

नमूना प्रश्न पत्र - २०७८ (२०२१)

विषय : अनिवार्य नेपाली (००२१)

पुणाङ्क : ७५

समय : ३ घण्टा

SET A

विद्यार्थीहरूले सकेसम्म आफ्नै शब्दमा उत्तर दिनु पर्नेछ ।

सबै प्रश्नको उत्तर दिनुहोस् :

१. तलको अनुच्छेदमा रेखाङ्कन गरिएका शब्दको अक्षर संरचना र अक्षर सङ्ख्या देखाउनुहोस् : (३)
आजको छलफलबाट म धेरै उत्साहित भएँ । यसरी हामी जस्ता युवापुस्तामा यस्तो बुझाइ रहेपछि हामीकहाँ रहेका विकृति, विसङ्गति, अन्धविश्वास, कुरीति हटाउन सकिन्छ । यसका लागि हामी जस्ता विद्यार्थी, युवा र शिक्षित वर्गले पहल गर्नुपर्छ ।
२. शुद्ध गरी पुनर्लेखन गर्नुहोस् : (३)
सहकारीको उपादेयता समाजका हरेक छेत्रमा उत्तिकै भएपनि आर्थिक समृद्धि र विकासमा यसको महत्त्व निकै विशिष्ट रहेको छ, विकासको मुख्य आधार आर्थिक समृद्धी हो । विकासका लागि आवश्यक आर्थिक समृद्धिमा सहकारीको भूमिका अपरिहार्य ठानिन्छ ।
३. कुनै एक प्रश्नको उत्तर दिनुहोस् : (२)
क) दिइएको अनुच्छेदबाट एउटा पारिभाषिक शब्द र एउटा अनुकरणात्मक शब्द पहिचान गरी वाक्यमा प्रयोग गर्नुहोस् :
कलकल बग्ने नदी, छडछड गर्ने भरना, जैविक विविधता एवम् सम शीतोष्ण जलवायु हाम्रो पर्यापर्यटनका विशिष्ट आधारहरू हुन् ।
ख) दिइएको अनुच्छेदबाट एउटा उखान र एउटा टुक्का पहिचान गरी तिनलाई वाक्यमा प्रयोग गर्नुहोस् :
आजकल आलु खाएर पेडाको धाक लगाउने र आँखा छल्ने मानिसको कमी छैन । असल समाज निर्माण गर्ने हो भने यस्ता कुरामा कानमा तेल हालेर बस्नु हुँदैन । धान खाने मुसो, चोट पाउने भ्यागुतो भयो भने मान्छेमा इमानदारिता हराउँदै जान सक्छ ।
४. तलको अनुच्छेदमा रेखाङ्कन गरिएका शब्दको पदवर्ग पहिचान गर्नुहोस् : (३)
निल आर्मस्ट्रङहरूलाई त्यति फिटफिटि परेन होला किनभने चन्द्रमामा पुग्दा उनीहरूसित यथेष्ट वैज्ञानिक उपकरण उपलब्ध थिए । हामी भने पानीसमेत नपाएर रोयौं । निकै माथि पुगेपछि दुइटा पानीका कुला भेटिँदा स्वर्ग पुगेको अनुभव भयो । मरुभूमिका यात्रीले एककासि मरुदान भेटे भैं हामी फुलेल भयौं ।
५. तलको अनुच्छेदबाट दुईओटा तत्सम र दुईओटा आगन्तुक शब्द पहिचान गरी लेख्नुहोस् : (२)
हार्डवेयर र सफ्टवेयरको कार्यका आधारमा कम्प्युटरलाई निवेश योजना, भण्डारण र उत्पादन गरी चार भागमा राखेर बुझ्न सकिन्छ । यी चार भागमध्ये निवेशअन्तर्गत कम्प्युटरमा तथ्याङ्क वा निर्देशन प्रविष्ट गराउने कार्य हुन्छ ।

६. कुनै एक प्रश्नको उत्तर दिनुहोस् : (३)
- क) तलका उपसर्ग र प्रत्यय लगाएर एक एकओटा शब्द बनाउनुहोस् :
 उपसर्ग : वि, अधि, गैर
 प्रत्यय : आइँ, ईन, आहा
- ख) दिइएको अनुच्छेदबाट तीनओटा समस्त शब्द पहिचान गरी विग्रह गर्नुहोस् र तीनओटा द्वित्व शब्द पहिचान गरी निर्माणप्रक्रिया देखाउनुहोस् :
 छरछिमेकमा बसिसकेपछि कहिलेकाहीँ तलमाथि हुन्छ । आपसि मेलमिलाप र सरसहयोगको भावनाले नै समाज र राष्ट्रले पनि अग्रगति लिन्छ । देशहितका निम्ति दशमुख भएर बाक्लाबाक्ल नगरी वचनबद्ध भई सबै एकजुट हुनुपर्छ ।
७. कुनै एक प्रश्नको उत्तर दिनुहोस् : (४)
- क) ले, लाई, बाट, देखि, का निम्ति, रो, को, मा विभक्ति लागेका भिन्न भिन्न कारकको प्रयोग गरी चार वाक्यमा आफूले देखेको कुनै घटनाको वर्णन गर्नुहोस् ।
- ख) तलको अनुच्छेदका वाक्यलाई उच्च आदरमा परिवर्तन गर्नुहोस् :
 उनी देशभक्त नारी हुन् । उनी देशभक्तिका बारेमा लामो समयसम्म प्रवचन दिन सकिन्छन् ।
 उनी सधैं सामाजिक कार्यमा सहभागी हुन्छिन् । तिमी पनि उनले हिँडेको बाटोमा हिँड ।
८. कुनै एक प्रश्नको उत्तर दिनुहोस् : (४)
- क) सामान्यार्थक क्रियापदको प्रयोग गरी चार वाक्यमा आफ्नो दैनिक कार्यको वर्णन गर्नुहोस् :
 ख) वाच्य परिवर्तन गर्नुहोस् :
 यसपालि नियमित रूपमा विद्यालय गइन्छ । सधैं गृहकार्य गरिन्छ । परीक्षामा राम्रो नतिजा ल्याइनेछ । आफ्नो भविष्य उज्ज्वल बनाइन्छ ।
९. कुनै एक प्रश्नको उत्तर दिनुहोस् : (४)
- क) एउटै वाक्यमा संश्लेषण गर्नुहोस् :
 दमयन्ती दरबारबाट निस्कइन् । उनी प्रेमी नलको खोजीमा जङ्गलमा भौँतारिइन् । उनले दुःखकष्ट भोगिन् । जसोतसो चेदी राज्य पुगेर उनले सुखको सास फेरिन् ।
- ख) तलका वाक्यलाई प्रत्यक्ष कथनमा परिवर्तन गर्नुहोस् :
 छोरीले बुबालाई आफ्नो पढाइ सकिएको कुरा बताइन् । बुबाले छोरीलाई उनको भावी गन्तव्यका बारेमा जिज्ञासा राख्नुभयो । छोरीले बुबालाई आफ्नै देशमा केही गर्ने योजना रहेको कुरा सुनाइन् । बुबाले छोरीको काम गर्व गर्न लायक भएको कुरा बताउनुभयो ।
१०. दिइएको अनुच्छेद पढी अन्त्यमा सोधिएका प्रश्नहरूको उत्तर दिनुहोस् : (५×१ = ५)
- आयुर्वेद पूर्वीय प्राचीन चिकित्सा पद्धति हो । 'आयुर्वेद' शब्दको अर्थ 'आयुको ज्ञान' भन्ने हुन्छ । यसलाई आयुर्विज्ञान पनि भनिन्छ । आयुको ज्ञान भन्नाले जीवनमा पूर्ण आयु जिउने विषय र कलाको ज्ञान हो । पूर्ण आयु जिउन स्वास्थ्य पहिलो आवश्यकता हो । स्वस्थ व्यक्ति नै पूर्णायुको जीवन जिउँछ, भन्ने आयुर्वेदको मान्यता हो । यसैले आयुर्वेदमा जीवन स्वस्थ राख्ने उपायका बारेमा विस्तृत रूपमा चर्चा गरिएको छ । जीवन स्वस्थ राख्नु भनेको सकरभर शरीरमा रोगको प्रवेश हुन नदिनु हो र कदाचित् रोगको प्रवेश भइहाले पनि उपचारका माध्यमबाट शरीरबाट त्यसको निष्कासन गर्नु हो । आयुर्वेदमा रोगको उपचारका लागि कायचिकित्सा, शल्य तन्त्र,

शालाक्य तन्त्र, भूतविद्या, कौमारभृत्य, अगद तन्त्र, रसायन तन्त्र र बाजीकरण तन्त्र गरी आठ अङ्ग रहेका छन् । यीमध्ये कायचिकित्सामा शारीरिक रोग, शल्य तन्त्रमा चिरफार गर्नुपर्ने रोग, शालाक्य तन्त्रमा नाक, कान, घाँटी वा अन्य कुनै कारण भएको टाउकाको रोग, भूतविद्यामा भूत, ग्रह वा मानसिक कमजोरीका कारण लागेको मानसिक रोगको उपचारको पद्धति प्रस्तुत गरिएको छ । यस्तै कौमारभृत्यमा गर्भवती स्त्रीलाई लाग्ने रोग र बालरोग, अगद तन्त्रमा शरीरमा विषालु पदार्थको प्रवेशका कारण उत्पन्न भएको रोग, रसायन तन्त्रमा वृद्धावस्थामा हुने रोग, बाजीकरण तन्त्रमा शरीरमा नेपाली, कक्षा १२ जण्ड धातुको कमीका कारण हुने रोगको उपचारको पद्धति समाविष्ट छ । आयुर्वेदका अनुसार मुख्य रूपमा शरीरमा वात, पित्त र कफ यी त्रिदोषको असन्तुलनका कारण रोगको प्रवेश हुन्छ । यी तीन दोषबाट बच्ने मुख्य उपाय भनेको उचित आहार र उपयुक्त जीवनशैली नै हो । उपयुक्त आहार र जीवनशैलीबाट शरीरमा रोगसँग लड्ने ओज वा जीवनी शक्ति सशक्त रूपमा क्रियाशील बन्छ । जीवनी शक्तिको सशक्तता हुँदा शरीरमा रोगले प्रवेश नै गर्न पाउँदैन, कदाचित् प्रवेश गरिहाले पनि त्यो प्रभावहीन हुन्छ । प्रभावहीन त्यस रोगलाई पनि स्थानीय जडीबुटी र खनिजको उपयोग गरी शरीरबाट सहजै निष्कासन गर्न सकिन्छ । यसैले उचित आहार, उपयुक्त जीवनशैली र उपलब्ध स्थानीय जडीबुटीको सेवनबाट स्वस्थ रहेर पूर्णायुको जीवन जिउन सकिन्छ भन्ने कुराको मार्गनिर्देशन गर्ने चिकित्सा पद्धति नै आयुर्वेद हो ।

प्रश्नहरू

(क) आयुर्वेदका आठ अङ्ग के के हुन् ?

(ख) कायचिकित्सा र शल्य तन्त्रमा कुन कुन रोगको उपचार पद्धति प्रस्तुत गरिएको छ ?

(ग) शरीरमा रोगको प्रवेश हुनुको कारण के हो ?

(घ) आयुर्वेदले जीवनमा पूर्णायु जिउन के गर्नुपर्ने सुझाव दिएको छ ?

११. दिइएको अनुच्छेद पढी मुख्य मुख्य चारओटा बुँदा टिपोट गरी सारांश गर्नुहोस् : (२+३=५)

जिज्ञासा नै ज्ञानको बीज हो । जिज्ञासा वृत्तिलाई विकसित गर्नु र त्यसमा उत्तम संस्कारको स्थापना गर्नुमा नै शिक्षाको उपयोगिता रहेको हुन्छ । यसै कारणले जुन शिक्षाले मानवका सद्वृत्तिको जागरण गर्दैन, जसले मानवलाई भोगप्रधान प्रेयोमार्गबाट कल्याणप्रधान श्रेयोमार्गतर्फ लर्दैन, मानव मनमा पसेर मानवलाई एक श्रेष्ठ जीवनस्वप्नले भरिदिँदैन त्यो शिक्षा होइन, साक्षरता मात्र हो । आज यस किसिमको साक्षरता नै संसारका अनेक जटिल समस्याको कारण बन्न पुगेको छ । यस कारण शिक्षा हाम्रो धर्म र संस्कृतिको अनुकूल हुनैपर्छ । विद्यार्थीले विद्यालयमा मात्र सबै कुरा सिक्छन् भन्नु ठुलो भुल हुन जान्छ । बालक परिवारमा, बाटामा, मित्रसम्पर्कमा र सर्वत्र केही न केही सिक्किरहेको हुन्छ । ऊ आफ्ना मातापिता, बन्धुबान्धव, साथीसँगाती, परिचित, अपरिचित मानिसको व्यवहारबाट पनि धेरथोर सिक्किरहेको हुन्छ । यस कारण समाजको वातावरण आजको जस्तो दूषित हुनुहुँदैन । समाजको वातावरणको परिष्कार गर्नु अत्यन्त आवश्यक छ । यसको लागि अर्थप्रधान जीवनदृष्टिको ठाउँमा कर्तव्यप्रधान जीवनदृष्टिको स्थापना अत्यन्त आवश्यक हुन आउँछ । कर्तव्यप्रधान जीवनदृष्टिको निर्माण संस्कृतिमूलक शिक्षाबाट हुने गर्छ । यस्तो शिक्षाबाट मानव असल त हुन्छ नै साथै सफल पनि हुन्छ ।

१२. कुनै एक प्रश्नको उत्तर दिनुहोस् : (४)

क) तपाईंको गाउँ/नगरमा फोहोरमैलाको उचित व्यवस्थापन हुन नसक्दा त्यसबाट पैदा भएको समस्यातर्फ सम्बन्धित पक्षको ध्यानाकर्षण गराउनका निम्ति कुनै राष्ट्रिय दैनिक पत्रिकाका सम्पादकलाईचिठी लेख्नुहोस् ।

ख) माध्यमिक तहको नेपाली विषय शिक्षक पदमा नियुक्तिको प्रयोजनका लागि कुनै विद्यालयमा पेस गर्नु पर्ने व्यक्तिगत विवरणको नमुना तयार पार्नुहोस् ।

१३. कुनै एक प्रश्नको उत्तर दिनुहोस् : (५)

क) महाकवि देवकोटा जयन्तीका अवसरमा आफ्नो विद्यालयमा आयोजित कवि गोष्ठीको विवरण समेटेर १५० शब्दसम्मको प्रतिवेदन लेख्नुहोस् । (मानिलिनुहोस् तपाईंको नाम मानवी हो र तपाईंको विद्यालयको नाम विद्या निकेतन मा.वि., धनुषा हो)

ख) 'नेपालमा विदेशी संस्कृतिको प्रभाव' शीर्षकमा १५० शब्दसम्मको टिप्पणी लेख्नुहोस् ।

१४. कुनै एकको व्याख्या गर्नुहोस् : (४)

क) मनैपछि भने पनि पर पुगी मरौं

नभुक्ने यो हिमालमा किन भुकी मरौं

ख) यो हिउँ मेरो थियो, मेरो मुटुको थियो र हिमाली हार्दिकता बोकेको र चम्किलो थियो ।

१५. कुनै एक प्रश्नको उत्तर दिनुहोस् : (४)

क) दिइएको कवितांश पढी सोधिएका प्रश्नको उत्तर लेख्नुहोस् :

हो र आमा !

“हो, तिमी जन्मँदा तिम्रो कलिलो अनुहारमा

त्यसकै छाया देख्ने आशा गरेकी थिएँ

तिम्रो हिस्सी परेको हँसाइमा त्यसैको सुन्दर छवि

तिम्रो तोते बोलीमा त्यसैको मधुर ध्वनि

तर त्यो मिठो गीतले तिमीलाई आफ्नो बाँसुरी बनाएनछ !

त्यो तिमी नै होला भन्ने

मेरो यौवनभरिको सपना थियो ।”

प्रश्नहरू

(अ) आमाको सपना के थियो ?

(आ) ‘त्यो मिठो गीतले तिमीलाई आफ्नो बाँसुरी बनाएनछ’ भन्नुको तात्पर्य के हो

ख) दिइएको कथांश पढी सोधिएका प्रश्नको उत्तर लेख्नुहोस् :

सुबोध पलडमै सुतिराख्नुभएको थियो । रिस उम्लँदा उम्लँदा मुखभरि आइसकेको थियो ।

यस्तो लाग्यो, धरतीभित्रबाट ज्वालामुखी फुटेर लाभा निस्कँदैछ । एउटा मृतविश्वास, आस्था

र रिसको ज्वाला प्याँकै सुबोधमाथि । उहाँको मुखै हेर्न मन लागेन जुन मुखलाई कति लोभी

भएर हेर्ने गर्थे । यो मेरो पहिलो रिस थियो उहाँमाथि । घृणैघृणाको पर्खाल उभिरियो

अगाडि । सद्भावनाको पुल भत्कियो । सौँचे, मेरी छोरी हराउँदा पनि सुबोधलाई चित्त

दुखेन, अझ योभन्दा बढ्ता एक्सिडेन्ट भयो भन्ने सुन्दा पनि उहाँले पेट दुखेको बहाना

गर्नुभयो । अस्पतालसम्म जानुभएन । आफ्नो रगतमाथि श्रद्धा, माया र करुणाको बदला घृणा

राख्ने सुबोधसँग मैले किन सम्बन्ध राख्ने ? सम्बन्ध राख्नु पनि अब अपराध सम्झन थालेँ

किनभने मेरा छोराछोरी मेरा लागि चन्द्र र सूर्य हुन् । सुबोधलाई जसरी मैले माया गरें, जुन विश्वास र आस्था राखें तर कहिले पनि मेरा छोराछोरीलाई मायाले बोलाउनुभएको सुनिनँ । छोराछोरीमाथि उहाँको ईर्ष्या थियो, जलन थियो । कत्रो दुर्भाग्य थियो मेरा लागि, मेरा छोराछोरीका लागि सुबोधसँग सम्बन्ध राख्नु मेरो आफ्नै स्वार्थ नभई छोराछोरीको स्वार्थ पनि गाँसिएको थियो ।

प्रश्नहरू

(अ) सुबोधसँग ममताको विश्वास टुट्नुको कारण के थियो ?

(आ) 'मेरा छोराछोरी मेरा लागि चन्द्र र सूर्य हुन्' भन्नुको आशय के हो ?

१६. कुनै एक प्रश्नको उत्तर दिनुहोस् : (४)

क) वर्गीय शोषण र सामाजिक कुरीति एवम् कुसंस्कारप्रतिको आलोचनाका दृष्टिले 'एक चिहान' उपन्यास तपाईंलाई कस्तो लाग्यो ? प्रतिक्रिया दिनुहोस् ।

ख) विदेश गएर र स्वदेशमै पनि जग्गा प्लटिङ गरेर प्रशस्त आमदानी गरिरहेको 'जीवन मार्ग' रिपोर्ताजको छिरिडले ती सबै छोडेर चोमोलुङ्मा औद्योगिक प्रतिष्ठान स्थापना गरी उद्यमी बनेको तपाईंलाई कस्तो लाग्यो ? आफ्नो विचार प्रस्तुत गर्नुहोस् ।

१७. कुनै एक प्रश्नको समीक्षमक उत्तर दिनुहोस् : (८)

क) आफ्नो दृढ सङ्कल्प पूरा गर्न मानिस जतिसुकै सङ्घर्ष गर्न पनि तयार हुन्छ भन्ने कुरा 'विरहिणी दमयन्ती' कथाका आधारमा पुष्टि गर्नुहोस् ।

ख) स्टीफन विलियम हकिङले मानवीय चेतनालाई नयाँ उचाइमा पुऱ्याउन गरेका योगदानको समीक्षा गर्नुहोस् ।

१८. दिइएका मध्ये कुनै एक शीर्षकमा २५० शब्दमा नघटाई निबन्ध लेख्नुहोस् : (८)

क) नेपालको आर्थिक समृद्धिका आधारहरू

ख) युद्धको त्रास र वर्तमान विश्व

ग) देशप्रति मेरो कर्तव्य



विद्यार्थीहरूले सकेसम्म आफ्नै शब्दमा उत्तर दिनु पर्नेछ ।

१. तलको अनुच्छेदमा रेखाङ्कन गरिएका शब्दको अक्षर संरचना र अक्षर सङ्ख्या देखाउनुहोस् : (३)
कुनै पनि परीक्षा सञ्चालन गर्दा त्यसको गोपनीयतालाई महत्त्व दिनु न्याय सङ्गत मानिन्छ ।
परीक्षार्थीले पनि यसका नियम र मर्यादालाई पूर्णतः पालना गरेको हुनुपर्छ ।
२. शुद्ध गरी पुनर्लेखन गर्नुहोस् : (३)
हकिङ वाल्यकालदेखि नै निकै जिज्ञाषु र सर्जनशील स्वभाव का थिए ! कुनै पनी यान्त्रीक वस्तुको भित्री सङ्रचनालाई बुझ्ने र तिनबाट बन्न सक्ने नयाँ वस्तुका बारेमा परिकल्पना गर्ने उनको बानि थियो ।
३. कुनै एक प्रश्नको उत्तर दिनुहोस् : (२)
क) दिइएका अंशबाट एउटा पारिभाषिक शब्द र एउटा अनुकरणात्मक शब्द पहिचान गरी वाक्यमा प्रयोग गर्नुहोस् :
कर्मचारीले कार्यालयमा अनधिकृत काम गर्दा स्पष्टीकरण सोधियो । राजस्व सङ्कलन तथा किनवेचको भरपाई फर्स्योर्ट गर्न नसक्दा उसलाई निलम्बन गर्ने आदेश आएपछि कार्यक्षमबाट उठेर सुटुकक भागेका ती कर्मचारी आज सरासर अदालत पुगेछन् ।
ख) दिइएको अनुच्छेदबाट एउटा उखान र एउटा टुक्का पहिचान गरी तिनलाई वाक्यमा प्रयोग गर्नुहोस् :
महामारीका समयमा हामीले तमास हेर्नु वा समस्यासँग घुँडा टेक्नु भन्दा पनि आँटी छोरालाई बाघले खाँदैन भन्ने भावना राखेर काम गर्नुपर्छ । सङ्कटका बेला सबैसँग हातेमालो गरी काम गर्दा दुवै हातमा लड्डु प्राप्त हुन सक्छ किनभने एकतामा बल हुन्छ भन्ने विचारलाई हामीले विश्वास गरेर आएका छौं ।
४. तलको अनुच्छेदमा रेखाङ्कन गरिएका शब्दको शब्दवर्ग पहिचान गर्नुहोस् : (३)
हाम्रो समाजमा दुलही भित्र्याउँदा र छोरीबेटी दिएर पठाउँदा सम्म त उनीहरूलाई विवाहको दुई-चार दिन निकै स्वागत सत्कार, मानमर्यादाको व्यवहार हुन्छ, तर डोलीमा हाली ल्याएर ठोकामा रोकी अनेक स्वागत सत्कार गर्दैमा तीस्वास्नीमान्छप्रति न्याय भएको मानिएला ।
५. तलको अनुच्छेदबाट दुईदुईओटा तत्सम र आगन्तुक शब्द पहिचान गरी लेख्नुहोस् : (२)
जीवनका अधिकांश क्षण ब्रह्माण्डको अनुसन्धानमा बिताउने हकिङको पारिवारिक जीवन र व्यक्तित्वका विविध पाटालाई भल्काउने चलचित्र र वृत्तचित्र बनेका छन् । 'द थेओरी अफ एन्थ्रिडिङ', 'अ ब्रिफ हिस्ट्री अफ टाइम' नामका चलचित्र र 'स्टिफन हकिङस युनिभर्स', 'होराइजन : द हकिङ प्याराडक्स' आदि वृत्तचित्र हुन् ।
६. कुनै एक प्रश्नको उत्तर दिनुहोस् : (३)
क) तलको अनुच्छेदबाट तीनओटा उपसर्ग व्युत्पन्न शब्द र तीनओटा प्रत्यय व्युत्पन्न शब्द पहिचान गरी तिनको निर्माणप्रक्रिया देखाउनुहोस् :
जीवन रमाइलोसँग बिताउने रहर कसलाई पो हुँदैन र सन्तानले संसार जित्नु अनि अभिभावकको सुरक्षा गरुन् भन्ने अपेक्षा सबैको हुन्छ । बुबाआमाप्रति आत्मीय र सम्मानित व्यवहार गर्नु छोराछोरीहरूको कर्तव्य र जिम्मेवारी दुवै हो ।

ख) तलको अनुच्छेदबाट तीनओटा समस्त शब्द र तीनओटा द्वित्व शब्द पहिचान गरी समस्त शब्दको विग्रह र द्वित्व शब्दको निर्माणप्रक्रिया देखाउनुहोस् :

इच्छाअनुसारको खानपिन, सरकारी वचनअनुसारको प्रतिबद्धता भएमा कर्णालीका जनताले बेरोजगार भएर पेटभर खान देशबाहिर जानु पर्दैन । आत्मनिर्भर भएर ससाना कुरामा, भैँभगडा नगरे समृद्धिको उचाइमा पुग्न समय लाग्दैन । यस्तै योजना चाहिएको छ, जसले एकएकको जीवन बदल्न सकोस् ।

७. कुनै एक प्रश्नको उत्तर दिनुहोस् : (४)

क) रेखाङ्कन गरिएका शब्दहरूको कारक पहिचान गरी लेख्नुहोस् :

प्रमोदले कैँचीले रिबन काटेर साहित्यिक कार्यक्रमको उद्घाटन गर्‍यो । पोखरामा बस्ने साथीले उसलाई कार्यक्रमका लागि बोलाएको थियो । पोखराबाट उनीहरू मुक्तिनाथ घुम्न जाने योजनामा थिए । प्रमोदले मोटरसाइकलद्वारा मुक्तिनाथसम्मको यात्रा गर्ने रहर भएको कुरा बतायो । आमाले प्रमोदलाई पत्रिका दिनुभयो र पढ्न भन्नुभयो ।

ख) तलका वाक्यलाई बहुवचनमा परिवर्तन गरी पुनर्लेखन गर्नुहोस् :

मेरो साथी फुटबल खेल्छ । ऊ फुटबल खेल्न देशविदेश डुल्छ । अहिले ऊ विदेश गएको छ । उसले त्यहाँ आफ्नो प्रतिभा देखाउने छ ।

८. कुनै एक प्रश्नको उत्तर दिनुहोस् : (४)

क) सामान्य भविष्यत् कालका क्रियापदको प्रयोग गरी चार वाक्यमा आफ्नो कुनै योजनाको वर्णन गर्नुहोस् ।

ख) आवश्यक कुरा थपघट गरी तल दिइएका वाक्यको वाच्य परिवर्तन गर्नुहोस् :

आज हामी कवितावाचन प्रतियोगितामा सहभागी हुन्छौं । त्यहाँ हामीले चर्चित कविहरू भेट्छौं । म पनि एउटा कविता वाचन गर्छु । हामी अरुले वाचन गरेका कविता सुन्छौं ।

९. कुनै एक प्रश्नको उत्तर दिनुहोस् : (४)

क) तलका चारओटा जटिल वाक्यलाई आठओटा सरल वाक्यमा परिवर्तन गर्नुहोस् :

जङ्गलको संरक्षण गर्नुपर्छ भन्ने कुरा उचित हो । मान्छेले जङ्गल मासे त्यसैले खडेरी लाग्न सुरु भयो । खडेरीले मानिस भोकभोकै परे अनि क्रान्तिले जन्म लियो । जङ्गलको उचित संरक्षण गर्नुपर्छ र भविष्यमा आइपर्ने सङ्कटबाट समयमै बच्नुपर्छ ।

ख) तलका वाक्यलाई अप्रत्यक्ष कथनमा परिवर्तन गर्नुहोस्:

जनताले भने, “देशको विकास कहिले हुन्छ ?”

