16} = (?)_2 = (?)_{10} = (?)_8 = (?)_5$.   8

3.

(i) Discuss how negative numbers can be represented in computer system. 8

(ii) Explain ASCII and EBCDIC Code. 8

UNIT-II

4.

(i) State De Morgan's Theorem and prove it. 8

(ii) Explain two Canonical forms of Boolean Expression for a truth table of your choice. 8

5.

(i) Simplify the Boolean function

$$F(x, y, z, u) = \sum(0, 2, 4, 6, 9, 13, 15) + \sum_{\phi}(1, 3, 7)$$ 8

(ii) Examine the validity of following Boolean equation

$$XZ + Y\overline{X} + YZ = \overline{X}Z + \overline{Y}X$$

and also draw circuit diagram of L.H.S. using NAND gate. 8

UNIT-III

6.

(i) Simplify the following Boolean expression and implement it using OR and AND gates :

$$Y = \overline{A}\overline{B}\overline{C}\overline{D} + \overline{A}BC\overline{D} + \overline{A}BC\overline{D} + AB\overline{C}D$$ 8

(ii) Explain the working of 3 input NAND gate. 8

7.

(i) Explain implementation of AND, OR, NOT gates by NOR gate. 8

(ii) Prove that NAND gate is an universal gate. 8

UNIT-IV

8.

(i) Describe the design procedures of Combinational circuit with an example. 8

(ii) What is Full Adder ? Explain it. Draw its logic diagram by using Half Adder. 8

9.

(i) Explain and draw the logic diagram of decimal to BCD encoder. 8

(ii) Design a 6 × 32 decoder with the help of 3 × 8 decorder. 8

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BCA/D-16

858

PROGRAMMING IN 'C'

Paper : BCA-116

Time : Three Hours]

[Maximum Marks : 80

Note : Attempt *five* questions in all. Question No. 1 is compulsory. In addition to compulsory question, attempt *four* more questions selecting *one* question from each Unit.

Compulsory Question

1. (i) Illustrate the rules for constructing variable names.

   (ii) Who developed 'C' language and in which year ?

   (iii) Describe Comma operator with example.

   (iv) Justify that go to statement can not be used to transfer control from outside to inside the loop.

   (v) What is purpose of break & continue statement ?

   (vi) What two important conditions must be satisfied by any recursive function ?

   (vii) What happens when a variable is not initialized in main function ?

   (viii) What will be output when you execute following code :

   ```
   # include < stdio.h >
   void main ( )
   { Char name [7] = "NETWORK"; print f ("%s", name);
   }
   ```

   (8×2=16)

UNIT-I

2. Explain getch ( ), getche ( ), getchar ( ) and gets ( ) functions with example. 16

3. (a) Illustrate the importance of 'C' language. (8+8)

   (b) What are escape sequences ? Write a program to output message in double quotes.

UNIT-II

4. (a) What is the purpose of if-else statement ? What are the two different forms of if-else statement ? How they differ ? Explain with example. (8+8)

   (b) Write a program to find the largest among three numbers.

5. Explain bitwise and unary operators available in 'C'. Illustrate the importance of bitwise operators with suitable example. 16

UNIT-III

6. (a) What is Parameter passing ? Explain, with example, Parameter passing schemes supported by 'C'. (10+6)

   (b) What is function prototype ? What is their purpose ? Where within a program are function prototype normally placed ?

7. Write a 'C' program to find sum & reverse of digits of a positive integer using do .... while control statement. 16

UNIT-IV

8. What does a storage classmean ? Describe the features of different storage classes available in 'C'. 16

9. Write a program to check whether a given string is palindrome or not. 16

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OBCA/D-16

859

COMPUTER & PROGRAMMING FUNDAMENTALS

Paper : BCA-III

Time : Three Hours]

[Maximum Marks : 80

Note : Attempt *five* questions in all, selecting *one* question from each unit in addition to compulsory Question No. 1.

Compulsory Question

1. (a) What is a Computer ?

   (b) What is ROM ?

   (c) Define the term "Software".

   (d) Define the term "Virus".

   (e) What is Debugging ?

   (f) What is Machine Language ?

   (g) Differentiate between Linear Search and Binary Search.