“हामी आजैदेखि देशविकासमा लाग्छौं ।” नेताले भने ।

जनताले भने, “हामीलाई भुटो बोलेर पटकपटक धोका नदिनुहोस् ।”

नेताले भने, “विश्वास गर्नुहोस् तपाईंहरूलाई ढाँट्ने काम अब कहिल्यै हुँदैन ।”

१०. तलको अनुच्छेद पढी सोधिएका प्रश्नहरूको उत्तर दिनुहोस्: (५)

पृथ्वीको उत्पत्ति करिब ४ अर्ब ५० करोड वर्ष अघि भएको अनुमान गरिन्छ भने पृथ्वीमा पहिलो जीवनको उत्पत्ति ३ अर्ब ५० करोड वर्ष अघि भएको मानिन्छ । पृथ्वीमा पहिलो जीवको उत्पत्ति भएको करिब १० करोड वर्षपछि हरित कण अर्थात् क्लोरोफिल भन्ने रङ्द्रव्य (पिग्मेन्ट) युक्त एक कोषीय जीवको विकास भयो । यसैलाई हामी हाल वनस्पति भन्छौं । यिनै हरित कणले गर्दा वनस्पति हरियो रङ्का भएका हुन् । हरित कणको मद्दतबाट वनस्पतिले फोटोसिन्थेसिस भनिने

जैविक प्रक्रियाद्वारा सौर्य ऊर्जालाई मानिसलगायत पृथ्वीका सम्पूर्ण प्राणी जगत्ले बाँच्न उपयोग गर्ने रासायनिक ऊर्जामा परिणत गर्छ । तसर्थ पृथ्वीमा सम्पूर्ण प्राणीको अस्तित्व अन्ततः वनस्पति र तिनका निहित फोटोसिन्थेसिस प्रक्रियामा भर पर्छ । समय क्रममा एकोषीय हरित कणयुक्त जीवबाट फूल फुल्ने र फूल नफुल्ने जातका विविध प्रजातिका बहुकोषीय वनस्पतिको विकास भयो । सबै प्रकारका वनस्पतिमध्ये फूल फुल्ने जातको वनस्पति सबैभन्दा विकसित ठूलो र प्रधान समूह हो । पृथ्वीमा फूल फुल्ने जातको वनस्पति लगभग १२ करोड वर्षअघि देखा परेको थियो । यस समूहका वनस्पतिले करिब ८ करोड वर्षदेखि पृथ्वीको भूभागको अधिकतम क्षेत्रफल आगट्टै आएका छन् । वनस्पति जगत्मा फूल फुल्ने जातको वनस्पतिलाई सबैभन्दा विकसित वनस्पति मानिए जस्तै प्राणी जगत्मा आधुनिक मानव होमोसेपियन्सलाई सबैभन्दा विकसित प्राणी मानिन्छ । आधुनिक मानव लगभग ५ लाख वर्षअघि मात्र पृथ्वीमा अस्तित्वमा आएको थियो । प्राणीहरूमध्ये सबैभन्दा जटिल र विकसित मस्तिष्क भएका कारण आधुनिक मानव प्राणी जगत्मा सर्वश्रेष्ठ भएको हो ।

प्रश्नहरू

- क) पृथ्वीको उत्पत्ति आजभन्दा कति वर्षअघि भएको अनुमान गरिएको छ ?
- ख) पृथ्वीमा एक कोषीय जीवको विकास कसरी भयो ?
- ग) कुन समूहका वनस्पतिले पृथ्वीको अधिकतम क्षेत्रफल ओगट्टै आएका छन् ?
- घ) आधुनिक मानवलाई प्राणी जगत्मा सर्वश्रेष्ठ किन मानिएको हो ?
- ङ) हरित कणले सौर्य ऊर्जालाई कुन प्रक्रियाबाट रासायनिक ऊर्जामा परिणत गर्छ ?

११. दिइएको अनुच्छेद पढी मुख्य मुख्य चारओटा बुँदा टिपोट गरी सङ्क्षेपीकरण गर्नुहोस् : (२+३=५)

सहकारीबाट स्वदेशमै रोजगारीको सिर्जना हुने भएकाले यो आत्मनिर्भरता र विकासको प्रमुख माध्यम बन्न सक्छ । अपार जलस्रोत एवम् उर्वरा भूमिले सम्पन्न र अनुपम प्राकृतिक सौन्दर्यले परिपूर्ण नेपालको जलस्रोत, कृषि र पर्यटनका क्षेत्रमा सहकारी सञ्चालनका सम्भाव्य अन्य क्षेत्र पनि पर्याप्त रहेका छन् । सहकारीका माध्यमबाट यिनको व्यवस्थापन गर्ने हो भने स्वदेशमै रोजगारी सिर्जना गर्न सकिन्छ । स्वदेशमै रोजगारी सिर्जना गर्न सके लाखौं युवा विदेशिनुपर्ने स्थितिको अन्त्य हुन्छ । सिर्जनशील युवाको सक्रिय सहभागितामा स्वदेशको विकास तीव्र रूपमा अधि बढ्छ । यसबाट परिनिर्भरता घट्न गई आत्मनिर्भर संस्कृतिको विकास हुन्छ र राष्ट्रिय अर्थतन्त्र पनि सुदृढ हुन्छ । सहकारीका माध्यमबाट उपर्युक्त सबै उद्योगलाई व्यवस्थित रूपमा सञ्चालन गर्दै नयाँ क्षेत्रलाई समेत समेटेर अधि बढ्न सके नेपाल संसारकै समुन्नत र सुखी मुलुक बन्छ ।

१२. कुनै एक प्रश्नको उत्तर लेख्नुहोस् : (४)

क) नेपाली कम्पनीले भर्खरै बजारमा ल्याएको आधुनिक प्रविधियुक्त विद्युतीय कारको सचित्र विज्ञापन बनाउनुहोस् ।

ख) जनचेतना सहकारीले सेयर पुँजी वृद्धिका लागि बसेको बैठकको निर्णयको नमुना लेख्नुहोस् :

१३. कुनै एक प्रश्नको उत्तर लेख्नुहोस् : (५)

क) जागरण युवा क्लबले गरेको खेलकुद कार्यक्रमका सम्पूर्ण विवरण समेटेर १५० शब्दसम्मको प्रतिवेदन तयार पार्नुहोस् ।

ख) 'वैदेशिक रोजगारीप्रतिको आकर्षण' शीर्षकमा १५० शब्दसम्मको टिप्पणी लेख्नुहोस् ।

१४. तलका मध्ये कुनै एकको व्याख्या गर्नुहोस् :

(४)

क) 'मानिसको परिचय शरीरले भन्दा पनि उसको मस्तिष्क र हृदयले दिन्छ ।'

ख) नीरस जिन्दगीलाई रसाउन मायाको सङ्गो नदी चाहिन्छ । जिन्दगी हाँसो रोदन, दुःख पीडा, कथा व्यथाले भरिएको सामूहिक भेल हो । आपत्, सुख र दुःख सबैलाई पर्छ ।

१५. कुनै एक प्रश्नको उत्तर लेख्नुहोस् :

(४)

क) दिइएको कथांश पढी सोधिएका प्रश्नको उत्तर लेख्नुहोस् :

कालोनिलो आकाशमा उत्तरतिर ध्रुवतारा त्यसको दाहिनेतिर साततारा र देब्रेतिर पाँच ताराका उज्याला तारामण्डलले तिनलाई मोहित तुल्यायो । पूर्वदेखि पश्चिमतिर केही दक्षिणतिर ढल्किएको आकाशगङ्गा दमयन्तीका दृष्टिमा सङ्गीतमय हुन थाल्यो । आकाश र पृथ्वी यस्ता सुन्दर छन् । तिनका बिच आफू एकली विरहिणी अवस्थामा अनुभव गरेर दमयन्ती कोमल मधुर स्वरमा वियोग र पीडाको गीत गाउन थालिन् । कतिबेरसम्म तिनले गीत गाइन्, तिनले आफैं थाहा पाइन् । आकाशमा बिस्तारै बिस्तारै उभिएर आउँदै पातला बादलले त्यो सुन्दर आकाशलाई दमयन्तीका हृदयमा धूमिल तुल्याउँदै लग्यो ।

प्रश्नहरू

(अ) माथिको अनुच्छेदमा कस्तो परिवेशको चित्रण गरिएको छ ?

(आ) आकाश र दमयन्तीको हृदयका बिच के समानता छ ?

ख) दिइएको जीवनी अंश पढी सोधिएका प्रश्नको उत्तर लेख्नुहोस् :

हकिङले पृथ्वीमा आइपर्ने सम्भावित विपत्तिबाट बच्न मानव समुदायलाई बारम्बार सचेत गराउने गर्थे । उनले परमाणुयुद्ध, विश्वव्यापी तापक्रम वृद्धि, प्रकृति विरुद्धका मानवीय गतिविधिका कारण पृथ्वीमा मानव जीवन खतरामा रहेको बताएका छन् । यसैले यसतर्फ समयमै सचेत हुन आग्रह गरेका छन् । यस्तै उनले मानिसलाई कृत्रिम बुद्धिमत्तापूर्ण रोबोटको निर्माणमा सचेत हुनुपर्ने बताएका छन् । कृत्रिम बुद्धिमत्तापूर्ण रोबोट मानिसको दिमागका उपज हुन् तर यिनीहरूको स्मरण र विश्लेषणात्मक सामर्थ्य मानिसको भन्दा धेरै हुँदै गइरहेको छ । मानिसले गर्न सक्ने सबै काम यी यन्त्रहरू सजिलै गर्न सक्छन् । यसैले उनी कृत्रिम बुद्धिमत्ताले मानिसलाई नभई मानिसले कृत्रिम बुद्धिमत्तालाई नियन्त्रण गर्नुपर्ने मान्यता बारम्बार दोहोर्याइरहन्थे ।

प्रश्नहरू

(अ) पृथ्वीमा मानव जीवन खतरामा पर्नुका कारण के के हुन् ?

(आ) हकिङले किन कृत्रिम बुद्धिमत्तापूर्ण रोबोटको निर्माणमा सचेत हुन आग्रह गरेका हुन् ?

१६. कुनै एक प्रश्नको उत्तर दिनुहोस् :

(४)

क) परिवर्तन र क्रान्तिको आवश्यकताका दृष्टिले 'आमाको सपना' कविता तपाईंलाई कस्तो लाग्यो, प्रतिक्रिया लेख्नुहोस् ।

ख) 'सहकारीका माध्यमबाट देशलाई आत्मनिर्भर बनाउन सकिन्छ' भन्ने विचारलाई तर्क दिएर पुष्टिहोस् ।

१७. कुनै एक प्रश्नको समीक्षात्मक उत्तर दिनुहोस् :

(८)

क) 'एक चिहान' उपन्यासले किसान र मजदुरका के कस्ता समस्याको चित्रण गरिएको छ, वर्णन गर्नुहोस् ।

ख) कम्प्युटरलाई भाइरसमुक्त बनाउनका लागि प्रविधिज्ञ पेशल र एन्टिभाइरस गोर्खेले गरेका काम के के हुन् ? समीक्षा गर्नुहोस् ।

१८. कुनै एक शीर्षकमा कम्तीमा २५० शब्दसम्मको निबन्ध लेख्नुहोस् :

(८)

क) मलाई मनपर्ने साहित्यकार

ख) वातावरण संरक्षण

ग) नेपालमा पर्यटन उद्योग



विद्यार्थीहरूले सकेसम्म आफ्नै शब्दमा उत्तर दिनुपर्ने छ ।

१. तलको अनुच्छेदमा रेखाङ्कन गरिएका शब्दको अक्षर संरचना र अक्षर सङ्ख्या देखाउनुहोस् : (३)
यहाँका प्राकृतिक स्रोत र साधनको समुचित उपयोग गर्न सकेमा देश समृद्ध बन्दछ । देशमै रोजगारीका अवसर सिर्जना हुन्छन् । यसले बाध्यतापूर्वक रोजगारीका लागि भौतारिएका युवाहरूको ठूलो सङ्ख्यालाई राहत पुग्छ ।
२. शुद्ध गरी पुनर्लेखन गर्नुहोस् : (३)
समाज विकासका क्रममा मानिसले प्रगति त गर्‍यो तर ऊ शान्त भएर बस्न सकेको चाहिँ छैन समाजमा सामुहिक भावनाको साटो व्यक्तिवादि सोच बढिरहेको छ । यस्तो नकारात्मक शोचलाई परित्याग गरेर सकारात्मक सोचका साथ आफ्नो कर्तव्य पालन गर्ने हो भने उसले जीवनमा सुखशान्ति पनि प्राप्त गर्छ ।
३. कुनै एक प्रश्नको उत्तर दिनुहोस् : (२)
(क) दिइएका अनुच्छेदबाट एउटा पारिभाषिक शब्द र एउटा अनुकरणात्मक शब्द पहिचान गरी वाक्यमा प्रयोग गर्नुहोस् :
हिजो एकजना आफन्त अचानक रुखबाट गत्याम्म लडेर बेहोस भएपछि उहाँलाई अस्पताल लगियो । चिकित्सकले शल्यक्रिया गर्नुपर्ने कुरा गरेपछि उहाँलाई सरासर शल्यक्रिया कक्षमा लगेर राखियो । म र एकजना भाइ फटाफट आर्थिक व्यवस्थापन गर्नतिर लाग्यौं ।
(ख) दिइएको अनुच्छेदबाट एउटा उखान र एउटा दुक्का पहिचान गरी तिनलाई वाक्यमा प्रयोग गर्नुहोस् :
विहान बेलुकीको छाक टार्न मुस्किल भएपछि ऊ विदेसियो । कराइबाट उम्केको माछो भुङ्गोमा भने भैँ त्यहाँ पनि उसले अनेकौँ सास्ती बेहार्नु पर्‍यो । ऊ विदेश जानेवित्तिकै कोरोना महामारी फैलिएकाले अभागी खान बस्यो, डाँडाकाँडा सुसाए भने भैँ भयो । अन्ततः ऊ त्यहाँबाट पनि अनेकौँ हन्डर र गोता खाई बर्मा गए नि कर्म सँगै, नेपाल गए नि कपाल सँगै भन्दै स्वदेशतिरै पक्रियो ।
४. तलको अनुच्छेदमा रेखाङ्कन गरिएका शब्दको शब्दवर्ग पहिचान गर्नुहोस् : (३)
धेरै कुरा गरेपछि उसले आँखाभरि आँसु पारेर भन्यो, “दाइ ! जीवनमा सुखको घाम कहिल्यै देख्न पाइएन, धेरैले मलाई सम्झाउने कोसिस पनि गरे तर आफ्नो भाग्यमा नभएको कुरा टाउको फोरेर पाइँदो रहेनछ,
५. तलको अनुच्छेदबाट दुईओटा तत्सम शब्द र दुईओटा आगन्तुक शब्द पहिचान गरी लेख्नुहोस् : (२)
उसले दौरा, सुरवाल, कोट र टोपीमा पहिचान खोज्यो । उसले आफ्नो स्मृतिमा घन्केका रोदी, घाटु र मारुनीको तालमा नेपाली संस्कृतिको प्रतिबिम्ब खोज्यो । ऊ आफन्तजन र आफ्नो भूमिबाट टाढा हुनुपर्दाको पीडामा छटपटाइरह्यो अनि आफ्नो इज्जत कतै अखबारका पृष्ठमा छरिएका छन् कि भनी हेर्न थाल्यो ।
६. कुनै एक प्रश्नको उत्तर दिनुहोस् : (३)
(क) तलको अनुच्छेदबाट तीनओटा उपसर्ग व्युत्पन्न शब्द र तीनओटा प्रत्यय व्युत्पन्न शब्द पहिचान गरी तिनको निर्माण प्रक्रिया देखाउनुहोस् :
नेपालको ग्रामीण क्षेत्रलाई पर्यटकीय आकर्षणको केन्द्र बनाउनका लागि यहाँको पर्यावरणलाई अत्यन्त ध्यान दिनु पर्दछ । सरकारी एवम् गैरसरकारी सङ्घसंस्थाहरूमार्फत गाउँले जनजीवनको महत्त्व दर्साउँदै बढमासहरूलाई तह लगाउने वातावरणको सिर्जना गर्नु पर्दछ ।

(ख) तलको अनुच्छेदबाट तीनओटा समस्त शब्द र तीनओटा द्वित्व शब्द पहिचान गरी समस्त शब्दको विग्रह र द्वित्व शब्दको निर्माण प्रक्रिया देखाउनुहोस् :

पसिनाको बलमा लहलह वाली भुलाउन सकेमा सुखप्राप्ति गर्न सकिन्छ भन्ने चक्रपाणि महात्माका सुविचारलाई मननयोग्य ठानी गाउँका सबैजना एकआपसमा सरसल्लाह गरी आलोपालो गरेर खेतमा सिँचाई गर्न थाले । यो थाहा पाएपछि आजभोलि पल्लागाउँको कान्छो पनि सामलतुमल बोकी चुपचाप आफ्नो खेतीकिसानीमा लागेको छ ।

७. कुनै एक प्रश्नको उत्तर दिनुहोस् : (४)

(क) ले, बाट, द्वारा, लाई, लागि, देखि, को र मा विभक्ति लागेका भिन्न भिन्न कारकको प्रयोग गरी चार वाक्यमा आफ्नो बाल्यकालको वर्णन गर्नुहोस् ।

(ख) तलको अनुच्छेदका वाक्यहरूलाई तृतीय पुरुषमा परिवर्तन गरी पुनर्लेखन गर्नुहोस् :

तिमी अरू व्यक्तिलाई खुसी बनाउन असाध्यै सिपालु छ्यौ । तिमिले आफ्नी बहिनीलाई निकै राम्रो उपहार दिएको रहिछ्यौ । तिम्री बहिनीले त्यो उपहार सम्मानपूर्वक राखेकी रहिछ । तिम्री कुनै समयमा यहाँ आयौ भने त्यो आफ्नै आँखाले देखेछ्यौ ।

८. कुनै एक प्रश्नको उत्तर दिनुहोस् : (४)

(क) पूर्ण भविष्यतकालीन क्रियापदको प्रयोग गरी चार वाक्यमा आफ्नो भविष्यको योजना प्रस्तुत गर्नुहोस् ।

(ख) तल दिइएका वाक्यको वाच्य परिवर्तन गर्नुहोस् :

आफूले सधैंभरि एकलै काम गर्थ्यौ । कहिलेकाहीँ दीनदुःखीलाई पनि सहयोग गर । साथीहरू पनि यस विषयमा छलफल गर्दै छन् । हामीले यस विषयमा एउटा योजना पनि बनाएका छौ ।

९. कुनै एक प्रश्नको उत्तर दिनुहोस् : (४)

(क) तलका चारओटा जटिल वाक्यलाई आठओटा सरल वाक्यमा विश्लेषण गर्नुहोस् :

उसले साथीहरूसँग मिलेर एउटा रोबोट बनायो र प्रदर्शनीमा राख्यो । जब सबैले उसको रोबोटको प्रशंसा गरे तब ऊ खुसी भयो । केही अवलोकनकर्ताले त्यो रोबोट विदेशमा पनि प्रदर्शन गर्नु पर्दछ भनी सल्लाह दिए । उसले आगामी दिनमा अझ नयाँ आविष्कार गर्ने सोच बनायो किनभने ऊ आफ्नो कार्यको प्रशंसा भएकामा उत्साहित थियो ।

(ख) तलका वाक्यलाई अपत्यक्ष कथनमा परिवर्तन गर्नुहोस् :

चामेले भने, “अध्यक्षज्यू ! अब आजको कार्यक्रम सुरु गरौं है ।”

अध्यक्षले चामेलाई भने, “हुन्छ, सुरु गर्नुहोस् र कार्यक्रम समयमै सक्नुहोला ।”

अध्यक्षले फेरि भने, “आजको यो कार्यक्रम सकेपछि अर्को कार्यक्रममा सहभागी हुनु छ ।”

“हस् अध्यक्षज्यू ! म समयमै कार्यक्रम सक्ने कोसिस गर्नेछु ।” चामेले भने ।

१०. दिइएको अनुच्छेद पढी अन्त्यमा सोधिएका प्रश्नको उत्तर दिनुहोस् : (५×१=५)

कूल गार्हस्थ उत्पादनमा औद्योगिक क्षेत्रको योगदान बढाउनका लागि स्वदेशी तथा विदेशी पुँजीको परिचालन गर्नुपर्छ । एकल बिन्दु सेवा केन्द्रका माध्यमबाट वैदेशिक लगानी प्रवर्धन गर्न आवश्यक छ । उपलब्ध स्रोतसाधन र श्रमको उपयोग गरेर औद्योगिक उत्पादन र उत्पादकत्वमा अभिवृद्धि गर्न सकिन्छ । लघु, घरेलु तथा साना उद्योगको संरक्षण र प्रवर्धन गरी रोजगारी सिर्जना गर्न सकिन्छ । गरिबी न्यूनीकरण, नेपाली वस्तु तथा सेवाका लागि लगानीमैत्री वातावरण सिर्जना, आयात प्रतिस्थापन र निर्यात प्रवर्धनका माध्यमबाट अर्थतन्त्रलाई सुदृढ गर्न आवश्यक छ । तुलनात्मक लाभ तथा प्रतिस्पर्धी क्षमता भएका नेपाली वस्तु तथा सेवाको उत्पादन वृद्धि गर्नुपर्छ । निर्यात प्रवर्धन तथा आयात व्यवस्थापन गरी आन्तरिक माग पूर्ति गर्न सकिन्छ । द्विपक्षीय, क्षेत्रीय

र बहुपक्षीय व्यापार प्रणालीबाट अधिकतम लाभ लिने गरी वैदेशिक व्यापारसम्बन्धी योजना तथा कार्यक्रम सञ्चालन गर्न आवश्यक छ । खाद्यान्न, औषधी तथा पेट्रोलियम पदार्थ जस्ता अत्यावश्यक वस्तुको सरल र उचित मूल्यमा सहज उपलब्ध हुने व्यवस्था आवश्यक छ । यसका लागि आपूर्ति व्यवस्थापनमा सुधार ल्याई मूल्य स्थिरता कायम गर्नुपर्छ । गुणस्तरीय वस्तु तथा सेवामा सहज पहुँच पुर्‍याई उपभोक्ताको हकहित संरक्षण गर्नुपर्छ । खाद्यान्न तथा अन्य वस्तुमा हुने मिसावट, ठगी, कालोबजारी, नियन्त्रण गर्न बजार अनगुमनलाई तीव्र बनाउन आवश्यक छ । यसका लागि विद्यमान ऐन नियमको प्रभावकारी कार्यान्वयन गर्ने गरी कार्यक्रम कार्यान्वयन गर्नुपर्छ ।

प्रश्नहरू

(क) केका लागि स्वदेशी तथा विदेशी पुँजीको परिचालन गर्नुपर्छ ?

(ख) गरिवी न्यूनीकरणका उपाय के के हुन् ?

(ग) अर्थतन्त्रलाई सुदृढ गर्न कस्ता उपाय अपनाउनुपर्छ ?

(घ) उपभोक्ताको हकहितको संरक्षण कसरी गर्न सकिन्छ ?

(ङ) उत्पादकत्व अभिवृद्धि तथा कालोबजारी पद तथा पदावलीको तात्पर्य लेख्नुहोस् ।

११. दिइएको अनुच्छेद पढी मुख्य मुख्य चारओटा बुँदा टिपोट गरी सारांश लेख्नुहोस् : (२+३=५)

सौँच्च नै विदेशमा नेपालीलाई परेको समस्या सुनाउने स्थान र समाधानका लागि सल्लाह लिन सक्ने एउटै मात्र थलो दूतावास नै हुन्छ । मानौं उनीहरू सानातिनादेखि ठुला र गम्भीर समस्याहरू दूतावासमा सुनाएपछि सहज रूपमा सुल्किन्छ भन्ने मनोविज्ञान लिएर आउँछन् । दूतावास नै आफ्नो आमाको दोस्रो रूप जस्तै ठान्छन् । विदेशमा पुगेकाले जसरी हरदुःखमा आमा भनेर पुकारिन्छ र सम्झिने गरिन्छ । हुन त यो मेरो अभिव्यक्ति हो । त्यसैले म जस्तै अरूले सम्झिन्छन् कि सम्झिदैनन् दुःखमा आफ्नी आमालाई तर म भने आपत्तिविपत् र दुःखमा जहिले पनि सम्झिन्छु आफ्नी आमालाई । त्यस्तै प्रकारले विदेशमा भएका नेपालीको आमाको रूपमा रहेको हुन्छ नेपाली दूतावास । दूतावासको उपस्थिति नभएका देशमा आफ्ना समस्या, पिरमर्का र मनको बह पोख्ने स्थान कहाँकतै हुँदैन । कम्तीमा आफ्नै देशका दाजुभाइलाई आफ्नै भाषामा आफ्ना समस्या सुनाउँदा मात्र पनि हलुका अनुभव हुन्छ । यिनै मानवीय कोणबाट सोचेर चुपचाप समस्या सुन्ने र सकेसम्म मलमपट्टी लगाउने खालका कुरा गरेर सम्झाउने र बुझाउने काम गर्नेतर्फ लाग्नुपर्‍यो कतारमा । यसरी कहिल्यै नभोगिएका, कहिल्यै नसुनिएका र कहिल्यै नसोचिएका विचित्र किसिमका कामबारे सल्लाह तथा सुझाव दिन बाध्य हुनुपर्‍यो कतारमा ।

१२. कुनै एक प्रश्नको उत्तर लेख्नुहोस् : (४)

(क) आफ्नो कलेजले सञ्चालन गर्न लागेको हाजिरीजवाफ प्रतियोगितामा सहभागिता जनाउनाका लागि अन्य कलेजलाई पठाउने सूचनाको नमुना तयार पार्नुहोस् ।

(ख) आफू स्वयम् उपस्थित हुन नसकेकाले आफूले अध्ययन गरेको विद्यालयबाट आफ्नो चारित्रिक प्रमाणपत्र बुझेर ल्याउनका लागि तपाईंले आफ्ना साथी रामप्रसादलाई दिएको मन्जुरीनामाको नमुना तयार पार्नुहोस् ।

१३. कुनै एक प्रश्नको उत्तर लेख्नुहोस् : (५)

(क) आफूले अवलोकन गरेको कुनै विज्ञान प्रदर्शनीको विवरण समेटेर १५० शब्दसम्मको प्रतिवेदन तयार पार्नुहोस् ।

(ख) 'नेपालमा बहदो बेरोजगारी र त्यसको समाधान' शीर्षकमा १५० शब्दसम्मको टिप्पणी लेख्नुहोस् ।

१४. कुनै एक उद्धरणको व्याख्या गर्नुहोस् :

(४)

(क) जति चढ्यो उति बाँकी हिमचुली शिखर
नदेखेको कुरा हेर्ने हामीलाई रहर् ।

(ख) हामीकहाँ नयाँ कुराको परिकल्पना गर्ने, जोखिम मोल्नेभन्दा पनि अरूले गरेको हेरेर त्यसैको अनुसरण गर्ने, अस्वस्थ प्रतिस्पर्धा गर्ने चलन छ ।

१५. कुनै एक प्रश्नको उत्तर लेख्नुहोस् :

(४)

(क) तलको कथांश पढी सोधिएका प्रश्नको उत्तर दिनुहोस् :

कुनै अजगर, कर्कोटक वा निषादयुवकले फेरि बलजपती गर्न नपाओस्, त्यस्ता कुनैले देखिहाल्यो भने पनि कुरूप र बौलाही ठानेर त्यस्ताले आक्रमण नगरुन् भन्ने विचार गर्दै दमयन्तीले आफ्नो केशलाई धुलाले मुसारेर जगल्ता जस्तो बनाइन् र आफ्नो रूपलाई हिलो दलेर विकृत तुल्याइन् । मानिसको परिचय उसको शरीरले भन्दा पनि उसको मस्तिष्क र हृदयले दिने हुँदा शरीरलाई जतिसुकै क्षतविक्षत तुल्याए पनि दमयन्तीको हृदय र बुद्धि भविष्यको उज्यालो आशामा नलप्रति भन् भन् ठी मुग्ध र कोमल हुँदै गयो ।

प्रश्नहरू

(अ) 'मानिसको परिचय शरीरले भन्दा पनि उसको मस्तिष्क र हृदयले दिन्छ' भन्नुको तात्पर्य के हो ?

(आ) दमयन्तीले आफ्नो रूप किन बदलेकी हुन् ?

(ख) दिइएको जीवनी अंश पढी सोधिएका प्रश्नको उत्तर लेख्नुहोस् :

हकिड बाल्यकालदेखि नै निकै जिज्ञासु र सिर्जनशील स्वभावका थिए । कुनै पनि यान्त्रिक वस्तुलाई गहिरिएर हेर्ने, त्यसको भित्री संरचनालाई बुझ्ने र तिनबाट बन्न सक्ने नयाँ वस्तुका बारेमा परिकल्पना गर्ने उनको बानी थियो । साथीहरूको सहयोग लिई उनले पुराना घडी तथा रेडियोका पार्टपुर्जाबाट कम्प्युटर बनाएका थिए र यसैबाट उनी अवधारणात्मक गणितीय समीकरणको समाधान गर्ने गर्थे । उनले आफूले खेल्ने गेम र हवाईजहाज, डुङ्गा आदिको नमुना पनि आफैं बनाएका थिए । यस्तो सिर्जनशील कार्यबाट प्रभावित भएका उनका साथीहरू हकिड आफ्नो संसारको रचना गरेर त्यसलाई चाहिने नियम आफैं बनाउन सक्छन् भनेर उनलाई थप हौसला दिन्थे । उनका यस्ता कामबाट प्रभावित भएका शिक्षक उनलाई जन्मजात प्रतिभा भएको व्यक्ति मान्थे । साथीहरू चाहिँ उनलाई आइन्स्टाइन भनेर बोलाउँथे । घरमा बस्दा पनि उनी प्रायः शोधखोजमा नै तल्लीन भइरहन्थे । उनी आफ्ना साथीलाई लिएर साँझको समयमा घरको पछाडि जान्थे र आकाशका तारालाई हेरिरहन्थे । ब्रह्माण्डप्रतिको जिज्ञासाले उनलाई बाल्यकालदेखि नै घच्चच्याइरहेको थियो ।

प्रश्नहरू

(अ) हकिड कस्तो स्वभावका थिए ?

(आ) हकिडलाई उनका साथीहरूले आइन्स्टाइन भन्नुको कारण के हो ?

१६. कुनै एक प्रश्नको उत्तर दिनुहोस् :

(४)

- (क) 'सहकारीलाई प्रभावकारी रूपमा सञ्चालन गरिएको खण्डमा नेपाललाई आत्मनिर्भर बनाउन सकिन्छ' भन्ने भनाइ तपाईंलाई कस्तो लाग्यो, सहकारी निबन्धका आधारमा प्रतिक्रिया दिनुहोस् ।
- (ख) 'मातृत्व' कथाकी पात्र ममताले सुबोधलाई छोडेर बाँकी जीवन सन्तानसँग बिताउन गरेको निर्णय तपाईंलाई कस्तो लाग्यो, आफ्नो विचार प्रस्तुत गर्नुहोस् ।

१७. कुनै एक प्रश्नको समीक्षात्मक उत्तर दिनुहोस् :

(८)

- (क) 'एक चिहान' उपन्यासले समाज परिवर्तनका लागि के कस्तो विचार प्रस्तुत गरेको छ ? समीक्षात्मक प्रतिक्रिया लेख्नुहोस् ।
- (ख) आमाको सपना के हो र त्यो कसरी साकार हुन सक्छ, 'आमाको सपना' कविताका आधारमा समीक्षात्मक उत्तर लेख्नुहोस् ।

१८. कुनै एक शीर्षकमा कम्तीमा २५० शब्दसम्मको निबन्ध लेख्नुहोस् :

(८)

- (क) देश विकासमा युवाको दायित्व र कर्तव्य
- (ख) नेपालको आर्थिक विकासमा पर्यटन उद्योगको भूमिका
- (ग) मेरो अभियान : भ्रष्टाचारमुक्त नेपालको निर्माण



विद्यार्थीहरूले सकेसम्म आफ्नै शब्दमा उत्तर दिनु पर्नेछ ।

१. तलका अनुच्छेदमा रेखाङ्कन गरिएका शब्दहरूको अक्षर संरचना देखाई अक्षर सङ्ख्या पनि लेख्नुहोस् : (३)
मौरीले अमिलो, गुलियो, पिरो, तितो आदि सबै प्रकारका रसहरूबाट मह बनाउँछ । मानिसको जीवनमा पनि समयले यस्ता सबै प्रकारका अवस्था सिर्जना गर्छ । यी सबै अवस्थालाई सुन्दर बनाउन सक्ने मानिस सफल मानिन्छ ।
२. शुद्ध गरी पुनर्लेखन गर्नुहोस् : (३)
 विश्व मानचित्रमा नेपाल सानो देखिएता पनि यो सुन्दर, शान्त र रमणिएँ मुलुकका रूपमा सुपरिचित छ !
३. कुनै एक प्रश्नको उत्तर दिनुहोस् : (२)
 (क) दिइएका अंशबाट एउटा पारिभाषिक शब्द र एउटा अनुकरणात्मक शब्द पहिचान गरी वाक्यमा प्रयोग गर्नुहोस् :
 युद्धमा प्रयोग भएका रासायनिक हतियार र विकिरणले मानव स्वास्थ्यमा गम्भीर प्रभाव पार्ने निश्चित छ । त्यस कारण रुस र युक्रेनको युद्ध समयमै रोकी विश्वभरि ह्वार विकिरण फैलिन र मानव सभ्यतालाई ख़ुत्रुक हुनबाट जोगाउनु आवश्यक छ ।
 (ख) दिइएको अनुच्छेदबाट एउटा उखान र एउटा टुक्का पहिचान गरी तिनलाई वाक्यमा प्रयोग गर्नुहोस् :
 समय हुन्जेल कानमा तेल हालेर बस्नेहरूले परीक्षामा आलु खान्छन् । जब भयो राति अनि बुढी ताती भनेभैँ उमेर र पैसा दुवै सकिएपछि छटपटाउनु र जुन जोगी आए पनि कानै चिरेको भनी शिक्षकलाई दोष लगाउनु उनीहरूको नियति बन्छ ।
४. तलको अनुच्छेदमा रेखाङ्कन गरिएका शब्दको शब्दवर्ग पहिचान गर्नुहोस् : (३)
 तिम्रो भाइ आइतबारसम्म विद्यालय आएन त्यसैले नै मैले उसलाई धेरै सम्झिएँ ।
५. तलको अनुच्छेदबाट दुई दुईओटा तद्भव र आगन्तुक शब्द पहिचान गरी लेख्नुहोस् : (२)
 पुस्तकका सट्टामा मोबाइल र ल्यापटपले काम गर्ने भए पनि यो कामचलाउ मात्र हुने रहेछ । कम्प्युटर आजको आवश्यकता हो तर प्राचीन कालका ऋषिहरू पनि ज्ञानका क्षेत्रमा कम थिएनन् । उनीहरूकै ज्ञान आज विकसित भएर नयाँ नयाँ हुँदै छ ।
६. कुनै एक प्रश्नको उत्तर दिनुहोस् : (३)
 (क) तलको अनुच्छेदबाट तीनओटा उपसर्ग व्युत्पन्न शब्द र तीनओटा प्रत्यय व्युत्पन्न शब्द पहिचान गरी तिनको निर्माण प्रक्रिया देखाउनुहोस् :
 मानव सुस्वास्थ्यका लागि समुचित आहार र विहार नै मुख्य विषय हो । पूर्वीय सांस्कृतिक मान्यतामा यसलाई मानवीय व्यवहारिक पक्षका रूपमा चर्चा परिचर्चा गरिएको छ ।

(ख) तलको अनुच्छेदबाट तीनओटा समस्त शब्द र तीनओटा द्वित्व शब्द पहिचान गरी समस्त शब्दको विग्रह र द्वित्व शब्दको निर्माणप्रक्रिया देखाउनुहोस् :

वनभोज खान गएका साथीहरू हरबखत हातखुट्टा हल्लाउँदै नाचगान गरी रमाइलो गर्दै थिए । एउटा निर्लज्ज मानिस आएर सबैलाई के के भनेर कारायो । यस्तो दोधारे अवस्थामा सबै आआफ्ना ठाउँमा उभिए । प्रवेश राता राता आँखा बनाउँदै थियो तर रमाले भैँभगडा गर्नु हुँदैन भनेर सम्झाई ।

७. कुनै एक प्रश्नको उत्तर दिनुहोस् : (४)

(क) ले, लाई, बाट, द्वारा, देखि, को, नो, मा विभक्ति लागेका भिन्न भिन्न कारकको प्रयोग गरी चार वाक्यमा आफूले पढेको विद्यालयको वर्णन गर्नुहोस् ।

(ख) तलको अनुच्छेदमा रहेका वाक्यहरूलाई प्रथम पुरुषमा परिवर्तन गर्नुहोस् :
तँ मान्छे होस् । तँले मान्छे कस्तो हुन्छ भन्ने बुझेको छस् । तर यो कुरा तँले कहिल्यै पालना गरिन्स् । तँले त मान्छेलाई यन्त्र मात्र ठानिस् ।

८. कुनै एक प्रश्नको उत्तर दिनुहोस् : (४)

(क) तलका दिइएका वाक्यको वाच्य परिवर्तन गर्नुहोस् :

यसपालि जाडो बिदामा मामाघर गइन्छ । बिदाको पुरै समय त्यहाँ बसिन्छ । मामासँग विभिन्न ठाउँमा घुमिन्छ । बिदा सकिएपछि घर फिर्निन्छ ।

(ख) आज्ञार्थक क्रियापदको प्रयोग गरी चार वाक्यमा आफ्नो भाइलाई मामाघर जाने बाटो देखाउनुहोस् ।

९. कुनै एक प्रश्नको उत्तर दिनुहोस् : (४)

(क) तलका आठओटा सरल वाक्यलाई चारओटा जटिल वाक्यमा संश्लेषण गर्नुहोस् :

पानी पर्छ । किसानहरू रमाउँछन् । किसानहरूले खेतमा काम गर्छन् । किसानहरूले अन्न फलाउँछन् । किसानहरूले धेरै परिश्रम गरेका हुन्छन् । व्यापारीहरूले नाफा कमाउँछन् । सरकारले कालो बजार नियन्त्रण गर्छ । किसानहरू खुसी हुन्छन् ।

(ख) तलका वाक्यलाई अप्रत्यक्ष कथनमा परिवर्तन गर्नुहोस् :

रामले भन्यो, “गुरु, परीक्षा कहिले हुन्छ ?”

गुरुले भन्नुभयो, “खै, मलाई त थाहा छैन ।”

“अनि गुरुलाई पनि थाहा हुँदैन त ?” रामले भन्यो ।

गुरुले भन्नुभयो, “सबै कुरा कसरी थाहा हुन्छ त ?”

१०. दिइएको अनुच्छेद पढी अन्त्यमा सोधिएका प्रश्नको उत्तर दिनुहोस् : (५×१=५)

साहित्य समाज, शक्ति, परम्परा तथा संस्कृतिको जीवन्त अभिव्यक्ति हो । त्यस कारण यसभित्र समाजका शक्ति सम्बन्धहरूको प्रभाव कुनै न कुनै रूपमा परेकै हुन्छ । आवाजको अभिव्यक्तिले शक्तिको वास्तविक स्वरूपलाई चिनाउँछ । समाजभित्रै अटाएको सीमान्तकृत समुदायसँग सम्बन्धित आवाजलाई पनि शक्तिको सम्बन्धले निर्देशित गर्छ अनि समाजको आवाजभित्रै उनीहरूको आवाज पनि मिसिएर आउँछ । सीमान्तीकृत समुदायको आवाजको सार्थकताका सम्बन्धमा गायत्री चक्रवर्ती स्पिभाकका विचारको संश्लेषण गर्दै तारालाल श्रेष्ठले लेखेका छन् “सबाल्टर्नहरू बोल्दैनन् भन्ने होइन । सबाल्टर्नहरू विद्रोह गर्न सक्दैनन् भन्ने पनि होइन । ...तर उनीहरूको बोली र विद्रोहले

निश्चित मान्यता र आधिकारिक आकार प्राप्त गर्न सहज छैन ।” यसरी आएको यो वर्गको आवाज स्वतस्फुर्त छ कि निर्देशित छ अनि आफ्नो वर्गको हितमा छ कि सम्प्रान्त वर्गको हितमा छ भन्ने विषयमा हेक्का राख्नु पर्छ । त्यसैगरी सीमान्तीकृत समुदायका पक्षमा गैरसीमान्तीय समुदाय, बौद्धिक, लेखक पनि बोलेका हुन्छन् । यस्ता आवाजहरूमा पनि अर्थले लक्षित गरेको कोणप्रति हेक्का राख्नु पर्छ । सबाल्टर्न बोलेको देखिए पनि उनीहरू कसका हितमा कसरी बोल्दैछन् भन्ने मुद्दा र सबाल्टर्नका नाममा को कसरी बोल्दै आएका छन् भन्ने कुरा विशेष अध्ययनको विषय हो । पाठभित्र सीमान्तीकृत समुदाय आफै बोल्न सक्छ वा अरूका माध्यमबाट पनि उनीहरूको आवाज उठेको हुन सक्छ, तर यस्ता आवाजहरूलाई विशेष ठानी हेर्नु पर्ने हुन्छ । समग्रमा पाठमा निहित सीमान्तीकृत समुदायको आवाजको विश्लेषण गर्दा कुनै पनि पात्रको बोलीले शक्तिको कस्तो स्वरूलाई भुल्काएको छ, सिङ्गो समाजको आवाजभित्र सीमान्तीकृतहरूको आवाज कसरी मिसिएर आएको छ, सबाल्टर्नहरू बोलेका छन् कि छैनन्, सबाल्टर्नको बोलीले स्थान पाएको छ कि छैन, सबाल्टर्नको आवाज स्वस्फुर्त छ कि निर्देशित छ, सबाल्टर्नहरू आफै बोलेका छन् कि अरूद्वारा बोलाइएका छन्, सबाल्टर्नहरू कसको हितमा कसरी बोलेका छन् आदि कुरामा ध्यान दिनु पर्छ ।

प्रश्नहरू

- (क) साहित्यमा समाज कसरी देखिन्छ ?
- (ख) साहित्यमा सीमान्तीकृत समुदायको आवाज कसरी व्यक्त हुन्छ ?
- (ग) सबाल्टर्नका विषयका आवाजलाई कसरी हेर्नुपर्छ ?
- (घ) तारालाल श्रेष्ठको भनाइको सार के हो ?
- (ङ) समाजमा शक्तिको भूमिका कस्तो हुन्छ ?

११. दिइएको अनुच्छेद पढी मुख्य मुख्य चारओटा बुँदा टिपोट गरी सारांश लेख्नुहोस् : (२+३=५)

नेपालको शिक्षाक्षेत्र सधैं अस्तव्यस्त रहन विवश बन्दै आएको छ । जुनसुकै आन्दोलनको पहिलो तारो बन्ने शिक्षाक्षेत्र यसै धरमर रहेको छ भने आफूभित्रै भएका विकराल समस्याले यसलाई भन् थला बसाउँदै आएको पाइन्छ । तसर्थ गुणात्मक शिक्षाको नारा जतिसुकै फलाक्ने परिपाटी रहे पनि स्थिति चाहिँ अत्यन्तै नकारात्मक बन्दै गइरहेको छ । यो राष्ट्रका लागि राम्रो सङ्केत होइन । आजको समयमा राष्ट्रिय मात्र होइन अन्तर्राष्ट्रिय शिक्षानीति हुनु आवश्यक छ । यसका लागि सरकार, विद्यालय सञ्चालक, शिक्षक, विद्यार्थी र अभिभावक सबैको एउटै उद्देश्य हुनुपर्दछ । यहाँका शैक्षिक संस्थाबाट उत्पादित जनशक्तिले विश्वको कुनै पनि कुनामा गएर अन्य देशबाट आएकाहरूसित प्रतिस्पर्धा गर्न सकोस् । यसका लागि सम्बन्धित पक्षले गहन ज्ञान र सीप दिनुपर्ने हुन्छ । तर नेपालको वर्तमान शैक्षिक स्थितिलाई हेर्दा सबै पक्ष गैरजिम्मेवार भएको देखिन्छ । विद्यालय सञ्चालक र मुनाफा, सरकार र निष्क्रियता, शिक्षक र राजनीति, अभिभावक र मौनता यी सबै एक अर्काका पर्याय त होइनन् ? यसतर्फ सबै पक्षले गम्भीर चिन्तन गर्नुपर्ने अवस्था आइसकेको देखिन्छ ।

१२. कुनै एक प्रश्नको उत्तर लेख्नुहोस् : (४)

- (क) कक्षा १२ को वार्षिक परीक्षा सम्बन्धित विद्यालयले सञ्चालन गर्ने भनी विभिन्न माध्यममा प्रकाशित भएका भ्रमपूर्ण समचारको खण्डन गरी राष्ट्रिय परीक्षा बोर्डले जारी गर्ने विज्ञप्तिको नमुना तयार पार्नुहोस्।

(ख) 'गोल्डस्टार कम्पनी' ले पोखराको 'फेवा थोक बिक्रेता' लाई सामान बुझाई रु. ७०,०००/- (सत्तरी हजार मात्र) भुक्तानी लिए वापत गरिदिएको भरपाईको नमुना तयार पार्नुहोस् ।

१३. कुनै एक प्रश्नको उत्तर लेख्नुहोस् : (५)

(क) आफ्नो विद्यालयद्वारा आयोजित उपत्यकाव्यापी कविता गोष्ठीको विवरण समेटेर १५० शब्दसम्मको प्रतिवेदन तयार पार्नुहोस् ।

(ख) 'विद्यालय शिक्षामा सुधारको आवश्यकता' शीर्षकमा १५० शब्दसम्मको टिप्पणी लेख्नुहोस् ।

१४. कुनै एकको व्याख्या गर्नुहोस् : (४)

(क) मानिस सिर्जनशील प्राणी हो ।

(ख) वास्तवमा कलम र हृदय दुबैको मेल भएपछि राम्रो लेख लेख्न सकिने रहेछ ।

१५. कुनै एक प्रश्नको उत्तर लेख्नुहोस् : (४)

(क) तलको कवितांश पढी सोधिएका प्रश्नको उत्तर दिनुहोस् :

मनैपछ भने पनि पर पुगी मरौं
नभुक्ने यो हिमालमा किन भुकी मरौं
जति चढ्यो उति बाँकी हिमचुली शिखर
नदेखेको कुरा हेर्ने हामीलाई रहर ।

प्रश्नहरू

अ) माथिको कवितांशमा नेपालीको कस्तो मानसिकताको चित्रण गरिएको छ ?