   (h) What is Internet ?

   (2×8=16)

UNIT-I

2. Diagrammatically explain the functional units of a Computer.

   16

OR

3. Explain various types of Primary Memory Devices.   16

UNIT-II

4. Explain different categories of Software with examples.   16

OR

5. What is Virus ? Explain various types of Computer viruses.

   16

UNIT-III

6. Draw and explain the various symbols used in Flowcharts. 16

OR

7. What is a Programming Language ? What are the characteristics of a good Programming language ? Explain different types of Programming languages.

   16

UNIT-IV

8. Differentiate between Bubble sort, Selection sort and Insertion sort.

   16

OR

9. What is Computer Network ? Explain various types of Network Topologies.

   16

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COMPUTER ORIENTED NUMERICAL METHODS

Paper : BCA-113

Time : Three Hours] [Maximum Marks : 80

Note : Attempt *five* questions in all. Question No. 1 is compulsory. Select *one* question from each unit. All questions carry equal marks.

Compulsory Question

1. (a) If ∇ is backward difference operator then compute $\nabla^3 f(x)$. 3

(b) Write formula for trapezoide rule for function $f(x)$ in interval $[X_0, X_3]$ including error term. 3

(c) If $f(x) = x^3 - 2x + 3 = 0$, find the best approximated initial value x_0 to start Newton-Raphson method. 3

(d) Find the inverse of matrix $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 0 \\ 5 & 4 & 3 \end{bmatrix}$. 3

(e) Define Round off error and Truncation error with example of each. 2

(f) Define a Lower triangular matrix and its importance. 2

UNIT-IV

8. Evaluate the integral $\int_1^2 \dfrac{dx}{2x+3}$ taking $n = 12$ (intervals) using :

(a) Trapezoidal rule. 8

(b) Simpson's $\dfrac{1}{3}$rd rule. 8

9. (a) Evaluate $\int_1^2 \dfrac{dx}{x}$ using Gaussian Quadrature formula. 8

(b) Derive Gaussian quadrature formula for integral $\int_a^b (x^2 + x + 1)\, dx$ for two points. 8

UNIT-I

2. (a) Find a real root of the equation $f(x) = x^3 - 4x - 15 = 0$ correct to 3 decimal places using Bisection method. 8

   (b) Using Newton-Raphson method, find a real root of equation $f(x) = x^3 - 5x + 3 = 0$ upto 3 iterations. 8

3. (a) Define Order of Convergence. Find order of convergence of False position method. 8

   (b) Using Iterative method, find a real root of equation $f(x) = x^2 - 3x + 6 = 0$. 8

UNIT-II

4. (a) Using Gauss Elimination method, solve the system of equations :

   $x + y + z = 6$

   $3x + 3y + 4z = 20$

   $2x + y + 3z = 13$. 8

   (b) Solve the system of linear equations using Gauss-Seidal method (carry out three iterations) :

   $6x + 15y + 2z = 72$

   $27x + 6y - z = 85$

   $x + y + 54z = 110$. 8

5. (a) Using Euler's modified method, solve the differential equation $\dfrac{dy}{dx} = x - y^2$ with $y(0) = 1$.

   Find $y(0.1)$ and $y(0.2)$ choosing $h = 0.1$. 8

   (b) Using Taylor's series method, solve $\dfrac{dy}{dx} = 2y + 3$; $y'(0) = 0$ to get $y(0.1)$ and y (0.2) taking $h = 0.1$. 8

UNIT-III

6. (a) Using Lagrange Interpolation formula, find $f(x)$ for $x = 15$ for table

x	0	45	90
$f(x)$	0	.7071	1.0

   (b) Using Newton's Forward difference interpolation formula for equal interval, find $f(1925)$ for table :

Year	1921	1931	1941	1951	1961
$f(x)$	46	46	81	93	101

7. (a) Explain orthogonal properties of Chebyshev polynomial of first kind. 8

   (b) Using Taylor's series approximation, solve $\dfrac{dy}{dx} = 1 + xy^2$; $y(0) = 1$; to find $y(0.2)$ taking $h = 0.1$. 8

OBCA/D-16

863

MATHEMATICS

(Mathematical Foundation–I)

Paper : BCA-115

Time : Three Hours]　　　　　　　　[Maximum Marks : 80

Note : Attempt *five* questions in all, selecting *one* question from each unit in addition to Question No. 1 which is compulsory.