आ) नेपालीले हिमचुलीबाट कस्तो प्रेरणा प्राप्त गरेका छन्, माथिको कवितांशका आधारमा व्याख्या गर्नुहोस्।

(ख) तलको निबन्धांश पढी सोधिएका प्रश्नको उत्तर दिनुहोस् ।

नेपालको आर्थिक विकासमा सहकारीले ठुलो योगदान दिन सक्ने कुरा केही वर्षभित्र यसले गरेका विभिन्न कार्यबाट थाहा पाउन सकिन्छ । यसैले समाजका सबै क्षेत्रमा सहकारीको आवश्यकता सबैतिरबाट महसुस गरिएको छ । सहकारी विभागको २०७७ को तथ्याङ्कअनुसार नेपालमा २९,८८६ सहकारी सञ्चालन भए पनि अहिलेसम्म सबै क्षेत्रमा सहकारीको सञ्चालन हुन सकेको छैन । सबैजसो क्षेत्रमा सहकारीलाई प्रभावकारी रूपमा सञ्चालन गरिएको खण्डमा नेपाल धेरै कुरामा स्वावलम्बी हुन सक्ने देखिन्छ ।

प्रश्नहरू

अ) नेपाललाई कसरी आत्मनिर्भर बनाउन सकिन्छ ?

आ) नेपालका घरेलु उत्पादनलाई व्यवस्थापन गरी बजारीकरण गर्न कस्ता उपाय अवलम्बन गर्नुपर्ला ?

१६. कुनै एक प्रश्नको उत्तर दिनुहोस् : (४)

(क) नारी प्रेम र सङ्घर्षका प्रतिमूर्ति हुन्भन्ने यस भनाइमा आफ्नो प्रतिक्रिया लेख्नुहोस् ।

(ख) 'जब शिक्षाको राम्रो विकास हुन्छ तब अन्धविश्वास, कुंस्कार, कुरीतिजस्ता कुरा निर्मूल हुँदै जान्छन्' नेपाली पहिचान पाठका आधारमा पुष्टि गर्नुहोस् ।

१७. कुनै एक प्रश्नको समीक्षात्मक उत्तर दिनुहोस् :

(८)

(क) 'एक चिहान' उपन्यासले जातीय विभेदको अन्त्य कसरी हुन सक्छ भनी निर्देश गरेको छ ? प्रस्ट पार्नुहोस् ।

(ख) इच्छाशक्ति, ज्ञानशक्ति र क्रियाशक्तिका सामु शारीरिक दुर्बलता शक्तिहीन हुन्छ भन्ने भनाइलाई स्टिफन विलियम हकिङ पाठका आधारमा पुष्टि गर्नुहोस्।

१८. कुनै एक शीर्षकमा कम्तीमा २५० शब्दसम्मको निबन्ध लेख्नुहोस् :

(८)

(क) नेपालका लागि पर्यटन

(ख) आणविक युद्ध र मानव सभ्यता

(ग) शान्ति र विकास



विद्यार्थीहरूले सकेसम्म आफ्नै शब्दमा उत्तर दिनु पर्नेछ ।

१. तलको अनुच्छेदमा रेखाङ्क गरिएका शब्दको अक्षर संरचना र अक्षर सङ्ख्या देखाउनुहोस्: (३)
नीरस जिन्दगीलाई रसाउन मायाको सडलो नदी चाहिन्छ । छहारीदार ओत चाहिन्छ । जीवनचक्र हाँसो, रोदन, दुःख पीडा र कथा व्यथाले भरिएको सामूहिक भेल हो ।
२. शुद्ध गरी पुनर्लेखन गर्नुहोस् : (३)
 मैले भनें, हामी कहाँ नयाँ कुराको परिकल्पना गर्ने जोखिम मोल्ने भन्दा पनी अरुले गरेको हेरेर त्यसैको अनुशरण गर्ने अस्वस्थ प्रतिस्पर्धा गर्ने चलन छ ।
३. कुनै एक प्रश्नको उत्तर दिनुहोस् : (२)
 क) दिइएको अंशबाट एउटा परिभाषिक शब्द र एउटा अनुकरणत्मक शब्द पहिचान गरी वाक्यमा प्रयोग गर्नुहोस् :
 नेपाल देश नै यस्तो भइसक्यो कि सरकार विधेयक ल्याएर शासन चलाउँछ; प्रतिपक्ष संसद अवरुद्ध गर्छ; व्यवस्थापिका संसद टुलुटुलु हेरेर बस्छ । सर्वसाधारण सडकमा बुरुक्क उफ्रिएर टायर बाल्छन् । सरकार रमिते बन्छ ।
 ख) दिइएको अनुच्छेदबाट एउटा उखान र एउटा दुक्का पहिचान गरी तिनलाई वाक्यमा प्रयोग गर्नुहोस् :
 हुने विरुवाको चिल्लो पात भनेभैँ सधैं परीक्षामा प्रथम हुने सुमनको सफलताबाट उसका अभिभावक खुसीले गद्गद् भए । अकवरी सुनलाई कसी लाउनु पर्दैन भन्दै मेधावी विद्यार्थी सुमनले सबैको नाक राखेकामा विद्यालयका प्रधानाध्यापक मुसुमुसु हाँस्दै पुरस्कार प्रदान गर्न थाल्नुभयो ।
४. रेखाङ्कन गरिएका शब्दको पदवर्ग पहिचान गरी लेख्नुहोस् : (३)
 हाम्रो देशका श्रमिक जनताले अभैँ पनि अरु देशका श्रमिकहरू सरह सुविधा पाएका छैनन् । उनीहरू मरुभूमिको तातो बालुवामा तरतर पसिना चुहाउँदै काम गर्दै छन् तर पनि जीवनस्तर कहिल्यै माथि उठ्न सकेको छैन ।
५. तलको अनुच्छेदबाट दुईओटा तत्सम शब्द र दुईओटा आगन्तुक शब्द पहिचान गरी लेख्नुहोस् : (२)
 सगरमाथा आरोहणका अनेक कीर्तिमान छन् । काजी शेर्पाले बिना अक्सिजन सगरमाथा आरोहण गरेर कीर्तिमान कायम गरेका छन् । त्यस्तै फोटोग्राफर, टेलिसिरियलका कलाकार र टेलिभिजनका निर्देशकबाट समेत सगरमाथाको शिखरमा पुगेर नवीनतम कार्य गरी कीर्तिमान राख्ने प्रयत्न भएका छन् ।
६. कुनै एक प्रश्नको उत्तर दिनुहोस् : (३)
 क) तलको अनुच्छेदबाट तीनओटा उपसर्ग व्युत्पन्न शब्द र तीनओटा प्रत्यय व्युत्पन्न शब्द पहिचान गरी तिनको निर्माण प्रक्रिया देखाउनुहोस् :
 नालायकहरूका पछाडि लागेर बेमतलब आफ्नो अनमोल जीवनलाई बर्बाद गराउने मूर्खता निश्चय पनि बुद्धिमानले गर्दैन । गायकदेखि नायकसम्मका प्रत्येक व्यक्ति दयनीय भएर होइन, सम्मानित भएर जिउन चाहन्छन् ।

ख) तलको अनुच्छेदबाट तीनओटा समस्त शब्द र तीनओटा द्वित्व शब्द पहिचान गरी समस्त शब्दको विग्रह र द्वित्व शब्दको निर्माण प्रक्रिया देखाउनु होस् :

सत्तालिप्त मानसिकता भएका र हरपल आआफ्नो सुविधा प्राप्तिका मात्र कुरा गर्ने अनि छिन छिनमा कुरा बदल्ने कामसाम केही नगर्ने तथा कथित जननेता भनाउँदा यी दुईजिब्रे नेताले गफगाफमा नै घरगाउँमा बस्ने सिधासाधा जनतालाई भुक्त्याएका छन् ।

७. कुनै एक प्रश्नको उत्तर दिनुहोस् : (४)

क) ले, लाई, बाट, द्वारा, लागि, निम्ति, देखि, मा जस्ता विभक्ति लागेका भिन्न भिन्न कारकको प्रयोग गरी चार वाक्यमा कुनै दुर्घटनाको वर्णन गर्नुहोस् ।

ख) तलको अनुच्छेदमा प्रयुक्त वाक्यहरूलाई स्त्रीलिङ्गमा परिवर्तन गरी पुनर्लेखन गर्नुहोस् :

ऊ रमेशको छोरो हो । ऊ विदेशी कम्पनीमा काम गर्छ । ऊ अहिले आफ्नो कमाइमा सन्तुष्ट छ । यहाँ पनि ऊ सन्तुष्ट थियो ।

८. कुनै एक प्रश्नको उत्तर दिनुहोस् : (४)

क) इच्छार्थक क्रियाको प्रयोग गरी चार वाक्यमा आफ्नो साथीको प्रगतिको कामना गर्दै एउटा अनुच्छेद तयार गर्नुहोस् ।

ख) तल दिइएका वाक्यको वाच्य परिवर्तन गर्नुहोस् :

जीवनमा धेरै दुःख सुख भोगियो । कहिले खुसीले हाँसियो । कहिले साथीभाइसँग नाचियो । जीवन सङ्घर्ष हो भन्ने कुरा पनि सिकियो ।

९. कुनै एक प्रश्नको उत्तर दिनुहोस् : (४)

क) तलका वाक्यहरूलाई एकै वाक्यमा संश्लेषण गर्नुहोस् :

लतमाया भात पकाइरहेकी थिइन् । हर्षनारान खुसी हुँदै भरेड उक्लिएर बुइंगलमा आइपुगे । हर्षनारान बेसरी हाँसे । लतमाया छक्क परिन् ।

ख) तलको अनुच्छेदका अप्रत्यक्ष कथनका वाक्यलाई प्रत्यक्ष कथनमा बदल्नुहोस् :

सुप्रियाले आज आफू घुम्न नजाने कुरा बताइन् । दाइले सुप्रियालाई घुम्न नजानुको कारण सोध्नुभयो । सुप्रियाले आफूलाई सञ्चो नभएको कुरा दाइलाई बताइन् । दाइले सुप्रियालाई आज घरमै बसेर आराम गर्न आग्रह गर्नुभयो ।

१०. तलको अनुच्छेद पढी अन्त्यमा सोधिएका प्रश्नको उत्तर दिनुहोस् : (५×१=५)

शास्त्रीय सङ्गीत समस्त सङ्गीतकलाको नियम हो । यसको ज्ञानविना कुनै पनि साधक कलाकार वा कलावन्त बन्न सक्दैन । या सङ्गीत शिक्षको माध्यम पनि हो । गुरुशिष्य परम्परामा विकसित हुँदै शास्त्रीय सङ्गीत आजभोलि शिक्षण संस्थामा पनि व्यापक रूपमा विकसित हुन थालेको छ , तर शास्त्रीय सङ्गीतमा निपूण भएका व्यक्तिहरूको सिर्जना गर्न शिक्षण संस्थाको अध्ययन मात्र पर्याप्त हुँदैन । प्रमाणपत्र प्राप्त गर्नका लागि हामीले अवश्य पनि त्यस्ता संस्थाहरूमा अध्ययन गर्न आवश्यक छ; तर विशेष कलाकार, कलावन्त वा साधक बन्न सङ्गीत कलाका साधक वा अध्येताहरूको विशेष शैलीद्वारा आफूलाई स्थापित गरिसकेका कलागुरुहरूकै शरणमा गई विशिष्ट कला वा ज्ञान हासिल गर्नुपर्दछ साथै आफ्नो फरक शैली र परिचयको निर्माण पनि गर्न सक्नुपर्दछ । गुरुको मर्यादा बढाउने साधक बन्न सक्नुपर्दछ अनि मात्र शास्त्रीय सङ्गीतको ज्ञानमा केही हासिल हुन सक्दछ । वर्षौंको अथक परिश्रमपछि मात्र केही प्राप्त गर्न सकिने हुनाले

यस प्रकारको शास्त्रीय सङ्गीतका साधना गरेर धैर्य, साहस र सहनशीलताको परिचय दिने साधक कमै पाइन्छन्, तर यस्तक कलासाधकले कलाको ,राष्ट्रको र गुरुकै गौरव बढाउनमा ठुलो योगदान गरिरहेका हुन्छन् । जुन कुरा प्रमाणपत्रका लागि अध्ययन गर्ने विद्यार्थी र कलासाधकहरूमा प्राप्त गर्न सकिँदैन । यो नै यी दुईका बिचको फरक हो ।

प्रश्नहरू:

क) के को ज्ञानबिना कुनै साधक कलाकार बन्न सक्दैन ?

ख) किन शास्त्रीय सङ्गीतका साधक कमै पाइन्छन् ?

ग) शास्त्रीय सङ्गीतका साधकले के गर्नमा ठुलो योगदान गरिरहेका हुन्छन् ?

घ) सङ्गीतको प्रमाणपत्र प्राप्त गर्ने सामान्य विद्यार्थी र कलासाधकमा के फरक हुन्छ ?

ङ) शास्त्रीय सङ्गीत भन्नाले के बुझिन्छ ?

११. दिइएको अनुच्छेद पढी चारओटा बुँदा टिप्नुहोस् र एक तृतीयांशमा सारांश लेख्नुहोस् : (२+३=५)

जीवनमा असफल हुन कोही पनि चाहन्नन् तर सफल हुनमा असफलतालाई पनि स्वीकार गर्न सक्नुपर्छ । खोला तर भन्न सजिलो छ तर खोला तरेर देखाउने काम श्रम र शक्तिसाध्य छ । असफल हुन्न भन्न सजिलो छ तर सफल हुन पनि निरन्तरको साधना र सुभबुझ चाहिन्छ । यसैले सफल हुन चाहने जोसुकैले असफलतासँग डराउनु चाहिँ हुँदैन । के गर्दा काम बन्छ के गर्दा बिग्रन्छ भन्ने सुभबुझको विकास पनि असफलतापछि नै हुन्छ । अठार पटक विश्वकै सर्वोत्कृष्ट लेखक बनेका सेठ गोडिनले सर्वोत्कृष्ट किताब निकाल्नु अघि दश वर्ष पुस्तक प्रकाशन गृहमा एक कर्मचारीका रूपमा काम गरेका थिए । यसपछि उनलाई किताब निकाल्ने धुन चढ्यो । हरेक महिना एउटा किताब निकाले । एउटा काम गरिरहेको मान्छेले अर्को काममा हात हाल्दा असफल हुने सम्भावना प्रबल हुन्छ । यसैले होला, उनले प्रकाशन गरेका १२० किताबमध्ये धेरैले उत्कृष्ट हुनु त परै जाओस् राम्रो बजारसमेत पाउन सकेनन् । व्यापार नभएका कारण उनीसित कर तिर्ने पैसासमेत भएन । यस्तो अवस्थामा पनि उनले हिम्मत भने हारेनन् । प्रत्येक असफलताले उनलाई पाठकमाझ कस्तो किताब लाने भन्ने बारे सिकाउन धेरै मदत गर्‍यो । त्यसपछि निकालेका हरेक पुस्तक सर्वोत्कृष्ट हुँदै गए । सर्वोत्कृष्ट लेखकको स्थान दिएका उनका १८ ओटै पुस्तकको अहिले ३५ भन्दा बढी भाषामा अनुवाद भइसकेका छन् । यस्तै महान् वैज्ञानिक थोमस एल्भा एडिसन पनि विद्युतीय चिमको आविष्कारका क्रममा हजारौं पटक असफल भएका थिए । “हजारौं पटक असफल हुँदा पनि तपाईंले किन हार मान्नुभएन ?” भन्ने प्रश्नको उत्तरमा उनी भन्ने गर्थे, “म असफल भएको थिइनँ, केवल हजारौं गलत बाटा चुनेको थिएँ ।” यसर्थ हरेक असफलता नै सफलताको प्रेरक पनि हो ।

१२. कुनै एक प्रश्नको उत्तर दिनुहोस् : (४)

क) प्रेरणा वस्त्रालय, पोखराले बालजु कपडा उद्योग, काठमाडौँलाई थान कपडा पठाइदिन अनुरोध गर्दै लेख्ने व्यावसायिक पत्रको नमुना तयार पार्नुहोस् ।

ख) ‘लुम्बिनी ट्रान्सपोर्ट कम्पनी’ ले बृटवलस्थित ‘युगज्योति वस्त्र भण्डार’ लाई सामान बुझाई रु.१,००,०००/- भुक्तानी लिएर वापत गरिदिएको भरपाईको नमुना तयार पार्नुहोस् ।

१३. कुनै एक प्रश्नको उत्तर लेख्नुहोस् :

(५)

क) आफू सहभागी भएको शैक्षिक भ्रमणको वर्णन गर्दै १५० शब्दसम्मको प्रतिवेदन तयार पार्नुहोस् ।

ख) 'कोरोना भाइरस : समस्या र सामाधान' शीर्षकमा १५० शब्दसम्मको टिप्पणी लेख्नुहोस् ।

१४. कुनै एक उद्धरणको व्याख्या गर्नुहोस् :

(४)

क) दुनियाँमा सब थोक हुन गाह्रो छ । समय लाग्छ, श्रम लाग्छ, बुद्धि खर्चिनुपर्छ तर प्रेम हुन केही गाह्रो छैन ।

ख) शारीरिक रूपमा अशक्त भए पनि दृढ इच्छाशक्ति तथा प्रतिभाको साथ पाएको र सधैं साधनामा रमाउने व्यक्ति कहिल्यै शक्तिहीन हुँदैन ।

१५. कुनै एक प्रश्नको उत्तर दिनुहोस् :

(४)

(क) दिइएको संवादांश पढ्नुहोस् र सोधिएका प्रश्नको उत्तर लेख्नुहोस् :

हेर घनश्याम, प्राकृतिक सौन्दर्यको मात्रै कुरा गर्ने हो भने पनि नेपालका हिमाल, जङ्गल र चरा मात्रै भनेर पुग्दैन । यहा असङ्ख्य पहाड, अन्नको भण्डार तराई, नदी, ताल, उपत्यका, सिमसार, जैविक विविधता आदि थुप्रै कुरा छन् । नेपाल आउने पर्यटक सबै हिमाल हेर्न र आरोहण गर्न आउने होइनन् नि । पर्यटनका पनि विभिन्न किसिम छन् भन्ने तिमीलाई थाहै छ । त्यसमध्ये सांस्कृतिक पर्यटन पनि त एक हो । नेपाल जस्तो सानो ठाउँमा सयौँ जाति, सयौँ भाषा, सयौँ संस्कृतिको अध्ययन गर्न पाउनु सांस्कृतिक पर्यटकका लागि ठुलो अवसर हो नि । त्यसैले नेपालको विविधतासँग पर्यटकको सरोकार हुने भएन र ?

प्रश्नहरू

(अ) नेपालको प्राकृतिक सौन्दर्यभित्र के के कुरा पर्छन् ?

(आ) नेपालमा सांस्कृतिक पर्यटनको कस्तो सम्भावना छ ?

(ख) दिइएको रिपोर्ताज अंश पढी सोधिएका प्रश्नको उत्तर दिनुहोस् :

हामीले विकल्प खोज्नुपर्छ । सबैले उही काम गरेर हुँदैन । हाम्रा आवश्यकता असीमित छन् । तिनको परिपूर्तिका लागि विविधता आवश्यक हुन्छ तर नगर्नुभन्दा केही गर्नु राम्रो हो । 'देखासिकी गरी खा आरिसे मरी जा' भन्ने हाम्रो उखान पनि छ । जहाँसम्म हाम्रो जस्तो उद्योगको कुरा छ, त्यसमा भने अहिले कति पनि काम भएकै छैन । हामीले गरेका काम त हात्तीका मुखमा जिरा जस्ता मात्रै हुन् । यस्ता हजारौँ उद्योग हुनुपर्छ । केही कुरामा भने हामीले ध्यान दिनुपर्छ । पहिलो कुरा हो गुणस्तरमा सम्भौता गर्नुहुँदैन । दोस्रो कुरा स्वस्थ प्रतिस्पर्धा, सहकार्य र आदानप्रदानको संस्कृति बसाउनुपर्छ । त्यसो गर्न सके हामी जति धेरै उत्पादन त्यति धेरै फाइदाको अवस्थामा जान्छौँ ।

प्रश्नहरू

(अ) 'देखासिकी गरी खा आरिसे मरी जा' भन्ने उखानको तात्पर्य के हो ?

(आ) जति धेरै उत्पादन त्यति धेरै फाइदाको अवस्थामा पुग्ने उपाय के हो ?

१६. कुनै एक प्रश्नको उत्तर दिनुहोस् : (४)

- क) हामीलाई बोलाउँछन् हिमचुली कवितामा प्रस्तुत 'अधि बढौं पाइलैपिच्छे मुटु हाम्रो हान्छ, पछि फर्कू यतिन्जेलको दुःखै खेर जान्छ ।' भन्ने भनाइप्रति तपाईं सहमत हुनुहुन्छ ? प्रतिक्रिया लेख्नुहोस् ।
- ख) नेपाल प्राकृतिक रूपले जति सुन्दर छ त्यति नै सयौं जाति, सयौं भाषा र अनेक संस्कृतिले सुसज्जित पनि छ भन्ने विचारलाई नेपाली पहिचान पाठका आधारमा पुष्टि गर्नुहोस् ।

१७. कुनै एक प्रश्नको उत्तर दिनुहोस् : (८)

- क) विरहिनी दमयन्तीले आफ्नो जीवनमा आइपरेका समस्याको समाधानका लागि कुन कुन उपाय अवलम्बन गरेकी छन्, समीक्षात्मक उत्तर लेख्नुहोस् ।
- ख) 'एक चिहान' उपन्यासमा नेपाली समाजको कस्तो अवस्थाको चित्रण गरिएको छ , वर्णन गर्नुहोस् ।

१८. कुनै एक शीर्षकमा कम्तीमा २५० शब्दसम्मको निबन्ध लेख्नुहोस् : (८)

- क) नेपालको अस्थिर राजनीति
- ख) सामाजिक सञ्जालको सदुपयोग
- ग) मेरो जीवनको लक्ष्य



Model Questions - 2078 (2022)

Subject: **Compulsory English (0041)**

Full Marks: 75

Time: 3 hrs.

Set A

Candidates are required to answer in their own words as far as practicable. The figures in the margin indicate the full marks.

Attempt all questions.

1. Read the text and do the given tasks.

The relationship between men and women has been the subject of lively discussion and countless jokes for who knows how long. More poems, stories, and songs have been written about the love between a man and woman than about any other theme. Some of literature's most memorable characters are lovers; take, for example, Romeo and Juliet, Antony and Cleopatra, Tristan and Isolde, Lancelot and Guinevere, Byronic and Selena, and Ram and Site Rhett. It would seem that men and women simply cannot live without each other. Yet, despite their passionate and irresistible attraction to each other, men and women have a hard time figuring each other out.

Men and women have been regarded throughout human history as opposites. In Eastern philosophy, this dichotomy is characterized as yin, representing feminine energy, and yang, representing masculine energy. Yin stands for slowness, softness, coldness, wetness, tranquility, and night, while yang symbolizes dryness, heat, aggression, hardness, and daylight. For every typically female characteristic, the opposite is attributed to males. Women are emotional; men are rational. Women are intuitive; men are logical. Women tend to be passive and submissive; men tend to be aggressive and dominant. Women need to communicate; men clam up and withdraw. Women seek relationships and community; men seek independence and power.

No one can dispute the universal biological difference between males and females, without which none of us would be around, as well as the distinct

anatomical variations in height, weight, build, physical strength, and so on. On a cellular level, all that differentiates one gender from the other is the combination of two single chromosomes. A fertilized egg that contains two X chromosomes will develop into a female; if it has one X and one Y chromosome, it will become a male. Sex hormones—specifically estrogen and progesterone produced by a female’s ovaries and testosterone secreted by the testes in males—are responsible for girls maturing at puberty into women and boys into men. Oxytocin, another important hormone that is released during stress, induces strong emotional attachments in females, while in males’ high levels of testosterone minimize the effects of this “relationship drug.” Women are designed by nature to become pregnant, to give birth, and to nurture. Men, on the other hand, are built to protect their dependents and to provide for them.

In addition to playing a role in sexual development, hormones present in the mother’s uterus during pregnancy influence the sexual differentiation of the brain. Men’s brains are 11 percent larger, because they require more neurons to control their larger bodies and muscles. Men predominantly use the logical, rational left side of the brain, which makes them more skilled at mathematics and problem-solving. Their larger inferior parietal lobule accounts for their superior ability to orient and visualize three-dimensional shapes and to perform mechanical tasks. Women’s more compact and efficient brains contain 4 percent more cells and cellular connections, a larger corpus callosum, and more developed Broca’s and Wernicke’s areas, which are related to language. Women use both hemispheres of the brain to process information, and they are more communicative and creative in their thinking. Women are able to multitask, to carry out preplanned tasks, and to tune into specific stimuli, such as a baby crying at night.

A. Mark the statements True, False or Not Given.

[5×1=5]

- a) The relation between man and woman is a popular phenomenon among people for a long time.
- b) The highest number of literary texts have been written about love.
- c) Yin and Yan represent positive and negative force that people have.
- d) Male and female have two distinct instincts.
- e) Female's brain is smaller than male's.

B. Choose the correct option.

[5×1=5]

- 1. Females have X chromosome(s).
 - a. one
 - b. two
 - c. no
- 2. Unlike men, women believe in.....
 - a. relationship
 - b. power
 - c. independence
- 3. Men's brains are women's.
 - a. smaller than
 - b. larger than
 - c. the same size as
- 4. While women are passive and submissive, men are.....
 - a. aggressive and dominant
 - b. rational and strong
 - c. helpful and logical
- 5. Women produce only small amounts of.....
 - a. estrogen
 - b. progesterone
 - c. testosterone

C. Answer the following questions.

[5×1=5]

- a. What are the features of male and female energy?
- b. What enables women to build relationship with people?
- c. When is oxytocin released?
- d. Why do you think men are good at mathematics and problem solving?
- e. Do women use both faculties of mind while processing information?

2. Write short answers to the questions.

[5×2=10]

- a) What were the three kinds of servants in China then? What does it indicate about contemporary Chinese society? (*My Old Home*)
- b) Describe the appropriateness of the title of the poem 'A Day'.
- c) What are the six dimensions of the normative marriage in the USA? (*Marriage as a Social Institution*)
- d) What, according to the essay, are the universal human abilities? (*Humility*)

e) Why does Mrs. Baroda not disclose her feelings towards Gouvernail to her husband? (*A Respectable Woman*)

3. Write long answers to the questions. [10]

a) The author has dealt with an issue of multiculturalism in the story. Why do you think multiculturalism has become a major issue in the present world? (*Neighbours*)

b) According to Famous Actress, men associated with theatre use the theatre actresses to make their estranged wives jealous so as to woo them back. Do you agree with her argument? Why? Why not? (*A Matter of Husbands*)

4. Write a paragraph on 'Growing Use of QR Code in the Nepali Market.' [7]

5. Write an email to the principal explaining why you need a good library at your college. [8]

6. Who is your favourite celebrity? Write his or her biography in about 300 words. [10]

7. Rewrite the sentences as indicated in the brackets. [10]

a) Let's have a break,? (*Add a question tag.*)

b) There was (little/ much) traffic so I came in time. (*Choose the correct one from the brackets.*)

c) The invitation is for one person. I don't mind whether you or she (come/comes) to the party. (*Choose the correct word from the brackets.*)

d) A nice tall young man/ a tall nice young man (*Choose the correct one*)

e) We take an early breakfast. It's generally ready (by/until/in) six in the morning. (*Choose the correct word from the brackets.*)

f) He showed me his new cab. He had paid a hundred thousand rupees for it. (*Join the given pair of sentences using relative clause*)

g) I heard the telephone ring. I picked it up. (*Join the pair of sentences using 'while/when' whichever appropriate.*)

h) Volleyball/every/country/play. (*Make a passive sentence using the given information.*)

i) She played the flute and then she had sung in their choir. (*Correct if necessary.*)

- j) He doesn't write as well as he speaks. (*Rewrite the sentence beginning with He speaks . . . so that it carries the same meaning.*)

8. Do as instructed.

[5×1=5]

- a) Mark the stressed syllable of the words "Holiday".
- b) Make a word using the suffix to make a new word "ly".
- c) His father got angry at him when he lost the keys of his office.
(*Underline the function words in the given sentence.*)
- d) What do these abbreviated words mean in dictionary?
det., idm.
- e) Make two compound words using the word "ball".



Attempt all questions.

1. Read the text and do the tasks.

The world where 2 billion people in homes that don't have light bulbs, technology holds the key to banishing poverty, says United Nations in a major report published this week. But rich nations and multinational corporations need to do a lot more to put technology into the hands of the world's poorest people. Even simplest technologies can transform lives and save money. Vaccines, crops, computers and sources of solar energy can all reduce poverty in developing countries. For example, cheap oral re-hydration therapy developed in Bangladesh has dramatically cut the death toll from childhood diarrhoea. But there has been a "market failure to meet the needs of the poor," says lead author Sakiko Fukuda-Parr. "There's no global framework for supporting research and development that address the common needs of poor people," she says.

Multination must become part of the solution, because they own around 60 per cent of world's technology. But they seldom make products for poor customers. Of 1223 new drugs marketed worldwide from 1975 to 1996, for example, just 13 were for tropical diseases. "It's big corporations that own the technology that really should read this report," says Fukuda-Parr. "We're asking them to be more socially responsible." They could do more to provide vital products such as medicines at different prices around the world to suit what people can afford. Or pledge a percentage of their profit towards research and development for the poor.

Governments from rich countries should pay more too. They and other sources such as the World Bank and international institutes could provide as much as \$10 billion. Developing countries should also make better use of intellectual property laws that entitle them to vital medicines just as South Africa did recently with AIDS drugs. Critics of the report say it doesn't take poor people's views into account. "You have to ask: is it affordable to people who earn less than a dollar a day? Is it accessible to them? Can it be managed by local people?" says Lucja Wisniewska of the British-based charity Immediate Technology Development Group.

Controversially, the report backs genetically modified crops despite the widespread opposition to them among Western environmentalist and non-governmental organizations. "To reject it entirely is forgoing a huge opportunity," says Fukuda-Parr. "If it is so good for multinationals, why shouldn't it be used by poor farmers," she adds. Computers could also revolutionize the lives of poor people allowing them to tap into a global wealth of free information that could help solve local problems. But they'd need to be cheap and wireless. Fukuda-Parr says that Brazil and India have already developed cheap computers, proving that countries can do it for themselves. But the objectives will be difficult to achieve. Time has stood still in sub-Saharan Africa, where there has been no increase in tractor use for a decade.

A. Complete the sentence in NO MORE THAN THREE WORDS AND OR A NUMBER. [5×1=5]

- a. people in the world live without domestic electricity.
- b. More than half the world's technology is owned by
- c. Between 1975 and 1996 a total of new drugs were marketed.
- d. The writer is surprised to find that UN report supports the production of
- e. Brazil and India have proved them by developingthat they don't need any support from others in solving their problems.

B. Answer the questions. [5×1=5]

- a. What claim is the writer making in the first paragraph?
- b. How can technology reduce poverty in developing countries?
- c. What does Fukuda-Parr mean by "socially responsible"?
- d. Why do some people criticize the UN report?
- e. In which part of the world, the UN objective of putting technology into the hands of poor people will be difficult to achieve?

C. Mark the statements TRUE, FALSE or NOT GIVEN. [5×1=5]

- a. Big corporations are a part of solution related to the technological void in the world.
- b. Governments are doing nothing to solve the problem.
- c. Developing countries can utilize AIDS drugs to bring solutions.

- d. Governments, the World Bank and international institutes may provide as much as \$10 billion dollars a year to the poor countries looking for solutions.
- e. Brazil and India are in the process of developing their own computers.

2. Write short answers to the questions. [5×2=10]

- a) How does Laxminarayan outsmart Ranabahadur? (*The Bull*)
- b) Why is the Universal Declaration of Human Rights important to you? (*Human Rights and the Age of Inequality*)
- c) Why did the students ignore the bookshelves in the 1990s? (*On Libraries*)
- d) Does the poet present migration in a positive light? Why? Why not? (*The Awakening Age*)
- e) Why does the speaker make a prayer to the God, but not to a king, a billionaire or a scientist? (*Every Morning I Wake*)

3. Write long answers to the questions. [2×5=10]

- a) Discuss 'Facing Death' as a modern tragedy.
- b) Treasure hunting is a favorable subject of children's story. Remember a treasure hunting story you read in your childhood and compare and contrast it with 'The Treasure in the Forest.'

4. Your school is going to organize a speech competition on its school-day. Draft a speech entitled with "Save Trees, Save Environment" using the following prompts. [7]

Natural world – plants, elements and animals – billions of living beings and billions of trees- environment – entire air, soil, trees, water- co-existence of all good environment- human being - greedy/ selfish/ consumerist - thinking him owner - other things property- urbanization- industrialization - road construction canal/ dam construction- airport construction - loss of trees - control greed/ appetite- good environment- quality life - bad environment - bad life.

5. Write a job application for the post of Marketing Coordinator, addressing the General Manager of Sunrise Enterprises. Consider the following clues: [8]

Qualification: Minimum BBS in Marketing

Work Experience: Minimum 2 years

Age: Between 25 to 30

6. Write a Press Release on MCC Statement on Nepal Compact Confirmation issued by the Ministry of Foreign Affairs. [10]

7. Rewrite the sentences as instructed in the brackets. [10×1=10]

- a) It got lost in the post. These things happen sometimes. (*Choose the best answer*)
i. can't have ii. might have iii. should have
- b) He is an introvert. He has got very (many/few) friends. (*Choose the correct word from the brackets.*)
- c) Neither he nor his friends (is/are) good at speaking English. (*Choose the correct word from the brackets.*)
- d) We study in the same college. We hardly see each other. (*Join the sentences using 'despite'.*)
- e) Did you know if he had left the office? (*Change the indirect question into direct question*)
- f) My sister was doing her homework. The doorbell rang. (*Join these clauses using 'when/while'.*)
- g) English people think that the number thirteen is unlucky. (*Change into passive.*)
- h) I can type 120 words (in/for/ by) a minute. (*Choose the correct word from the brackets.*)
- i) When I was very young, I (used to/would) not like milk. (*Rewrite the sentence using the correct answer from the bracket.*)
- j) I bought (red/a/comfortable/new) scooter. (*Rewrite the sentence putting the adjectives in the correct order.*)

8. Do as instructed. [5×1=5]

- a) Write the noun form of the verb 'nurture'.
- b) Define these professionals.
i. chemical engineer ii. biomedical engineer
- c) empower, development (*Mention suffix or prefix whichever used in the words and separate them from the root word.*)
- d) Differentiate between snorting laughter and cruel laughter.
- e) Give two examples of closed compound.



Attempt all questions.

1. Read the text and do the activities that follow.

The Central Bureau of Statistics has published various facts and figures in its census report. The figures indicate a particular cause for concern. One, there is a lopsided concentration of people in the Terai region. Two, just over 66 percent of the population resides in urban areas. With 68 percent of the world's population projected to live in urban areas by 2050, the figure reflected may tempt people to believe it is in line with global trends. But urbanization is pretty shambolic in Nepal, and there are numerous problems that the administration needs to be mindful of.

Towns and cities have seen unprecedented expansion in the last two decades, but it has been largely unplanned and pretty haphazard. There is no thought to preserve any natural aesthetics when building houses, and more often than not, the access ways to residential properties are ill-planned. And with more and more people moving into urban areas, it has led to an acute shortage of accommodation, and consequentially sky-high rent rates have forced newcomers to live in squalid conditions. There's nothing rosy for the early settlers either. People living in cities lack basic amenities.

Access to clean, affordable drinking water is still a significant problem in the cities, especially for residents in Kathmandu. People's expectations were dashed when the much-awaited Melamchi Water Supply Project had to stop supplying water to the valley to carry out repair works after barely being operational for a few months. Waste management is another issue where no lasting solution has been reached; often, during the monsoon season, residents of Kathmandu have to endure piles of rubbish strewn all over the city. And to make matters worse, there is the issue of raw sewage being brazenly dumped in rivers making it unbearable to even walk along the banks, let alone reside there.

The inadequacies of solid waste management, if not resolved, could lead to environmental degradation and aggravate public health problems. These are just a few examples of the disorganized state of operations. The history of urban planning is a new concept to the Nepali psyche. The concept of urban planning was only introduced in the third national five-

year plan 1967-71, and it is pretty evident that nothing much has been done to cater to the needs of the masses of people flocking to urban areas. Every bit of free space is being used up to erect concrete structures to accommodate the ever-increasing flow of people, often encroaching on areas deemed uninhabitable by the old locals. The disastrous effects were visible for all during the earthquake in 2015 when buildings built on loose grounds gave way and led to their collapse, causing widespread damage and destruction and loss of life. But the way urbanization has continued, it seems the hazards of high-rises have been all but forgotten. There is an urgent need to redress the ongoing problem of continued urbanization, and if we are to carry on at this pace, stretching every bit of resource at our disposal, we could be looking at a ticking time bomb.

A. Choose the best answer.

[5×1=5]

- a. The word '**lopsided**' in the first paragraph stands for.....
 - i. People in the Tarai region develop a balanced view
 - ii. People in general have a balanced view.
 - iii. People lived in Tarai lean to one side.
 - iv. People in the Tarai region never solve their problem themselves.
- b. The phrase '**mindful of**' in the first paragraph means.....
 - i. The administration should be aware of the problems.
 - ii. The administration should go for the action.
 - iii. The administration should ignore the problems.
 - iv. People are highly pressurized by the administration.
- c. The intended meaning of the noun phrase '**squalid conditions**' in the second paragraph is.....
 - i. Newcomers are forced to live in an ill situation.
 - ii. Newcomers are fond of living a systematic life.
 - iii. Newcomers can afford sky-high rents.
 - iv. Newcomers are lucky enough to live a better life.
- d. The expression '**There's nothing rosy for the early settlers either.**' in the second paragraph means:
 - i. There were no facilities for the people who started living recently.
 - ii. Early settlers hadn't got anything worthy.
 - iii. Everything was good for people who settled in the past.
 - iv. Everything was served to the people for their worth living.

- e. The implied meaning of the clause 'People's expectations were dashed...' in the third paragraph is.....
- People lost their hope for better existence.
 - Thing that was hoped for was destroyed.
 - The honour that was ruined by the people.
 - The state where people ignored the ideas.

B. Match the following words with their oppositive meaning. [5×1=5]

- | | |
|----------------|--------------------------------|
| a. shambolic | i. difficult to pay for |
| b. affordable | ii. Stop overreaching |
| c. encroaching | iii. delightful/pleasing |
| d. aggravating | iv. accumulation |
| e. disposal | v. well planned and systematic |

C. Answer the following questions. [5×1=5]

- What are the major outcomes of the census report?
- How are the urban areas expanded?
- What are the two significant problems of the cities?
- What plan was brought in the third national five-year plan?
- What is causing pollution to rivers?

2. Write short answers to the questions. (Any five) [5×2=10]

- How did Runtu behave with his childhood mate after long time? Why did he do so? (*My Old Home*)
- What are the differences between the paralyzed child and his sister? (*The Half-closed Eyes of the Buddha and*)
- Why and how does the poet appeal to the Nigerians to rise up for the 'Awakening Age'?
- What does the play 'The Bull' tell us about contemporary Nepali society?
- Why and how was the writer attracted to the library from his childhood? (*On Libraries*)
- "Greed generally equals great loss." Justify the statement with reference to 'The Treasures in the Forest.'
- What does the essay tell us about the conflicting history of human civilization? (*Humility*)

3. Write long answers to the following questions. [2×5=10]

- a) Is another human rights movement necessary? Why? (*Human Rights and the Age of Inequality*)
- b) Do you call Rakesh a devoted son? Discuss critically. (*A Devoted Son*)

4. Summarize the following story. [7]

He awoke to the huge, insect like creatures looming over his bed and screamed his lungs out. They hastily left the room and he stayed up all night, shaking and wondering if it had been a dream. The next morning, there was a tap on the door. Gathering his courage, he opened it to see one of them gently place a plate filled with fried breakfast on the floor, then retreat to a safe distance. Bewildered, he accepted the gift. The creatures chattered excitedly. This happened every day for weeks. At first, he was worried they were fattening him up, but after a particularly greasy breakfast left him clutching his chest from heartburn, they were replaced with fresh fruit. As well as cooking, they poured hot steamy baths for him and even tucked him in when he went to bed. It was bizarre. One night, he awoke to gunshots and screaming. He raced downstairs to find a decapitated burglar being devoured by the insects. He was sickened, but disposed of the remains as best he could. He knew they had just been protecting him. One morning the creatures wouldn't let him leave his room. He lay down, confused but trusting as they ushered him back into bed. Whatever their motives, they weren't going to hurt him. Hours later a burning pain spread throughout his body. It felt like his stomach was filled with razor wire. The insects chattered as he spasmed and moaned. It was only when he felt a terrible squirming feeling beneath his skin that he realised the insects hadn't been protecting him. They had been protecting their young.

5. Write a letter to the editor pointing out the issues of gender violence in Nepalese societies. [8]

6. Write a biography of a person who lives in the USA. He was born in one of the remote villages in Nepal. He did his SEE from a government school. He moved to the USA after he passed his MA from Tribhuvan University, Kathmandu. [10]

7. Rewrite the sentences as indicated in the brackets. [10×1=10]

- a) Even though she didn't study well. She.....(*Complete the sentence using a modal verb.*)
- b) Only (few/little/a few/a little) employees know how important the project was. (*Rewrite the sentence using the appropriate quantifier.*)
- c) When did she invite the man? (*Change into passive voice.*)
- d) She was excluded from the team (so/because/due to) her arm injury. (*Choose the correct alternative.*)
- e) Five hundred rupees (is/are) a big amount for her. (*Select the correct option*)
- f) Do you know the man? The police have been searching for him a month. (*Join the sentences using relative clause.*)
- g) After the program had finished, we run out of the hall. (*Correct the sentence.*)
- h) If they had practiced, theythe match. (*Complete the conditional sentence correctly.*)
- i) I can type 120 words (by/for/in) a minute. (*Choose the correct preposition.*)
- j) She is *Nepali/educated/a/beautiful* girl. (*Rewrite the sentence placing the adjectives in the right order.*)

8. Do as instructed. [5×1=5]

- a. The word 'Negotiation' has (three/four/five) syllables. (*Choose the correct answer from the brackets.*)
- b. Use the following words in the sentences of your own.
 - i. Open-mindedness ii. radical
- c. Define the following words related to the stock market.
 - i. Liquidity ii. Margin
- d. Which of the following pairs has similar vowel sound /u:/?
 - i. boom/book ii. foot/loose iii. room/sooth
- e. Which of the following is the example of closed compound word?
 - i. Single-burner ii. Dining room iii. Rattlesnake



Attempt all questions.

1. Read the text and do the given tasks.

That placebos can cure everything from dandruff to leprosy is well known. They have a long history of use by witch doctors, faith healers, and even modern physicians, all of whom refuse to admit their efficacy. Modern distribution techniques can bring this most potent of medicines to the aid of everyone, not just those lucky enough to receive placebos in a medical testing program.

Every drug tested would prove effective if special steps were not taken to neutralize the placebo effect. This is why drug tests give half the patients the new medication and half a harmless substitute. These tests prove the value of placebos because approximately five percent of the patients taking them are cured even though the placebos are made from substances that have been carefully selected to be useless.

Most people feel that the lucky patients in a drug test get the experimental drug because the real drug provides them a chance to be cured. Yet analysis shows that patients getting the placebo may be the lucky ones because they may be cured without risking any adverse effects the new drug may have. Furthermore, the drug may well be found worthless and to have severe side effects. No harmful side effects result from placebos.

Placebos regularly cure more than five percent of the patients and would cure considerably more if the doubts associated with the tests were eliminated. Cures are principally due to the patient's faith, yet the patient must have doubts knowing that he may or may not be given the new drug, which itself may or may not prove to be an effective drug. Since he knows the probability of being given the true drug is about fifty percent, the placebo cure rate would be more than doubled by removing these doubts if cures are directly related to faith.

The actual curing power of placebos probably stems from the faith of the patient in the treatment. This suggests that cure rates in the ten percent

range could be expected if patients are given placebos under the guise of a proven cure, even when patients know their problems are incurable.

It may take a while to reach the ten percent level of cure because any newly established program will not have cultivated the word-of-mouth advertising needed to ensure its success. One person saying "I was told that my problem was beyond medical help, but they cured me," can direct countless people to the treatment with the required degree of faith. Furthermore, when only terminal illnesses are treated, those not cured tell no one of the failure.

Unfortunately, placebo treatment centers cannot operate as nonprofit businesses. The nonprofit idea was ruled out upon learning that the first rule of public medicine is never to give free medicine. Public health services know that medicine not paid for by patients is often not taken or not effective because the recipient feels the medicine is worth just what it cost him. Even though the patients would not know they were taking sugar pills, the placebos cost so little that the patients would have no faith in the treatment. Therefore, though it is against higher principles, treatment centers must charge high fees for placebo treatments. This sacrifice of principles, however, is a small price to pay for the greater good of the patients.

A. Mark the statements *True, False, or Not Given.* (5×1= 5)

- a. The price of placebo treatment must be kept artificially high because patients have little faith in inexpensive treatments.
- b. The experimentation of drugs is always beneficial for the patients.
- c. Since free medicine is of low quality, it cannot cure the patients.
- d. Placebos regularly cure more than nine percent of the patients and would cure considerably more if the facts associated with the tests were eliminated.
- e. The healing power of placebos depends on the ingredients they are made up of.

B. Complete the sentences below. Write NO MORE THAN THREE WORDS from the passage for each answer. (5×1= 5)

- a. Witch doctors, faith healers, and even modern physicians have been using.....for a long time.
- b. In the past placebos were available to a few people, but now due to....., they can reach everywhere and benefit everyone.
- c. Patients getting the placebo are considered to be lucky because they are likely to be cured without riskingthe new drug may have.
- d. Cure rates could rise if patients are given placebos under the guise of a
- e. If related with the tests were eliminated, placebos would cure considerably more patients than it does now.

C. Answer to the questions. (5×1= 5)

- a. What are placebos used for?
- b. Do placebos have any side effects? Give reason.
- c. Write one advantage of giving placebos under the guise of a proven cure.
- d. Why cannot placebo centers be operated as nonprofit centres?
- e. Give an appropriate title to the passage.