1.　(a)　State whether A = B or not.

$$A = \{x : x^2 = 16, x \in N\}; B = \{-4\}.$$　　2

　　(b)　Define Complete and Bounded lattice.　　2

　　(c)　Differentiate $\sin x^0$ w.r.t. x.　　2

　　(d)　In how many ways can 52 playing cards be distributed equally among four heaps ?　　2

　　(e)　Solve $\dfrac{d^3 y}{dx^3} = \dfrac{6y}{x^3}$.　　4

　　(f)　If $^5P_r = 2 \cdot {}^6P_{r-1}$, find r.　　4

UNIT-I

2.　(a)　If R is an equivalence relation on a set A, show that R^{-1} is also an equivalence relation on A.

(b) Let D_{35} be the set of positive factors of 35. Two binary operations '+' and '.' are defined as follows :

$a + b = $ l.c.m (a, b) and

$a . b = $ g.c.d. $(a, b) \ \forall \ a, b, \in D_{35}$.

An operation ',' on D_{35} is defined as $a' = \dfrac{35}{a} \ \forall \ a \in D_{35}$.

Show that $(D_{35}, +, ., ', 35)$ is Boolean Algebra.

3. (a) How many numbers greater than a million can be formed with digits 2, 3, 0, 3, 4, 2, 3 ?

(b) Prove that $(A \cap B) \cap C = A \cap (B \cap C)$.

UNIT-II

4. (a) A function f is defined as follows :

$$f(x) = \begin{cases} x^p \cos 1/x & \text{when } x \neq 0 \\ 0 & \text{when } x = 0. \end{cases}$$

What condition should be imposed on p such that f may be continuous at $x = 0$?

(b) If $y = \sqrt{x + \sqrt{x + \sqrt{x + \dots \dots \text{to } \infty}}}$,

show that $(2y - 1) \dfrac{dy}{dx} = 1$.

5. (a) Differentiate $\tan^{-1} \dfrac{\sqrt{1 + x^2} - 1}{x}$ w.r.t. $\sin^{-1} \dfrac{2x}{1 + x^2}$.

(b) If $y = e^{m \sin^{-1} x}$, prove that $(1 - x^2)y_2 - xy_1 = m^2 y$.

UNIT-III

6. (a) Find the differential equation of the circles touching the y-axis at the origin.

(b) Solve $e^{y/x}(x - y) \, dx + x(1 + e^{y/x}) \, dy = 0$.

7. (a) Solve $y \, dx - x \, dy + \log x \, dx = 0$.

(b) Solve $(2x^2y - 3y^4) \, dx + (3x^3 + 2xy^3) \, dy = 0$.

UNIT-IV

8. (a) Show that

$$\dfrac{1}{D - \alpha} X = e^{\alpha x} \int e^{-\alpha x} X \, dx.$$

(b) Solve $(D^3 - 2D^2 - 5D + 6)y = e^{3x}$.

9. (a) Solve $\dfrac{d^2 y}{dx^2} - y = x^2 \cos x$.

(b) Solve $(1 + x)^2 \dfrac{d^2 y}{dx^2} + (1 + x) \dfrac{dy}{dx} + y = 4 \cos (\log (1 - x))$.

_____

BSIT/D-16

12509

COMMUNICATION SKILLS-I

BSIT-101

Time : Three Hours]

[Maximum Marks : 30

Note : Attempt all questions.

1. Answer the following questions :

5×1=6

(a) What is Informal Communication ?

(b) Discuss 'Interview'.

(c) What is a circular ?

(d) Comment on e-Mail Etiquettes

(e) Make a sentence from the following phrasal verb :

care for.

2. (a) Give merits and demerits of oral and written communication.

Or

(b) What points should be kept in mind while making announcements over a Public Address System ?

(b) Write short notes on *any two* of the following :

(i) Radio broadcast

(ii) Lecture

(iii) Meeting

(iv) Conference.

3. (a) Write a detailed note on FAX.