2. Write short answers to the questions. (5×2=10)

- a. What is the impact of Rakesh's mother's death on his father? (*A Devoted Son*)
- b. What does the speaker pray for? Why? (*Every morning I Wake*)
- c. Why did Pelayo and Elisenda imprison the old man in the chicken coop? (*A Very Old Man with Enormous Wings*)
- d. What are the contributing factors to wisdom? (*Knowledge and Wisdom*)
- e. Why did the speaker desire to follow men warp in her? (*I Was My Own Route*)

3. **Write long answers to the questions.** (2×5=10)
- Sketch the character of Monsieur Durand. (*Facing Death*)
 - The poem "I Was My Own Route" is about the women have been burdened with the patriarchal ideologies from the past so as to detach them from such burden, they have to establish their own identity for their intimate liberation and respect. Justify.
4. **Write a news story based on the given information.** [7]
Cristiano Ronaldo Sets Champions League Appearance Record with No. 178
by Associated Press
September 30
- made more history in the Champions League
 - Manchester United against Villarreal on Wednesday
 - a record 178th appearance in the competition
 - sharing the appearance record with Iker Casillas
 - former teammate at Real Madrid
 - Ronald's first game in the Champions League in 2003
 - scored 135 goals in the competition, another record
 - won the Champions League title five times.
5. Write a newspaper article highlighting the three ideas (reduce, reuse and recycle) in garbage management in your community. [8]
6. The couples, who laugh together, stay together. Is it important for the married couples to have the same sense of humour? Write an essay about the importance of mutual understanding between spouses for their happy married life. [10]
7. **Rewrite the sentences as indicated in the brackets.** [10×1=10]
- You'd better not take tuition classes,? (*Add an appropriate question tag*)
 - She has a smart TV at home. She..... (*Complete the sentence with a modal verb*)

- c. I need (the/some/few) money to run my business smoothly. (*Choose the correct word from the brackets.*)
- d. Neither the gas fire nor the heaters (is/are/have) suitable for room heating. (*Choose the correct word from the brackets.*)
- e. We didn't go for the morning walk (because of/as/ so) it was raining. (*Choose the correct word from the brackets.*)
- f. Do you remember whether we paid for the tickets? (*Change this indirect question in to a direct one.*)
- g. I borrowed Estienne's car. Had you known about it? (*Correct the sentence if necessary.*)
- h. My child is the heir of my property. Why have they been trying to affect the trial? (*Place the adverbial phrase "as a rule" in appropriate place*)
- i. The exam this year was (much/easy) than it usually is. (*Make a comparison by using the words given in the brackets.*)
- j. I bought (red/ a/ comfortable/electronic/ new) bicycle. (*Rewrite the sentence using the adjectives in the correct order.*)

8. Do as instructed.

[5×1= 5]

- a. Which one of the following is not a suffix?
 i. ness ii. able iii. mono iv. ment
- b. Ellen has worn high-heels. She is (dragging/teetering/lagging). (*Choose an appropriate word from the brackets.*)
- c. Fluffy went flip-flop all over the floor. (*Underline the consonant clusters in the given sentences.*)
- d. Define the terms: i. obituary ii. hagiography
- e. Write the verb form of the word 'real'.



Attempt all questions.

1. Read the text and do the task.

Every day, millions of shoppers hit the stores in full force-both online and on foot-searching frantically for the perfect gift. Last year, Americans spent over \$30 billion at retail stores in the month of December alone. Aside from purchasing holiday gifts, most people regularly buy presents for other occasions throughout the year, including weddings, birthdays, anniversaries, graduations, and baby showers. This frequent experience of gift-giving can engender ambivalent feelings in gift-givers. Many relish the opportunity to buy presents because gift-giving offers a powerful means to build stronger bonds with one's closest peers. At the same time, many dread the thought of buying gifts; they worry that their purchases will disappoint rather than delight the intended recipients.

Anthropologists describe gift-giving as a positive social process, serving various political, religious, and psychological functions. Economists, however, offer a less favorable view. According to Waldfogel (1993), gift-giving represents an objective waste of resources. People buy gifts that recipients would not choose to buy on their own, or at least not spend as much money to purchase (a phenomenon referred to as "the deadweight loss of Christmas"). To wit, givers are likely to spend \$100 to purchase a gift that receivers would spend \$80 to buy themselves. This "deadweight loss" suggests that gift-givers are not very good at predicting what gifts others will appreciate. That in itself is not surprising to social psychologists. Research has found that people often struggle to take account of others' perspectives- their insights are subject to egocentrism, social projection, and multiple attribution errors.

What is surprising is that gift-givers have considerable experience acting as both gift-givers and gift-recipients, but nevertheless tend to overspend each time they set out to purchase a meaningful gift. In the present research, we propose a unique psychological explanation for this overspending problem-i.e., that gift-givers equate how much they spend

with how much recipients will appreciate the gift (the more expensive the gift, the stronger a gift-recipient's feelings of appreciation). Although; link between gift price and feelings of appreciation might seem intuitive to gift-givers, such an assumption may be unfounded. Indeed, we propose that gift-recipients will be less inclined to base their feelings of appreciation on the magnitude of a gift than givers assume.

Why do gift-givers assume that gift price is closely linked to gift-recipients' feelings of appreciation? Perhaps givers believe that bigger (i.e., more expensive) gifts convey stronger signals of thoughtfulness and consideration. According to Camerer (1988) and others, gift-giving represents a symbolic ritual, whereby gift-givers attempt to sign; their positive attitudes toward the intended receiver and their willingness to invest resources in a future relationship. In this sense, gift-givers may be motivated to spend more money on a gift in order to send a "stronger signal" to their intended recipient.

A. Mark the statements True, False or Not given. [5×1=5]

- a) People prefer buying gifts online to buying physical stores.
- b) Some people like buying gifts because it makes them closer to the people who are not very close to them.
- c) Gift giving practice is considered as a positive social process by anthropologists, for it is more civilized way of appreciation.
- d) Higher the price of the gift better the gift is appreciated by the receivers.
- e) When people are giving gifts, they prefer cheaper things.

B. Answer to the questions. [5×1=5]

- a) Do people always love buying gifts? Why?
- b) What is 'dead weight loss of Christmas'?
- c) How the response of the same person differs when one is purchasing things as gifts or for their own use?
- d) How do the gift-givers decide if the gift is good enough or not?
- e) How does Camerer unfold the relation between price and gift?

C. Match the words with their possible meanings in the context of the passage. **[5×1=5]**

- | | |
|---------------------|---------------------------------|
| a) To hit the store | i) at the risk of extinction |
| b) Engender | ii) be available for purchase |
| c) Dread | iii) baseless |
| d) Unfounded | iv) something not found or lost |
| e) Inclined | v) having a slope |
| | vi) cause to exist |
| | vii) fear greatly |
| | viii) willing |

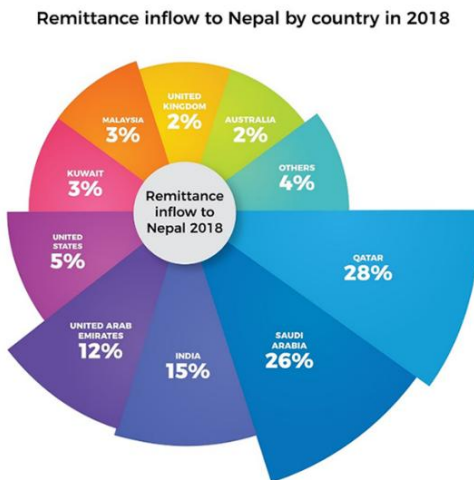
2. Write short answers to the questions. **[5×2=10]**

- a) How do the imagines support the theme of the poem "A Day"?
- b) The author says "I was not a good pupil, but I was a good learner." Justify it relating to the text. (*On Libraries*)
- c) The story deals with the common people's gullibility. How do Palayo and his wife take advantage of common people's whim? (*A Very Old Man with Enormous Wings*)
- d) What is the speaker like? Is he a rebel? (*Soft Strom*)
- e) How does Monsieur Duran die? (*Facing Death*)

3. Write long answers to the questions. **[2×5=10]**

- a) What is the cause of conflict in Mrs. Baroda's mind? What role does Mrs. Baroda 'being a respectable woman' play in the story? (*A Respectable Woman*)
- b) What, according to Russell, is the essence of wisdom? And how can one acquire the very essence? Give reasons for your answer. (*Knowledge and Wisdom*)

4. Based on the following diagram, interpret the contribution of remittance to Nepal from different countries. The data shows the numerical value of 2018 AD. [7]



Source: World Bank

5. Write an application based on the vacancy announcement given below. [8]

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6. Desmond Tutu once said, "Forgiving is not forgetting; it is actually remembering- remembering and not using your right to hit back, it's a second chance for a new beginning." Write a memoir describing an incident when you saw or experienced the problem being solved with forgiveness. [10]

7. Rewrite the sentences as indicated in the brackets. [10×1=10]

- This phone has the most features. This phone is the most expensive. (Connect the sentences using relative clause.)
- I am busy today but I was busier yesterday. I'm not (Complete the comparative sentence.)
- The schedule/the participants/will distribute (Make a passive sentence arranging the given information.)
- If you don't promise to give my book back next week, I won't lend you it. (Use 'as long as' without altering the meaning.)
- His step-mother was not very kind to him. He had been staying with her. (Join the pair of sentences using relative clause.)
- Ukrainian president said to Putin, "We can communicate smoothly." (Report the sentence.)
- You must fasten your seat belt before you drive. (Place the adverb 'always' appropriately in the sentence.)
- I really need to know if he will have finished the report by tonight. (Change question into direct question)
- She can hardly love him after all that,? (Add a question tag)
- Tweezers always useful to handle small objects. (Use the correct form of 'be' verb)

8. Do as indicated. [5×1=5]

- Where is the engine in this bird? (Identify whether the sentence has 'falling/rising' intonation)
- We walked along the cobbled roads together chatting and playing like games. (Write synonym of the underlined word.)
- Define these terms.
 - metamorphosis
 - calcification
- Write the adjectival form of the word "Noun".
- The small cat is on the big mat. (Underline the content words in the given sentence.)



Model Questions - 2078 (2022)

Subject: Mathematics (0081)

Full Marks: 75

Time: 3 hrs.

SET A

Candidates are required to give answers in their own words as far as practicable. The figures in the margin indicate full marks.

GROUP – A

Attempt all questions.

[11×1=11]

Rewrite the correct option in your answer sheet.

- In how many ways 4 players out of 11 players can be selected when two particular players are always included?
A. C(11, 4) B. C(11, 2)
C. C(9, 4) D. C(9, 2)
- The value of $1 - \frac{\log 2}{1!} + \frac{(\log 2)^2}{2!} - \frac{(\log 2)^3}{3!} + \dots =$
A. 2 B. $\frac{1}{2}$
C. 1 D. 0
- The general solution of $\sin \frac{3\theta}{2} = 0$ is
A. $\theta = n\pi, n \in \mathbb{Z}$ B. $\theta = \frac{n\pi}{3}, n \in \mathbb{Z}$
C. $\theta = \frac{2n\pi}{3}, n \in \mathbb{Z}$ D. $\theta = \frac{3n\pi}{2}, n \in \mathbb{Z}$
- What is the value of λ , so that the vectors $(2\vec{i} + 6\vec{j} + 27\vec{k}) \times (\vec{i} + 3\vec{j} + \lambda\vec{k}) = 0$?
A. 3 B. 27
C. $\frac{27}{2}$ D. $\frac{20}{27}$
- The angle between the planes $3x - 4y + 5z = 0$ and $2x - y - 2z = 5$ is
A. $\frac{\pi}{6}$ B. $\frac{\pi}{3}$
C. $\frac{\pi}{4}$ D. $\frac{\pi}{2}$

6. The latus rectum of hyperbola $16x^2 - 9y^2 = 144$ is
- A. $\frac{32}{9}$ B. $\frac{32}{3}$
 C. $\frac{8}{3}$ D. $\frac{4}{3}$
7. Four unbiased coins are tossed successively. The mean and variance of the distribution is differed by
- A. 1 B. 2
 C. 3 D. 4
8. If x changes from 4 to 4.1, then actual change in the function $x^2 + x$ is
- A. 0.91 B. 0.9
 C. 0.1 D. 0.81
9. $\int \frac{dx}{(x+3)\sqrt{x+2}}$ equals
- A. $2 \tan^{-1} \sqrt{x+2} + C$ B. $2 \tan^{-1} \sqrt{x+3} + C$
 C. $2 \tan^{-1} \sqrt{x^2+2} + C$ D. $2 \tan^{-1} x + C$
10. The forward elimination step of Gaussian elimination method, the coefficient matrix of a system of equation is obtained as $\begin{pmatrix} 0 & 2 & 5 \\ 0 & 0 & -3 \\ 0 & 0 & 0 \end{pmatrix}$, then the system of equation has
- A. unique solution B. no solution
 C. infinitely many solutions D. finite solutions
11. A body of 5 kg falling from a certain height is brought to rest hitting the ground with the speed of 10 ms^{-1} . Find the duration of contact when the resistance force of the ground is 500 N?
- A. 1 s B. 0.1 s
 C. 0.01 s D. 0.5 s

OR

What is the elasticity of demand for the demand function $Q = 150 - P^2$ at $P = 5$ when the price is increased by 10%?

- A. 0.1 B. -1
 C. 0.4 D. -0.4

GROUP – B

Attempt all questions.

[8×5=40]

12. State De'moivres theorem. Write the Euler's formula representing the complex number $\cos\theta + i\sin\theta$. Using De'moivres theorem find the square root of $-1 + \sqrt{3}i$. [1+1+3]

13. a) If α and β are the roots of $px^2 + qx + q = 0$, prove that $\sqrt{\frac{\alpha}{\beta}} + \sqrt{\frac{\beta}{\alpha}} + \sqrt{\frac{q}{p}} = 0$ [3]

b) Using inverse matrix method solve the system of equations:

$$-2x + 4y = 3, 3x - 7y = 1. \quad [2]$$

14. a) Using vector method, show that $\sin(A + B) = \sin A \cos B + \cos A \sin B$ [3]

b) If $\cos^{-1} x + \cos^{-1} y + \cos^{-1} z = \pi$, then prove $x^2 + y^2 + z^2 + 2xyz = 1$. [2]

15. The marks obtained by 8 students in Mathematics and Physics are given below

S. N.	1	2	3	4	5	6	7	8
Marks in Maths	40	60	35	68	70	96	70	84
Marks in Physics	48	62	28	52	85	90	52	73

Find the rank correlation coefficient between the marks in Mathematics and Physics and interpret the rank correlation coefficient hence obtained. [4+1]

16. Using simplex method, Maximize $F = 4x - 6y$ subject to the constraints,

$$2x - 3y \leq 8$$

$$x + y \leq 24$$

$$x, y \geq 0$$

[5]

17. a) Find the derivative of $\left(\cosh \frac{x}{a}\right)^{\log x}$ [3]

b) Using L.Hospital rule evaluate: $\lim_{x \rightarrow 0} \frac{(e^x - 1) \tan x}{x^2}$ [2]

18. Evaluate: (a) $\int \sqrt{x^2 - 9} \, dx$ (b) $\int \frac{1}{(a^2 + x^2)(b^2 + x^2)} dx$ [1+4]

19. a) A stone is thrown horizontally with the velocity $\sqrt{2gh}$ from the top of the of height h . Find where it will strike the level of ground through the foot of tower? [2]

- b) P, Q are like parallel forces. If P is moved parallel to itself through a distance x, show that the resultant of P and Q moves a distance $\frac{Px}{P+Q}$. [3]

OR

Define consumer and producer surplus. The demand and supply function under perfect competition are $P_d = 16 - x^2$ and $P_s = 2x^2 + 4$ respectively. Then find

- market price
 - consumer surplus
 - producer surplus
- [5]

Group 'C'

Attempt all questions.

[3×8=24]

20. a) Find the general term and sum upto n terms of the series:
 $1.n + 2.(n-1) + 3.(n-2) + \dots$ [4]
- b) State binomial theorem. If $(1+x)^n = C_0 + C_1x + C_2x^2 + \dots + C_nx^n$, then show
 $C_0C_n + C_1C_{n-1} + C_2C_{n-2} + \dots + C_nC_0 = \frac{2n!}{n!n!}$. [1+3]
21. a) Define direction cosine of a line. If OX, OY and OZ are three mutually perpendicular axis then
- What are the direction cosines of these coordinate axes? [1+1]
 - What are the projection of line joining the points A (x_1, y_1, z_1) and B (x_2, y_2, z_2) on the coordinate axes? [2]
 - Prove that the sum of squares of the projection in coordinate axes is square length of AB. [1]
- b) Consider an equation of ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, $a > b > 0$ and e be its eccentricity then
- What are the coordinates of vertices?
 - What are the coordinates of foci?
 - What are the equation of directrices? [3]
22. a) Verify Lagrange's mean value theorem for the curve $f(x) = x(x-2)$ in $[1, 4]$. Also find the point on the curve prescribed by the theorem [5]
- b) A differential equation is given by $\frac{dy}{dx} = \frac{y}{x} - \sin^2 \frac{y}{x}$
- State the type of differential equation and its order [1]
 - Obtain the general solution of the differential equation [2]



Attempt all questions.**[11×1=11]***Rewrite the correct option in your answer sheet.*

1. Let a sequence of group of natural numbers is (2,3), (4,5,6), (7,8,9,10) Which one of the following is the first term of the n^{th} group of sequence?
A. $\frac{1}{2}(n^2 + n + 2)$
B. $\frac{1}{2}(n^2 - n + 2)$
C. $n(n+1)$
D. none
2. The quadratic equation $ax^2 + bx + c = 0$ have reciprocal root if
A. $b = 0$
B. $c = a$
C. $c = 0$
D. $b = c = 0$
3. Which one of the following is the general value solution for $\sin x = -1$?
A. $2n\pi, n \in \mathbb{Z}$
B. $(2n-1)\frac{\pi}{2}, n \in \mathbb{Z}$
C. $(4n+1)\frac{\pi}{2}, n \in \mathbb{Z}$
D. $(4n-1)\frac{\pi}{2}, n \in \mathbb{Z}$
4. Two non-zero vectors are such that their cross product is zero, then the vectors are
A. coplanar
B. collinear
C. perpendicular
D. co-initial
5. What are the direction ratios of normal to the plane $2x - 7y + 2z + 1 = 0$?
A. 2, 1, 2
B. $1, \frac{-1}{2}, 1$
C. 1, -2, 1
D. None of the above.
6. How far apart are the directrix of the curve $25x^2 + 9y^2 - 300x - 144y + 1251 = 0$?
A. 12.5
B. 14.2
C. 13.2
D. 15.2
7. Let A and B be any two dependent events with $P(A) \neq 0$ and $P(B) \neq 0$. Then $P(A/B)$ is
A. $P(A \cap B)$
B. $P(A).P(B)$
C. $\frac{P(A \cap B)}{P(A)}$
D. $\frac{P(A \cap B)}{P(B)}$

8. The normal to a given curve is parallel to x-axis if
- A. $\frac{dy}{dx} = 0$
- B. $\frac{dy}{dx} = 1$
- C. $\frac{dx}{dy} = 0$
- D. $\frac{dx}{dy} = 1$
9. The value of $\int \frac{(\tan^{-1} x)^2 dx}{(1+x^2)}$ is
- A. $2\tan^{-1}x + c$
- B. $\frac{(\tan^{-1} x)^3}{1+x^2} + c$
- C. $\frac{1}{3}(\tan^{-1} x)^3 + c$
- D. $\frac{1}{(1+x)^2} + c$
10. A system of equations: $x + y + 2z = 7$, $3x + 4y - 5z = -5$, $2x - y + 3z = 12$; are solved using the partial pivoting of Gaussian elimination, then which one of the following are the pivots for eliminating x and y respectively?
- A. 3, $-\frac{11}{3}$
- B. 3, $-\frac{11}{6}$
- C. 2, $-\frac{1}{3}$
- D. 1, $-\frac{8}{3}$
11. The maximum horizontal range of a particle thrown with a certain velocity is 10 m. Find the velocity of projection. ($g = 10\text{ms}^{-2}$)
- A. 5 ms^{-1}
- B. 20 ms^{-1}
- C. 10 ms^{-1}
- D. 2.5 ms^{-1}

OR

The demand function $P = 45 - 2Q$, then the consumer surplus at $Q = 10$ is

- A. 45
C. 100
- B. 25
D. 10

GROUP – B

Attempt all questions.

[8×5=40]

12. Distinguish between permutation and combination with suitable examples. For $0 < r \leq n$ prove that
- (i) $P(n, r) = r! \times C(n, r)$
- (ii) $C(n, r) + C(n, r-1) = C(n+1, r)$ [2+1+2]

13. a) Show that: $1 + \frac{1+2}{2!} + \frac{1+2+2^2}{3!} + \dots = e^2 - e$ [3]

b) Define binary operation. Show that the usual operation addition is binary on the set of integers Z. [2]

14. a) If position vectors of three vertices of a triangle are $\vec{i} + 2\vec{j} + 3\vec{k}$, $-\vec{i} + \vec{j} - 8\vec{k}$ and $-4\vec{i} + 4\vec{j} + 6\vec{k}$ then find the angles of the triangle. [2]

b) Show that $\sin^{-1} x = \tan^{-1} \frac{1}{\sqrt{1-x^2}}$, for $-1 < x < 1$. Further using the result

show that $\sin^{-1} \frac{4}{5} + 2 \tan^{-1} \frac{1}{3} = \frac{\pi}{2}$. [3]

15. Two lines of regression are $x + 2y = 5$ and $2x + 3y = 8$ and $\sigma_x^2 = 12$.

Calculate

a) Means of x and y – series [1]

b) Regression coeff. of x on y [1]

c) Regression coeff. of x on y [1]

d) Correlation coefficient between x and y [1]

e) Variance of y-series. [1]

16. Solve following LP by simplex method,

Maximize (F) = $5x_1 + 3x_2$

Subject to $2x_1 + x_2 \leq 40$, $x_1 + 2x_2 \leq 50$; $x_1, x_2 \geq 0$ [5]

17. a) What is derivative of a curve? At what angle does the curve $(1+x)^x$ cut the x-axis? [2]

b) Find the derivative of $\log(\cos x)$, using definition. [3]

18. Define a linear differential equation. Solve the linear differential equation

$(1+x^2) \frac{dy}{dx} + y = e^{\tan^{-1} x}$ [1+4]

19. a) Derive the resultant of two like parallel forces acting on a rigid body [3]

b) Find the velocity of 4 kg shot that will just penetrate through a wall 25 cms thick, the resistance being 36 tonnes wt. [2]

OR

A difference equation $y_{t+1} = 1.8y_t$ is given

- a) Solve the equation for the periods 2, 3, 4 given that the income in the year 1 is Rs. 12500.
- b) Obtain the sequence of the solutions of the difference equation for $t = 2, 3, 4$ in terms of y_t .
- c) Find the general solution for y_t in terms of t .
- d) Evaluate y_6 when $y_1 = \text{Rs. } 12500$.

GROUP – C

Attempt all questions.

[3×8=24]

20. a) Using De Moivre's theorem find cube roots of unity. If α and β are complex cube roots of unity then show $\alpha^4 + \beta^4 + \alpha^{-1}\beta^{-1} = 0$ [3+2]
 b) A system of equations is given by $x - 3y - 7z = 6$, $2x + 3y + z = 9$, $4x + y = 7$. Solve the system using Cramer's method. [3]
21. a) Find the equation of hyperbola in the standard form with focus at $(-7, 0)$ and eccentricity $7/4$. [2]
 b) Write the condition that the lines with direction ratios a_1, b_1, c_1 and a_2, b_2, c_2 are parallel? Using the condition show that the line joining $(1, 2, 3)$ and $(-1, -2, -3)$ is parallel to the line joining $(2, 3, 4)$ and $(5, 9, 13)$. [2]
 c) Prove that lines whose direction cosines are given by the relation $al + bm + cn = 0$ and $fmn + gnl + hlm = 0$ are perpendicular if $\frac{f}{a} + \frac{g}{b} + \frac{h}{c} = 0$ [4]
22. a) Verify Rolle's theorem for the curve $f(x) = \sqrt{25 - x^2}$ in $[-5, 5]$. [3]
 b) Evaluate: i) $\int \frac{dx}{2 + \cos x}$ ii) $\int \frac{1-x}{x^2 + x^3} dx$ [2+3]

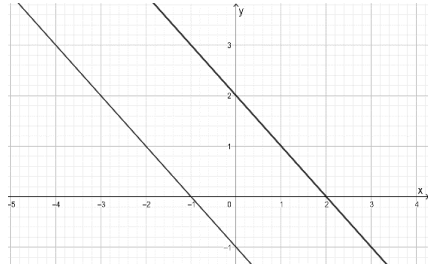


Attempt all questions.