   Or

   Differentiate among tables, chart and diagram.   3

   (b) Write short notes on any *two* of the following :
   - (i) e-Mail
   - (ii) Cell Phone
   - (iii) Film Strip
   - (iv) Cinema   1½×2=3

4. (a) Fill in the blanks with appropriate articles :
   - (i) It is..........honour to be here.
   - (ii) He is studying in..........University.
   - (iii) He gifted his brother..........umbrella.   3×½=1½

   (b) Fill in the correct form of the verb given in brackets :
   - (i) We..........ten short of the required number. (be)
   - (ii) Tomorrow, he..........for Delhi. (leave)
   - (iii) The train..........late by ten minutes. (run)   3×½=1½

   (c) Change the narration of the following sentences :
   - (i) "Leave all this and go to college", said his mother.
   - (ii) Said said, "You are crazy."
   - (iii) The beggar said, "Please give me something to eat."   3×½=1½

   (d) Change the voice of the following sentences :
   - (i) This has been done by me.
   - (ii) The teacher praised the child.
   - (iii) The principal declared a holiday.   3×½=1½

5. Make a precis of the following passage and suggest a suitable title :   6

   A staggering 2,31000 people are killed in road accidents in the country every year, as pointed out in the latest Global Status Report on Road Safety, 2013. Motorcyclists, pedestrians and cyclists constitute a majority of the victims. Despite such a high casualty rate, the government is not at all bothered about road safety. Recently, India's standards of road safety were exposed when five Indian cars failed the test conducted by the UK-based Global New Car Assessment Programme. In India, manufactures of cars do not have to subject their vehicles to any organic crash test. What's worse ! even multinational car companies that follow safety norms in their home countries do not do so while manufacturing cars in India in order to reduce cost. Their standard explanation is that they follow the road safety standards in India. Actually, this amounts to saying that the life of an Indian is not as precious is, say the life of an American or a German.

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 9 is compulsory. All questions carry equal marks.

Unit I

1. (a) Find the rank of the matrix : 4

$$A = \begin{bmatrix} 1 & 2 & -1 & 3 \\ -2 & -4 & 4 & -7 \\ 1 & 2 & 1 & 2 \end{bmatrix}$$

(b) Find the characteristic roots and spectrum of matrix :

$$A = \begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$$

(b) Let A = {3, 4, 5} and B = {4, 12, 15}. Find R where R is the relation "x divides y" from a set A to set B. Also find R⁻¹. 4

Unit V

(Compulsory Question)

9. (a) If A = {(a, b), c}, find the power set P(A). 2

(b) Find eigen values of : 2

$$\begin{bmatrix} 1 & 2 & -1 \\ 0 & 1 & 2 \\ 0 & 0 & 1 \end{bmatrix}$$

(c) Find the rank of : 2

$$\begin{bmatrix} 0 & 0 & 1 \\ 0 & 2 & 0 \\ 1 & 0 & 1 \end{bmatrix}$$

(d) Solve : 2

$$\frac{d^3 y}{dx^3} - 7\frac{dy}{dx} - 6y = 0$$

reducing it to normal form.

2. (a) Prove that :

$$A = \begin{bmatrix} 2 & 6 & 1 \\ 0 & 1 & -6 \\ 3 & 4 & 2 \end{bmatrix}$$

satisfies its characteristic equation.

(b) Diagonalize : 4

$$A = \begin{bmatrix} 1 & -2 & 4 \\ -2 & 2 & 0 \\ 4 & 0 & -7 \end{bmatrix}$$

Unit II

3. (a) Prove that $y = A \cos x + B \sin x$ is a solution of the differential equation : 4

$$\frac{d^2 y}{dx^2} + y = 0$$

(b) Solve the differential equation : 4

$$(x - y)^2 = \frac{dy}{dx} a^2$$

4. (a) Solve $(x^2 + y^2)dx - 2xydy = 0$. 4

(b) To find the necessary and sufficient conditions that the equations $Mdx + Ndy = 0$ may be exact. 4

Unit III

5. (a) Solve the differential equation : 4

$$\frac{d^3 y}{dx^3} + y = 3 + e^{-x} + 5e^{2x}$$

(b) Solve the differential equation : 4

$$x^3 \frac{d^2 y}{dx^2} - 2y = x^2 + \frac{1}{x}$$

6. (a) Prove that $4^n - 3n - 1$ is a multiple of a for all $n \in N$. 4

(b) Prove that : 4

$$(A - B) \cup (B - A) = (A \cup B) - (A \cap B).$$

Unit IV

7. (a) Prove the the relation "is congruent to" on the set of all triangles in a plane is an equivalence relation. 4

(b) Let $f : R \rightarrow R$ be a function defined as $f(x) = 115x + 49, x \in R$. Show that f is on-to. 4

8. (a) A survey shows that 63% of Indians like oranges whereas 76% like apples. If x% of Indians like both oranges and apples, find the value of x. 4

Total Pages : 02

BSIT/D-16

12601

PHYSICS-I

BSIT-103

(EM Theory)

Time : Three Hours]

[Maximum Marks : 40

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

(Compulsory Question)

1. (a) What do you mean by displacement current ?
   (b) Define intrinsic impedance of medium.
   (c) What is ground wave propagation ?   8
   (d) What are resonant antennas ?

Unit I

2. What is Gauss divergence theorem ? Drive mathematical expression of the same.   8

3. Give basic idea of em waves and write Maxwell's equation in differential and integral forms.   8

Unit II

4. Drive an expression for plane wave equation in conducting Medium.   8

5. (a) What is Lorentz Gauge conditions ?   4
   (b) Describe Skin Effect.   4

Unit III

6. Explain propagation of EM waves in atmosphere.   8

7. What is remote sensing and write its applications.   8

Unit IV

8. (a) Explain radiation mechanism of antenna.   4
   (b) Define Antenna Gain.   4

9. What do you mean by Transmission lines ? Write its equivalent circuit and define characteristics impedance.   8

BSIT DIGITAL ELECTRONICS-I

BSIT-104

Time : Three Hours]

[Maximum Marks : 40

Note : Attempt any *Five* questions. Q. No. 1 is compulsory.
All questions carry equal marks.

(Compulsory Question)

1. (a) What is Grey Code ? Give the advantages of grey
    code over binary code.   2

   (b) Design AND gate and OR gate using NAND gates
       and NOR gates.   2

   (c) Write the uses of multipexer.   2

   (d) Write a short note on race-around condition in J-K
       flip-flop.   2

Unit I

2. (a) Converts a grey code 11011011 into binary.   1

   (b) Convert the following :   6

       (i) $(46.5)_{10} = (x)_2 = (y)_8 = (z)_{16}$

       (ii) $(36.4)_8 = (X)_2 = (Y)_{10} = (Z)_{16}$

(c) Perform the subtraction using 2's complementary arithmetic :

$$(23)_{10} - (16)_{10}$$ 1

3. (a) Convert the binary number 10101001 into grey code.   1

(b) Convert the following :

(i) $(38.AB)_{16} = (X)_2 = (\quad)_8 = (\quad)_{10}$ 6

(ii) $(10101.111)_2 = (X)_{10} = (X_1)_8 = (X_2)_{16}$ 4

(c) Multiply $(11011)_2$ with $(1111)_2$.   1

Unit II

4. (a) Draw the symbol and truth table of XOR gate.   2

(b) Explain De-Mrgan's law in brief.   2

(c) Simplify the following four various K-map and make the circuit diagram using NAND gates :   4

$$\sum_{A,B,C,D} 0, 2, 4, 6, 8 + \sum_\phi 1, 5, 13, 15$$

5. (a) Simplify the logic equation using Boolean algebra :   2

$$Z = (A\bar{B}\bar{C} + A\bar{B}C + ABC + AB\bar{C})(A + \bar{B})$$

(b) Obtain the minimal SOP expression using K-map and make the circuit diagram using NAND gates :   4

$$f(A,B,C,D) = \sum 0, 1, 3, 6, 8, 10 + \sum 14, 15$$

(b) Design XNOR gate using NAND gates.   2

Unit III

6. (a) Design a digital comparator to compare two 2-bit long binary numbers.   4

(b) Design an even parity bit generation for excess-3 code.   4

7. (a) Design binary to BCD code converter using NAND gates.   5

(b) What is a decodes ? Write the applications of decoders.   3

Unit IV

8. (a) Degin and explain master-slave J-K flip-flop using NAND gates. Also discuss its asynchronous behaviour.   6