[11×1=11]

Rewrite the correct option in your answer sheet.

- What is the value of n , if ${}^nP_r = {}^nP_{r+1}$ and ${}^nC_r = {}^nC_{r-1}$?
 A. 3
 B. 2
 C. 5
 D. 6
- The graph of a simultaneous equation is given aside, then the system of the equation is
 A. consistent and dependent
 B. inconsistent and independent
 C. consistent and independent
 D. inconsistent and dependent



- If $\sin^{-1}x + \sin^{-1}y = \frac{\pi}{3}$ then $\cos^{-1}x + \cos^{-1}y =$
 A. $-\frac{\pi}{3}$
 B. $\frac{\pi}{3}$
 C. $\frac{2\pi}{3}$
 D. 0
- Which one of the following is the angle between two vectors \vec{a} and \vec{b} if $|\vec{a} \times \vec{b}| = \vec{a} \cdot \vec{b}$?
 A. 0
 B. $\frac{\pi}{2}$
 C. π
 D. $\frac{\pi}{4}$
- The distance of point (2, 3, 5) from yz-plane is
 A. 2 unit
 B. 3 unit
 C. 5 unit
 D. 1 unit
- The foci of the ellipse $9x^2 + 5y^2 - 30y = 0$ are equal to
 A. (0, 3 ± 2)
 B. (2 ± 3 , 0)
 C. $(\sqrt{5}, 2 \pm \frac{3}{2})$
 D. $(\sqrt{5}, 3 \pm 2)$

7. If $3x + 2y = 26$ and $6x + y = 21$ be two regression lines, then correlation coefficient r_{xy} is
- A. -0.2 B. 0.2
C. 0.5 D. -0.5
8. A function $f(x)$ is said to be continuous for $x \in R$ if
- A. limit of $f(x)$ exists for all $x \in R$
B. It is discontinuous at $x = 0$
C. It is differentiable for $x \in R$
D. It is differentiable for $x \neq 0$
9. The value of $\int \frac{1}{\sqrt{a^2 - x^2}} dx$ is equal to
- A. $\frac{1}{a} \tan^{-1} \frac{x}{a} + c$ B. $\tan^{-1} \frac{x}{a} + c$
C. $\frac{1}{a} \sin^{-1} \frac{x}{a} + c$ D. $\sin^{-1} \frac{x}{a} + c$
10. Maximum of $Z = 5x_1 + 3x_2$ is subjected to the constraints $x_1 + 2x_2 \leq 10$, $x_1 - x_2 \leq 8$; $x_1, x_2 \geq 0$. In the starting simplex tableau x_1, x_2 are the non-basic variables and Z is zero. The value of Z in next simplex tableau is
- A. 24 B. 40
C. 15 D. 80
11. The least velocity with which a cricket ball can be thrown 10 m horizontally is
- A. 10 ms^{-1} B. 20 ms^{-1}
C. 100 ms^{-1} D. 200 ms^{-1}

OR

According to the principle of dynamics of market price, the rate of change of price is

- A. directly proportional to the excess demand
B. inversely proportional to the excess demand
C. directly proportional to the excess supply
D. none of the above

GROUP – B

Attempt all questions.

[8×5=40]

12. Consider a complex number $\frac{1+3i}{1-2i}$.
- a) Express the complex number in the form of $a + ib$ [1]
 - b) Represent the complex number in its polar form and hence write their modulus and principal argument. [1]
 - c) Using De Moivre's theorem find square roots of the complex number. [3]
13. a) State principle of mathematical induction. Applying the principle of mathematical induction prove that $3^{2n} - 1$ is divisible by 8. [3]
- b) If one root of quadratic equation $ax^2 + bx + c = 0$ is double of the other then show $2b^2 = 9ac$. [2]
14. a) Find the general value solution for $\cos 3x + \cos x = \cos 2x$. [2]
- b) Find the equation of plane thorough $(3, 2, 1)$ and is perpendicular to the line joining points $(-5, 3, 7)$ and $(2, -4, 5)$. [3]
15. In a class there are 25 out of 40 students are girls. If two students are chosen at random what is the probability of getting
- a) both are girls? [1.5]
 - b) First is boy and second is girl? [1.5]
- Further, what will be the probability of one student is boy and other will be girl when students are selected with replacement method? [2]
16. Write down the steps solving a system of equations using the Gaussian elimination method? Solve the following simultaneous equations using Gaussian elimination method with partial pivoting: $2x_1 + 2x_2 + x_3 = 6$, $4x_1 + 2x_2 + 3x_3 = 4$, $x_1 - x_2 + x_3 = 0$. [1+4]
17. a) Examine the applicability of Rolle's Theorem for $f(x) = 1 - (x-1)^{2/3}$ in $[0, 2]$. [2]
- b) Find the derivative of $x^{\sinh^2 x/a}$ [3]
18. Evaluate the integrals: a) $\int \frac{dx}{\sqrt{(x-\alpha)(x-\beta)}}$ b) $\int \frac{dx}{2\sin x + 3\cos x}$. [2+3]
19. a) A man carries a bundle at the end of a stick 75 cm long which is placed over his shoulder. What should be the distance between his hand and shoulder so that the pressure on the shoulder may be three times the

weight of the bundle? [2]

- b) Find the velocity and the direction of projection of a shot which passes in a horizontal direction just over of a building which is 50 meter off and 25 meter high. ($g = 9.8 \text{ ms}^{-2}$) [3]

OR

Given that demand function and supply function are $Q_{s,t} = 100 + 4p_t - 1$ and $Q_{d,t} = 170 - 5p_t$ respectively. Using equilibrium condition, find expressions for P_t and Q_t when $P_0 = 36$. Also find the equilibrium price and quantity. Is the price level stable? [5]

GROUP – C

Attempt all questions.

[3×8=24]

20. a) Define binomial coefficients. Write one property of binomial coefficients in the expansion of $(1+x)^n$. Find the coefficient of x^6 in the

expansion of $\left(3x^2 - \frac{1}{3x}\right)^9$ [1+1+3]

- b) If $(1+x)^n = C_0 + C_1x + C_2x^2 + \dots + C_nx^n$

i. Find the coefficient of x^{n-2} in the product of $(1+x)^n \cdot (x+1)^n$ [1]

ii. Find the coefficient of x^{n-2} in the expansion of $(1+x)^{2n}$ [1]

iii. Should the coefficient of x^{n-2} in (i) always be equal to the coefficient of x^{n-2} in (ii)? Give your reason. [1]

21. a) Using vector method prove: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$ [4]

b) Find the angle between the lines whose direction cosines l, m, n satisfies the relation $l + m + n = 0$ and $l^2 + m^2 - n^2 = 0$. [4]

22. a) Find from first principle, the derivative of $e^{\tan x}$. [4]

b) The temperature T of a cooling objects drops at the rate of which is proportional to the difference $(T - S)$, where S is the constant temperature of the surrounding medium. Thus, $\frac{dT}{dt} = -k(T - S)$, where

K is positive constant and t is the time. Find the solution of the differential equation at $T(0) = 100$. [4]



Attempt all questions.

[11×1=11]

Rewrite the correct option in your answer sheet

- The Euler's form of the complex number $i - \sqrt{3}$ is
 - $2e^{i\frac{\pi}{2}}$
 - $2e^{-i\frac{\pi}{6}}$
 - $2e^{-i\frac{\pi}{3}}$
 - $2e^{i\frac{5\pi}{6}}$
- The n^{th} term of the series $5 + 7 + 13 + 31 + 85 + \dots$ is
 - $4 + 3^n$
 - $5 + 3^n$
 - $5 + 3^{n-1}$
 - $5 + n^3$
- Which one of the following is the general value for θ satisfying the equations $\sin \theta = \frac{1}{2}$ and $\cos \theta = -\frac{\sqrt{3}}{2}$?
 - $n\pi + \frac{\pi}{6}$
 - $2n\pi + \frac{\pi}{6}$
 - $2n\pi + \frac{5\pi}{6}$
 - $2n\pi \pm \frac{2\pi}{3}$
- If \vec{a} and \vec{b} are any two adjacent sides of a parallelogram, then what will be the area of parallelogram having $2\vec{a} - \vec{b}$ and $\vec{a} + 2\vec{b}$ as its diagonals?
 - $\vec{a} \times \vec{b}$
 - $5(\vec{a} \times \vec{b})$
 - $\frac{5}{2}(\vec{a} \times \vec{b})$
 - $2(\vec{a} \times \vec{b})$
- The projection of line OP on the co-ordinate axes are 6, 2, 3 respectively, then distance of OP is
 - 7
 - 11
 - 15
 - $\sqrt{11}$
- A pair of dice is tossed once and a total of 8 has appeared. What is the chance that odd number appears on each dice?
 - $\frac{2}{9}$
 - $\frac{2}{5}$
 - $\frac{1}{4}$
 - $\frac{3}{5}$

7. Let $y = f(x)$ be any function then approximate change in y is defined by
 A. $dy = f'(x)dx$ B. $dy = f'(x)\Delta x$
 C. $dy = f'(y)\Delta x$ D. $dy = f(x + \Delta x) - f(x)$
8. $\int \frac{x dx}{(x-1)(x-2)}$ equals
 A. $\log \frac{(x-1)^2}{|x-2|} + C$ B. $\log \frac{(x-2)^2}{|x-1|} + C$
 C. $\log \left(\frac{x-1}{x-2} \right)^2 + C$ D. $\log |(x-1)(x-2)| + C$
9. The slope of tangent to the curve at a point is twice to the slope of the line joining that point to the origin, then the curve is
 A. circle B. parabola
 C. hyperbola D. ellipse.
10. In Gauss-elimination method, the coefficient of variable of equation a_{ij} where $i=j$ are known as
 A. basic elements B. non basic elements
 C. pivot elements D. common elements
11. If two like parallel forces of $\frac{P}{Q}$ Newtons and $\frac{Q}{P}$ Newtons have resultant of 2 Newtons, then
 A. $P = Q$ B. $P = 2Q$
 C. $2P = Q$ D. $P^2 = Q$

OR

The cost function and the revenue function are given by the equations $TC = 7 + 2x + x^2$, $TR = 10x$, where x is level of output, then the break-even point (s)

- A. 1, 7 B. 1
 C. 7 D. -1, -7

GROUP – B

Attempt all questions.

[8×5=40]

12. If α and β are two roots of equation $ax^2 + bx + c = 0$, find the equation whose roots are $(\alpha - \beta)^2$ and $(\alpha + \beta)^2$. Also, If sum of roots of the equation be equal to the sum of their squares, show $2ac = ab + b^2$. [3+2]

13. a) Using , matrix method solve the system of equations:
 $x + 2y - z = -5$, $2x - y + z = 6$, $x - y - 3z = -3$. [3]

b) Define group. If (G, o) is a group, then show $(aob)^{-1} = b^{-1} o a^{-1}$ [2]

14. a) Prove that $4(\cot^{-1}3 + \operatorname{cosec}^{-1}\sqrt{5}) = \pi$. [3]

b) Find the equation of the ellipse whose latus rectum is half the major axis and focus is at $(3, 0)$. [2]

15. a) Calculate the correlation coefficient from the following data: [3]

X:	10	12	14	20	22
Y:	8	9	7	14	13

b) 20% of the bulbs produced by a machine are non-defective, In the sample of 4 bulbs determine the probability of getting at least one bulb are defective. [2]

16. Use simplex method to solve the following LPP

Maximize $(W) = 5x + 3y$

Subject to the constraints: $2x + y \leq 40$, $x + 2y \leq 50$; $x, y \geq 0$ [5]

17. State first mean value theorem. Interpret the statement geometrically.

Using the theorem, find the point on the curve $f(x) = x^2 - 6x + 1$ at which tangent drawn is parallel to the chord joining the points $(1, -4)$ and $(3, -8)$. [1+2+2]

18. Prove $\int \operatorname{cosec} x dx = \log\left(\tan\frac{x}{2}\right) + c$ and using the result evaluate:

$$\int \frac{dx}{2\sin x + 3\cos x} . \quad [2+3]$$

19. a) A straight weightless rod 60 cm in length, rests in a horizontal position between two pegs places at a distance of 6 m apart, one peg being at one end of the rod, and weight of 2 N is suspended from the other end; find the pressure on the pegs. [3]

b) A particle is projected with a velocity u . If the greatest height attained by the particle be H , prove that the range R on the horizontal plane

$$\text{through the point of projection is } R = 4\sqrt{H\left(\frac{u^2}{2g} - H\right)} \quad [2]$$

OR

The demand function for a product is $Q = f(P) = 22500 - 75P$, where Q is measured in units and P in rupees.

- (i) Determine the quadratic total revenue function $R = f(P)$. [1]
- (ii) What is the concavity of the graph of the revenue function? [1]
- (iii) What is the total revenue at a price of Rs. 40? [1]
- (iv) How many units will be demanded at this price? [1]
- (v) At what price will the total revenue be maximum and what will be the maximum revenue? [1]

GROUP – C

Attempt all questions.

[3×8=24]

20. a) How many words, with or without meaning, can be formed from the letters of the word 'MONDAY' if,
- i) 4 letters are used at a time [1]
 - ii) all letters are used at a time [1]
 - iii) all letters are used but first letter is a vowel [1]
 - iv) all letters are used but first letter is consonant. [1]
- b) In the expansion of $\left(\frac{3x^2}{2} - \frac{1}{3x^2}\right)^{12}$
- i) Find the general term and using it compute the term which is independent of x .
 - ii) Find the middle terms in the expansion.
21. a) Derive the formula for angle between two lines whose direction cosines are l_1, m_1, n_1 and l_2, m_2, n_2 . Further state the condition for the lines to be
- (i) Parallel (ii) Perpendicular [4+1+1]
- b) If the position vectors of points A and B are given by $(1, 4, 6)$ and $(-2, 5, 1)$ then find the unit vectors perpendicular to the plane containing both \overrightarrow{OA} and \overrightarrow{OB} . [2]
22. a) State L. Hospital rule. Using the rule evaluate: $\lim_{x \rightarrow 0} \frac{x - \sin x \cos x}{x^3}$ [1+2]
- b) Find the derivative of $x^{\sinh^2 x/a}$ [2]
- c) Solve differential equation: $(x^2 + 1) \frac{dy}{dx} + 2xy = 3x^2$ [3]



Attempt all questions.

[11×1=11]

Rewrite the correct option in your answer sheet.

1. In how many ways the numbers of 3 digits divisible by 5 can be formed using the digits 0, 1, 2, 3, 4, 5?
 A. 320
 B. 40
 C. 36
 D. 20
2. What is the value of k, so that the roots of $2x^2 + (4 - k)x - 17 = 0$ has the roots equal in magnitude but opposite in sign?
 A. 2
 B. 4
 C. -4
 D. 17
3. Which one of the following is not true?
 A. $\vec{a} \times \vec{b} = \vec{b} \times \vec{a}$
 B. $\vec{a} \times \vec{a} = 0$
 C. $\vec{a} \times (\vec{b} + \vec{c}) = \vec{a} \times \vec{b} + \vec{a} \times \vec{c}$
 D. $(\vec{a} \times \vec{b})^2 + (\vec{a} \cdot \vec{b})^2 = a^2 b^2$
4. Which one of the following is the principal value of $\sin^{-1} \left[\sin \frac{2\pi}{3} \right]$?
 A. $\frac{2\pi}{3}$
 B. $-\frac{\pi}{3}$
 C. $\frac{\pi}{6}$
 D. $\frac{\pi}{3}$
5. A die is rolled two times then what is the probability that the numbers in each face shows the odd numbers given that the sum of numbers appeared in the faces of die is observed to be 8?
 A. $\frac{8}{9}$
 B. $\frac{1}{3}$
 C. $\frac{2}{5}$
 D. $\frac{1}{4}$
6. If α, β, γ are the angles made by the line with coordinate axes then value of $\sin^2 \alpha + \sin^2 \beta + \sin^2 \gamma =$
 A. 1
 B. 2
 C. 0
 D. $\frac{1}{2}$
7. Which one of the following is the equation of plane through the intersection of the planes $x + y + z = 6$ and $2x + 3y + 4z + 5 = 0$ and is perpendicular to the plane $4x + 5y - 3z = 8$?
 A. $x + 7y + 13z - 96 = 0$
 B. $x + 7y - 13z - 96 = 0$
 C. $x + 7y + 13z + 96 = 0$
 D. $x - 7y + 13z - 96 = 0$

8. Let $f(x) = \log(x + \sqrt{x^2 + 1})$ then $f'(x)$ is equal to
- A. $x^2 + 1$ B. $\frac{x}{\sqrt{x^2 + 1}}$
 C. $1 + \frac{1}{\sqrt{x^2 + 1}}$ D. $\frac{1}{\sqrt{x^2 + 1}}$
9. If $\int \frac{dx}{5 + 4\cos x} = k \tan^{-1}\left(\frac{1}{3} \tan \frac{x}{2}\right) + C$, then value of k is
- A. $\frac{3}{2}$ B. $\frac{1}{3}$
 C. $\frac{1}{2}$ D. $\frac{2}{3}$
10. The forward elimination step of Gaussian elimination reduces the coefficient matrix of system of equation into
- A. Diagonal matrix B. Identity matrix
 C. Upper triangular Matrix D. Lower triangular matrix
11. If a stone is projected at an angle α to the horizontal with the initial velocity u then which one of the following is the time taken by the projectile to attain its maximum height?
- A. $u \sin \alpha$ B. $\frac{u \sin \alpha}{g}$
 C. $\frac{2u \sin \alpha}{g}$ D. $\frac{u^2 \sin 2\alpha}{g}$

OR

What will be the consumer surplus if the demand function is $p = 16 - q^2$ and the market price is 12?

- A. $\frac{14}{3}$ B. $\frac{16}{3}$
 C. 5 D. $\frac{17}{3}$

GROUP – B

Attempt all questions.

[8×5=40]

12. State principle of mathematical induction. Using the statement prove that:
 $2^n < (n + 1)!$. [1+4]
13. Write any three properties of cube roots of unity. Prove any one of them.
 Using the properties prove that: $(1 - \omega)(1 - \omega^2)(1 - \omega^4)(1 - \omega^8) = 9$. [2+1+2]

14. a) If \vec{a} and \vec{b} are any two vectors, then derive the expression for $\sin\theta$

given by $\sin\theta = \frac{|\vec{a} \times \vec{b}|}{|\vec{a}||\vec{b}|}$. [3]

- b) Find the general value solution for $\sin 2x \cdot \tan x + 1 = \sin 2x + \tan x$ [2]

15. From the following data:

	Price (Rs.)	Demand of commodity
Arithmetic mean	36	85
Standard deviation	11	8

coefficient of correlation = 0.66

- (i) Find the regression coefficients. [2]

- (ii) Find the equation of regression lines. [2]

- (iii) Estimate the likely price of commodity when quantity of demanded commodity is 75. [1]

16. Using simplex method solve The following LPP:

Max $z = 3x + 5y$

Subject to the constraints: $x + 2y \leq 20$, $x + y \leq 16$; $x, y \geq 0$ [5]

17. a) Using definition, find the derivative of $\tan^{-1} x$ [3]

- b) Find the equation of Tangent and normal to the curve $x^2 - y^2 = 7$ at (4, 3). [2]

18. Let $y = f(x)$ be any function. Present graphically, the differential dx of the independent variable x and dy of the dependent variable y . If x be length of sides of a square such that its area be given by $y = x^2$, compute dx and dy when x changes from 2 to 2.01. [3+2]

19. a) A cricket ball of mass 150 g is moving with the velocity of 12 ms^{-1} and is hit by the bat so that the ball is turned back with a velocity of 20 ms^{-1} . The force blow acts for 0.01 s. Find the impulse and the average force exerted on the ball by the bat. [3]
- b) Find the velocity and direction of projection of shot which passes in a horizontal direction just over the top a wall which is 250m off and 125m high. ($g = 9.8 \text{ ms}^{-2}$) [2]

OR

The following table shows the inter-relationship between the product of to industries A and B in a year

Industry	A	B	Consumer's Demand	Total Output
A	45	50	55	250
B	30	40	30	100

- i) Find the coefficient of output matrix. [3]
 ii) Find the gross output of the two industries A and B to satisfy the demands of 72 and 48 units. [2]

GROUP – C

Attempt all questions.

[3×8=24]

20. a) If three consecutive coefficients in the expansion of $(1 + x)^n$ be 45, 120, 210 then find n. [4]

- b) Write the expansion of e^x . Using it prove that:

$$\frac{1 + \frac{1}{2!} + \frac{1}{4!} + \frac{1}{6!} + \dots}{\frac{1}{1!} + \frac{1}{3!} + \frac{1}{5!} + \dots} = \frac{e^2 + 1}{e^2 - 1} \quad [1+3]$$

21. a) Define ellipse. Find the co-ordinate of centre, vertices, eccentricity foci and the equation of the directrix of the ellipse

$$x^2 + 5y^2 + 3x - 10y - \frac{71}{4} = 0 \quad [5]$$

- b) Find the direction cosines of line which is perpendicular to the lines whose direction cosines are proportional to 3, -1, 1 and -3, 2, 4 [3]

22. a) Evaluate the following integrals:

$$\text{i) } \int \frac{dx}{\sqrt{1 + e^{-2x}}} \quad \text{ii) } \int \frac{dx}{x - \sqrt{x^2 - 4}} \quad [2+2]$$

- b) Solve the differential equations:

$$\text{i) } \frac{dy}{dx} + \frac{1 + \cos 2y}{1 - \cos 2x} = 0 \quad \text{ii) } y(1 + xy) dx - x dy = 0 \quad [2+2]$$



Model Questions – 2078 (2022)

Subject: Physics (1021)

Full Marks: 75

Time: 3 hrs.

SET A

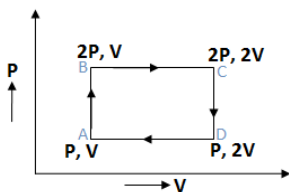
Attempt all questions.

GROUP – A

Circle the best alternative to the following questions.

[11×1=11]

1. The moment of inertia of a body of mass M about a given axis is I . What is the radius of gyration?
a) $\frac{I}{M}$ b) IM c) $\sqrt{\frac{I}{M}}$ d) \sqrt{IM}
2. Two simple harmonic motion are given by $x_1 = a \sin(\omega t)$ and $x_2 = b \cos(\omega t)$. The phase difference between them, in radians, is:
a) π b) $\frac{\pi}{2}$ c) $\frac{\pi}{4}$ d) 0
3. What fraction of a wooden raft of density 0.8 g/cc will be outside the sea water of density 1.2 g/cc?
a) $\frac{2}{3}$ b) $\frac{1}{2}$ c) $\frac{2}{5}$ d) $\frac{1}{3}$
4. An ideal gas undergoes a reversible isothermal expansion from a state i to f. The change in entropy $\Delta S(i \rightarrow f)$ is
a) 0 b) >0
c) <0 d) not defined for this process
5. An ideal mono-atomic gas is taken round the cycle ABCDA as shown in figure. The work done during the cycle is



- a) PV b) $2PV$ c) $PV/2$ d) ZERO

6. Which one of the following represents progressive wave?
 - a) $y = A \sin Kx$
 - b) $y = A \sin t$
 - c) $y = A \cos (at - bx + c)$
 - d) none of these
7. Laplace correction makes use of which of the following process?
 - a) Isobaric
 - b) Isothermal
 - c) Adiabatic
 - d) Isochoric
8. A transformer core is laminate to
 - a) Reduce hysteresis losses.
 - b) Reduce eddy current losses.
 - c) Reduce copper losses.
 - d) Reduce all above losses.
9. The thermocouple cannot measure the temperature:
 - a) Between cold junction temperature and neutral temperature
 - b) Between neutral temperature and inversion temperature
 - c) Between cold junction temperature and inversion temperature
 - d) Just above the cold junction temperature
10. Curie temperature is the temperature above which
 - a) A ferromagnetic substance becomes paramagnetic.
 - b) A paramagnetic substance becomes ferromagnetic.
 - c) A paramagnetic substance becomes diamagnetic.
 - d) A ferromagnetic substance becomes diamagnetic.
11. Which of the following particle is considered as God particle?
 - a) Neutrino
 - b) Higgs Boson
 - c) Meson
 - d) Positron

GROUP – B

Answer the following questions.