(b) Write the applications of flip-flops.   2

9. (a) Discuss and design D-flip-flop.   4

(b) How J-K flip-flop can be converted into T flip-flop ? Explain the synchronous and asynchronous behaviour of T flip-flop.   4

BSIT/D-16　　　**12603**

ELECTRONIC COMMUNICATION-I

BSIT-105

Time : Three Hours]　　　　　　　　　[Maximum Marks : 40

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

1. (a) What is compounding and why is it required ?

   (b) Why high carrier frequencies are used for transmission ?

   (c) Why quantizing noise effects small amplitude signals in a PCM system far more than large signals ?

   (d) How does noise affect channel capacity ? **2 each**

Unit I

2. (a) The rms value of a carrier voltage is 150 volts. Compute its rms value when it has been amplitude modulated by a sinusoidal audio voltage to a depth :

   (i) 20%

   (ii) 40% **5**

   (b) How FM is advantages over AM ? **3**

3. In an FM system, the frequency deviation is 5 kHz when the audio modulating frequency is 500 Hz and the audio modulating voltage is 2V. Compute modulation index. Also compute the frequency deviation and the modulation index if AF voltage is increased to 8V while the modulation frequency is reduced to 200 Hz.   8

Unit II

4. (a) For a low pass signal with $f_m = 20$ kHz, what should be the minimum sampling frequency ?   3

   (b) What is pulse modulation ? Discuss PAM in detail.   5

5. (a) What is meant by quantization errors ? Explain its types.   4

   (b) Write a short note on Natural sampling and explain the importance of large guard time.   4

Unit III

6. (a) Compare delta modulation with PCM and explain the term slope overloading. How can slope overloading be reduced ?   5

   (b) Draw the block diagram of PCM transmitter and explain its working.   3

7. (a) State the advantages and applications of pulse code modulation.   3

   (b) What do you understand by companding ? Why is it preferred to quantizing with tapered steps ? Justify your answer with the help of typical companding curves.   5

Unit IV

8. (a) What factors are necessitated while designing a communication system ? Explain.   4

   (b) How an echo suppressor may interfere with data transmission ? List the steps for the prevention of the interference.   4

9. (a) What is Crosstalk ? State the steps to reduce the crosstalk in a communication system.   4

   (b) An analog signal carries eight bits in each signal element. If 5000 signal elements are sent per second, find the baud rate and bit rate.   4

BSIT/D-16

12604

COMPUTER FUNDAMENTALS-I

BSIT-106

Time : Three Hours]   [Maximum Marks : 40

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

1. Attempt all questions :   4×2

    (a) Give the name of first supercomputer.

    (b) What is data archiving ? Name some secondary storage media used for data archiving.

    (c) What is community-supported software ?

    (d) What information is available on the Taskbar ?

Unit I

2. What is a computer ? Give the block diagram of computer ? Give its characteristics.   8

3. Write short notes on the following :   8

    (a) Input devices

    (b) Files

    (c) Mainframe Computers.

Unit II

4. Write short notes on the following :   8

   (a) Magnetic Bubble Memory

   (b) Charged Couple Devices.

5. (a) In the context of magnetic disk storage, define the
       following term and write relationship among then
       (if any) :   6

       (i)   Track

       (ii) Cylinder

       (iii) Sector

       (iv) Disk Address.

   (b) What will be storage capacity of a double-sided
       disk with 400 tracks, 16 sectors per track, and 512
       bytes per sector ?   2

Unit III

6. What are the different ways of acquiring software ? List
   their advantages and limitations.   8

7. (a) Are all public-domain software "freewave" ?
       Explain.   3

   (b) Why is firmwave gaining popularity ?   3

   (c) Distinguish between application software and system
       software.   2

Unit IV

8. What is Multimedia ? Explain its components and give
   its Applications.   8

9. (a) What do you mean by Indent in MS-Word ?
       Distinguish between Positive and Negative Indent.   4

   (b) How can you correct your document from Misspell ?   2

   (c) How you can create a macro and use it ?   .   2