[8×5 = 40]

1. a) What is couple of force? Give an example applied in your home. [1+1]
 b) Obtain the moment of inertia of a thin rod about an axis passing through its centre and perpendicular to its plane. [3]
2. a) Giving an example of each type, compare between periodic and simple harmonic motions. [2]
 b) A certain simple pendulum has a period on the earth of 1.60 s. What is its period on the surface of Mars, where $g = 3.71 \text{ m/s}^2$? [3]

OR

- a) Define Capillarity. Why undergarments are usually made of cotton? [1+1]
- b) What correction is to be made in a barometer reading if the barometer has a glass tube of internal diameter 3mm ? (Surface tension of mercury = 0.545 Nm^{-1} , density of mercury = $13.6 \times 10^3 \text{ kgm}^{-3}$; angle of contact = 140°) [3]
3. a) When we blow air with our mouth narrow open, we feel the air cool. When the mouth is made wide open, we feel the air warm. What are the thermodynamic processes involved in these processes? Explain. [2]
- b) In case of petrol engine, in which strokes do the adiabatic processes occur? [1]
- c) In a petrol engine, the rate of production of heat due to the combustion of petrol is $7.45 \times 10^5 \text{ cal/hr}$. The efficiency of the engine is 30%. Calculate the power of the engine. [2]
4. a) State and explain Huygen's principle [2]
- b) Verify the laws of refraction of light by using Huygen's principle. [3]

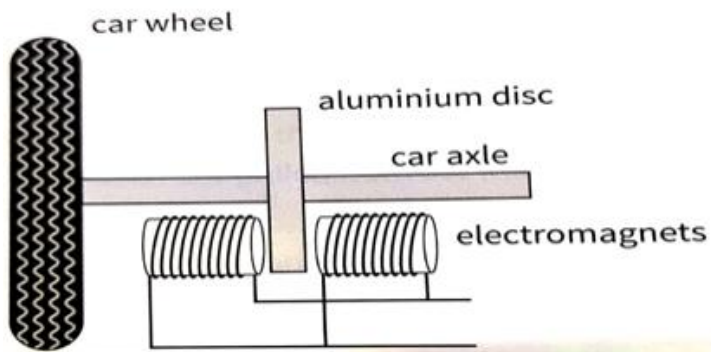
OR

- a) Compare between interference & diffraction of light. [2]
- b) A plane transmission grating gives an angle of diffraction of line at 30° in the second order. Find the number of lines per cm on the grating if the wavelength of light used is $5 \times 10^{-5} \text{ cm}$. [3]
5. A shunt is used to convert a galvanometer of resistance G into an ammeter.
- a) A shunt must have very low resistance. Why? [1]
- b) To increase the range of ammeter n times, what value of shunt is required? [1]
- c) If the galvanometer shows the deflection out of range in the experiment, what conclusion can be drawn? [1]
- d) While converting the galvanometer of resistance 10Ω into an ammeter in the range 1A, a very small resistance 0.1Ω in parallel and a resistor

89.9 Ω in series are required with the galvanometer. What is full scale reading in the galvanometer? [2]

OR

- a) An alternating emf is applied across a capacitor. Justify that current in it leads to the applied emf by phase angle $\frac{\pi}{2}$. [3]
 - b) Write the equation of house-hold AC supply in Nepal (i.e. 220 V and 50 Hz). [2]
6. a) State Lenz's law and explain how you would use a coil to demonstrate the law. [3]
- b) A vehicle brake consists of an aluminium disc attached to a car axle as in figure. Electromagnets cause an emf to be induced in the disc. Explain how the induction of an emf causes the wheel to slow down. [2]



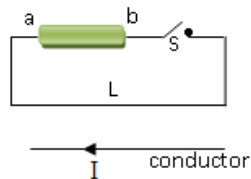
7. a) Can X-ray diffraction experiment be performed by an ordinary grating? Justify. [2]
- b) The spacing of atomic planes in a crystal is $1.1 \times 10^{-10}\text{m}$ and when a monochromatic beam of X-rays incident on them at a glancing angle of 5.0° , a first order image is produced. Calculate the wavelength. What is the glancing angle for a second order range? Interpret result. [3]
8. a) A nucleus contains no electrons, yet it ejects them. Explain. [2]
- b) A radioactive source has decayed to one tenth of one percent of its initial activity in 100 days. What is its half life period? [3]

GROUP – C

Give long answer to the following questions.

[3 × 8 = 24]

9. a) In the circuit shown in fig, ab is battery. When switch S is suddenly closed, the wire L is pulled towards the lower conductor parallel with the wire carrying current I.



- i. Which (a or b) is the positive terminal of the battery? Explain. [2]
 - ii. Is the wire pulled towards the conductor if it is not parallel with the conductor? Justify it. [1]
- b) A closed curve encircles several conductors. The line integral around this curve is $3.83 \times 10^{-4} \text{ Tm}$. What is the net current enclosed in the conductor? [1]
- c) A current carrying solenoid produces magnetic field along its axis. Does the magnetic field at its center change if the iron rod is inserted inside it? If yes, by which factor? Explain. [2]
- d) In Hall effect experiment, is it possible that no transverse potential difference will be observed? Under what circumstances might this happen? [2]
10. a) What is Doppler's effect? Explain. [2]
- b) Find an expression for change in apparent frequency heard by observer while a source is moving towards and away from stationary observer. [3]
- c) A car sounding a horn and producing note of 500 Hz, approaches and then passes a stationary observer at a steady speed of 20 m/s. Calculate the change in frequency heard by the observer [velocity of sound is 340 m/s] [3]
11. a) i. What do you mean by quantization of charge? [1]
- ii. The terminal velocity of the drop will be changed in the Millikan's oil drop experiment if more intense X ray is passed. Why? [2]
- b) In the absence of electric field, the drop will have certain velocity. When electric field is switched on and X-ray is passed, what

observation on the different terminal speeds of the drop, suggest about the quantization of charge? [2]

- c) i. In a Millikan's apparatus, an oil drop of weight 2.0×10^{-15} kg acquires two surplus electrons. When a p.d. of 620 V is applied between the pair of horizontal metallic plates, the drop is in equilibrium. Find the distance between the plates. [2]
- ii. Sketch the nature of force involving in the process in part c(i) showing their proper direction. [1]

OR,

In the photoelectric effect, when electromagnetic radiation strikes the surface of a metal, electrons leave the metal surface. However, when radiation of less than a certain frequency strikes the surface, it is observed that there is no emission of electrons.

- a) i. Explain why there is no emission of an electron if the frequency is too low. [2]
- ii. State two other pieces of evidence provided by the photoelectric effect which suggest that electromagnetic radiation has particle properties. [1]
- b) i. The work function of the metal is 3.8 eV. Calculate the minimum frequency of electromagnetic radiation that causes photoelectric emission. [2]
- ii. An electron at the surface of the metal is emitted with a kinetic energy of 4.5×10^{-19} J. Calculate the energy of the incident photon in eV. [2]
- c) Mention any two applications of photo-electric effect in our daily life. [1]



SET B

Attempt all questions.

GROUP – A

Circle the best alternative to the following questions.

[11x 1 = 11]

1. When torque acting upon a system is zero, which of the following will be constant?
 - a) Force
 - b) Linear momentum
 - c) Angular momentum
 - d) Impulse
2. A hole is bored in the earth along its diameter. When a ball is dropped from its one end,
 - a) it remains stationary.
 - b) it moves and stops at the centre.
 - c) it exhibits SHM.
 - d) it comes out from the other end.
3. If the surface tension of a soap solution is T , what is the work done in blooming a soap bubble of radius r ?
 - a) $\pi r^2 T$
 - b) $2\pi r^2 T$
 - c) $4\pi r^2 T$
 - d) $8\pi r^2 T$
4. A Carnot's cycle contains
 - a) Two isothermal processes only
 - b) Two adiabatic processes only
 - c) Two isothermal processes and two adiabatic processes
 - d) Two isothermal processes and two isobaric processes
5. First law of thermodynamics is the law of conservation of
 - a) Mass
 - b) energy
 - c) momentum
 - d) heat
6. Light waves are transverse because they
 - a) get reflected
 - b) get refracted
 - c) get polarized
 - d) do not get polarized

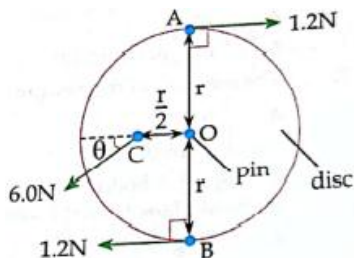
7. Speed of sound in a gas depends on
 - a) temperature and pressure
 - b) surface area and volume
 - c) temperature and composition
 - d) composition and surface area
8. Three charged particles H^+ , He^+ and O^+ moving with the same energy enter normally in a uniform magnetic field. Then,
 - a) H^+ deflects most
 - b) H^+ and He^+ deflect equally
 - c) He^+ deflect least
 - d) all deflect equally
9. The Cold Junction of a thermocouple is maintained at $10^\circ C$. No thermos emf is developed when the junction is maintained at $530^\circ C$, then the neutral temperature is:
 - a) $520^\circ C$
 - b) $540^\circ C$
 - c) $270^\circ C$
 - d) $265^\circ C$
10. Current in the LCR circuit becomes extremely large when
 - a) Frequency of AC supply is increased.
 - b) Frequency of AC supply is decreased.
 - c) Inductive reactance becomes equal to capacitive reactance.
 - d) Inductance becomes equal to capacitance
11. The momentum of a photon of wavelength λ is
 - a) $h\lambda$
 - b) h/λ
 - c) λ/h
 - d) $h/c\lambda$

GROUP – B

Answer the following questions.

[8 × 5 = 40]

1. a) Define the torque of a couple. [1]
 - b) A thin disc of radius r is supported at its center O by a pin. The disc is supported so that it is vertical. Three forces act in the plane of the disc, as shown in Fig.



Two horizontal and opposite forces, each of magnitude 1.2 N , act at points A and B on the edge of the disc. A force of 6.0 N , at an angle θ below the horizontal, acts on the midpoint C of a radial line of the disc, as shown in Fig. The disc has negligible weight and is in equilibrium.

- i. State an expression, in terms of r , for the torque of the couple due to the forces at A and B acting on the disc. [1]
 - ii. Friction between the disc and the pin is negligible. Determine the angle θ . [2]
 - iii. State the magnitude of the force of the pin on the disc. [1]
2. a) Write two differences between viscous force and Solid friction. [2]
 - b) What is the magnitude and direction of the terminal velocity when an air bubble of 1 mm in diameter rises in a liquid of viscosity 150 centipoise and density 0.9 gcm^{-3} ? ($g = 981\text{ in cgs}$) [3]
 3. a) Why don't we obtain 100% efficiency in Carnot's engine? [2]
 - b) A Carnot's engine has 50% efficiency with sink at 9°C . By how many degrees should temperature of source be increased in order to raise the efficiency to 70% ? [3]

OR

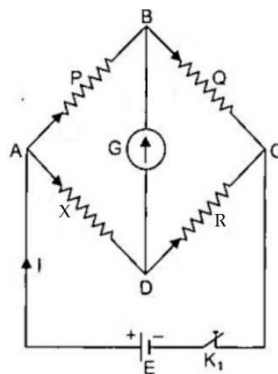
- a) What is an isothermal process? Derive the expression for the work done in isothermal process. [1+3]
 - b) Can work be done by the system without changing its volume?[1]
4. a) Write down purpose of performing Young's Double Slits Experiment. [1]
 - b) i. Show that the bright and dark fringes are equally spaced in Young's Double Slits Experiment. [3]
 - ii. What will be the effect on the fringe width if the double slit experiment is performed in water? [1]

5. a) What is wattless current?
- b) An alternating current having peak value 14 A is used to heat a metal wire. To produce the same heating effect in equal time what constant current that should be applied on the wire?
- c) Find the time required for 50 Hz alternating current to reach its value from zero to rms value. [2]

6. A Wheatstone Bridge circuit is shown in fig in which four resistances and galvanometer are connected. Resistances P, R and Q are known and X is unknown.

- a) Define Wheatstone bridge and write its one application. [1]

- b) While doing experiment, Current flows through the circuit, through all resistors and also through the galvanometer. What is the condition of bridge?



- i. If current flows from B to D through the galvanometer and vice versa? [1]

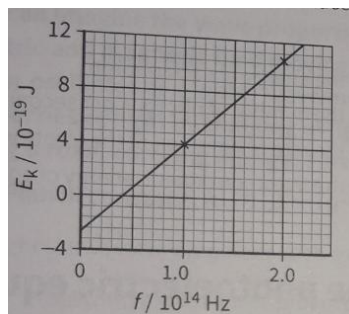
- ii. If no current flows though the galvanometer. Is this condition useful in the given fig, how? [2]

- c) What happens in the sensitivity of bridge if the value of P is made very large? [1]

7. a) What do you mean by specific charge of an electron? Is its value a universal constant for an electron? [1]
- b) The value of specific charge (e/m) is constant for cathode rays (or electrons) but not for positive rays. Why? [2]
- c) In an evacuated tube electrons are accelerated from rest through a potential difference of 3600 V and then travel in a narrow beam through a field free space before entering a uniform magnetic field of $2 \times 10^{-3} \text{ T}$, the flux lines of which are perpendicular to the beam. In the magnetic field the electrons describe a circular arc of radius 0.1 m, calculate e/m of the electron. [2]

OR

- a) This graph shows the variation with frequency f of the maximum kinetic energy E_k of the electrons emitted from the surface of a metal: [3]



i. Use the photoelectric equation to show that the gradient of the graph is equal to Planck's constant.

ii. Obtain a value for Planck's constant from the graph.

iii. State how the work function energy can be obtained from the graph.

b) Obtain a value for the work function energy. [1]

c) Imagine that the graph is redrawn for a metal with a smaller work function. State how the gradient and intercept of the new graph compare with the old graph. [1]

8. a) i. What is potential barrier? [1]

ii. What is the effect of temperature on the potential barrier of a diode? [2]

b) Is it possible to measure barrier potential of junction diode by using sensitive voltmeter? [2]

GROUP – C

Give the long answer to the following questions. [3 x 8 =24]

9. a) What do you mean by intensity of sound ? [2]

b) Prove that the intensity of sound is directly proportional to square of amplitude [3]

c) A baby's mouth is 30 cm from her father's ear and 1.50 m from her mother's ear. What is the difference between the sound intensity level heard by the father and by the mother? [3]

OR,

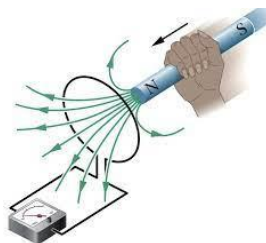
a) What do you mean by diffraction of light? Mention the types of diffraction pattern. [2]

b) In diffraction through single slit, the width of central maxima is twice of width of first maxima. Prove it. [4]

- c) What happens to the width of central diffraction pattern when the experimental setup is emerged in water? [2]

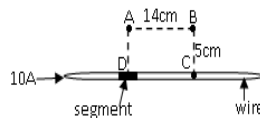
10. An ammeter registers a current in the wire loop when magnet is moving with respect to the loop.

- a) Name the current thus developed in the loop wire. [1]
 b) How can you find the direction of current developed in the loop wire? [1]
 c) The magnetic flux through a coil is varying according to the relation, $\phi = (4t^3 + 5t^2 + 8t - 5)$ Weber, calculate the induced current through the coil at $t = 2$ sec if the resistance of the coil is 3.1Ω . [3]
 d) Write the working principle of transformer. Suggest any two ideas to reduce the losses in transformer. [1 + 2]



OR.

- a) Write one significant difference between Bio-Savart's law and Ampere's law. [1]
 b) A straight wire carries a 10A current. ABCD is a rectangle with point D in the middle of a 1.1 mm segment of the wire as shown in figure.
 i. Find the magnetic field at point A due to this segment. [1]
 ii. If the wire is made semi-infinite, obtain the expression of magnetic field at any point P at minimum distance 'a' from the wire. [1]
 iii. Sketch the graph for the variation of the magnetic field B due to the whole wire with the distance. [1]
 c) What is the physical significance of radial magnetic field in the moving coil galvanometer? [2]
 d) A wooden ring whose mean diameter is 14cm is wound with a closely spaced toroidal windings of 600 turns. Compute the magnitude of magnetic field at the center of the cross section of the windings when the current in the windings is 0.65A. [2]



11. Electrons are known to show wave properties, with a wavelength given by the de Broglie equation.

a) State the de-Broglie equation in words. [1]

b) i. Show that the wavelength of an electron of kinetic energy E is

given by the equation: $\lambda = \frac{h}{\sqrt{2mE}}$, where m is the mass of the

electron. [2]

ii. Sketch nature of graphical relationship between λ & E for an electron. [1]

c) Calculate the de-Broglie wavelength of an electron accelerated through a p.d. of 2.0 kV. [2]

d) The electrons in *part c* are passed through a crystal structure and diffract. Explain why the electrons are diffracted? [2]

OR,

Iodine -131 ($^{53}\text{I}^{131}$) is a radioactive isotope with a decay constant of $9.9 \times 10^{-7} \text{ s}^{-1}$.

a) State what is meant by: i. radioactive ii. decay constant. [2]

b) Obtain a relation between half life and decay constant. [3]

c) i. Some water becomes contaminated with iodine-131. The activity of the iodine – 131 in 1.0kg of water is 560 Bq. Determine the number of iodine-131 atoms in 1.0kg of water. [1]

ii. Regulations require that the activity of iodine -131 in 1.0kg of water is to be less than 170 Bq. Calculate the time, in days, for the activity of the contaminated water in (i) to be reduced to 170 Bq. [2]



SET C

Attempt all questions.

GROUP – A

Circle the best alternative to the following questions.

[11 × 1 = 11]

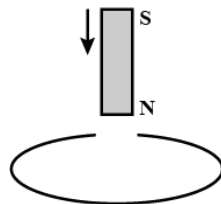
- The spokes are used in bicycle wheel to
 - ↑ frictional force
 - ↓ frictional force
 - ↑ moment of inertia
 - ↑ angular momentum
 - Radius of Gyration of an uniform rod about an axis through its middle is
 - $L/(3)^{1/2}$
 - $L/(8)^{1/2}$
 - $L/(12)^{1/2}$
 - $L/(2)^{1/2}$
 - Viscosity of liquid and gases, with increase in temperature.
 - decreases and increases
 - increases
 - increases and decreases
 - decreases
 - In pressure-volume diagram given below, the isochoric, isothermal, isobaric and isentropic path respectively are
 - BA, AD, DC, CB
 - DC, CB, BA, AD
 - AB, BC, CD, DA
 - CD, DA, AB, BC
-
- A gas is initially at 27°C. It is compressed adiabatically from 27 litres to 8 litres. The rise in temperature is ($\gamma = 1.4$)
 - 402°C
 - 215°C
 - 675°C
 - 273°C
 - A parallel beam of light of wavelength 450 nm passes through a long slit of width 0.2 mm. The angular divergence in which most of the light is diffracted is
 - 0.29°
 - 0.146°
 - 0.257°
 - 0.292°
 - The expression relating polarizing angle and refractive index is
 - $\mu \sin \theta_p = 1$
 - $\mu \cot \theta_p = 1$
 - $\mu \tan \theta_p = 1$
 - $\mu \cos \theta_p = 1$

8. If a wire carrying current 'I' is bent to two arms making the right angle between them then the magnetic field intensity 'B' at the distance 'a' from both arms is:

- a) $\frac{\mu_0 I}{4\pi a}$ b) $\frac{\mu_0 I}{2\pi a}$
 c) $\frac{\mu_0 I}{\sqrt{2}4\pi a}$ d) $\frac{\mu_0 I}{\sqrt{2}2\pi a}$

9. A copper ring having cut such as not to form a complete loop is held horizontally and a bar magnet is dropped through the ring with its length along the axis of ring, then acceleration of falling magnet is

- a) g
 b) less than g.
 c) more than g.
 d) zero.



10. Area of hysteresis curve indicates
 a) Retentivity
 b) Coercivity
 c) Loss of energy per cycle.
 d) All of the above.
11. The value of specific charge (e/m) of an electron is
 a) $1.6 \times 10^{-19} \text{ C/kg}$
 b) $1.77 \times 10^{11} \text{ C/kg}$
 c) $1.77 \times 10^{-11} \text{ C/kg}$
 d) $9.1 \times 10^{-31} \text{ C/kg}$

GROUP – B

Answer the following questions.

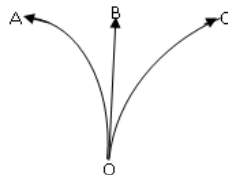
[8 × 5 = 40]

1. a) State, by reference to displacement, what is meant by simple harmonic motion ? [2]
 b) Derive an expression for the time period of the simple pendulum if its motion is simple harmonic. [3]
2. a) Define adhesive and cohesive forces with an example each. [2]
 b) Show that the surface tension of a liquid is numerically equal to its surface energy. [3]
3. a) Why does a gas have two specific heat capacities? Explain. [2]

- b) Establish the relation between C_p and C_v for a gas. [3]

OR

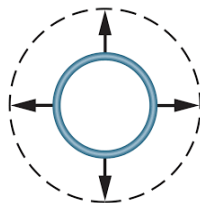
- a) We cannot convert heat energy to mechanical work without creating a temperature difference. Explain on the basis of second law of thermodynamics. [2]
- b) Explain the working of petrol engine with PV diagram. [3]
4. a) How stationary wave is formed? Explain. [2]
- b) Prove that the distance between any two consecutive nodes or antinodes is $\lambda/2$. [3]
5. a) A neutron, a proton and an electron enter vertically upward with equal velocity in a region of the uniform magnetic field applied inward normal to the plane of paper as shown in fig.



- i. Which particles go along OA and OC, why? [2]
- ii. What physical phenomenon can be concluded from the particle moving along OB? [1]
- b) When a charge particle moves in a magnetic field, magnetic force $F = Bqv\sin\theta$ acts on it. A conductor contains large number of charges, then obtain the expression of magnetic force on the conductor from above equation. [2]

OR

- a) If the circular conductor shown in figure undergoes thermal expansion while it is in uniform magnetic field, a current is induced clockwise around it. Is the magnetic field directed into or out of the page? [1]
- b) Explain how the concept of mutual inductance is used in the working principle of transformer. [2]
- c) Calculate the value of inductance needed to store 1 kWh of energy in a coil carrying 200 A current. [2]
6. a) What do you mean by phasor diagram? Draw phasor diagram for an AC circuit containing inductor and resistor connected in series.
- b) A circuit consists of an inductor of $200\ \mu\text{H}$ and resistance of $10\ \Omega$ in series with a variable capacitor and a $0.10\ \text{V}$ (rms), $1.0\ \text{MHz}$ supply.



Calculate (i) capacitance to give resonance (ii) the quality factor of circuit at resonance. [3]

7. a) Can one photon eject more than one electron at a time? Explain. [2]
- b) Copper and sodium have work function 4.5eV and 2.0eV, respectively. Radiation of wave length 4000\AA fall on the two surfaces. Can there be photoelectric emission in both metals? [2]
- c) Explain, how is photoelectric effect used in fire alarms? [1]
8. a) i. What is a logic gate? [2]
- ii. Write down the Boolean expression for AND, OR and NOT gate? [2]
- b) How is a NOT gate different from AND or OR gate? Can NOT gate be made from junction diodes? [2]
- c) The output of two-input AND gate is fed to a NOT gate. Give its logic symbol and write down its truth table. Identify the new logic gate formed. [1]

OR

- a) What do you meant by: i. the decay constant λ of radioactive material, ii. the half life $T_{1/2}$? [2]
- b) The decay constant and half life are related by the equation: $\lambda = \frac{0.693}{T_{1/2}}$.
The half life of $^{27}\text{Co}^{60}$ is 5.26 years.
i. What do the numbers 27 & 60 represents?
ii. Calculate the decay constant of $^{27}\text{Co}^{60}$.
iii. Calculate the activity of 1.00 gm of $^{27}\text{Co}^{60}$. [Given, 60 gm of $^{27}\text{Co}^{60}$ contain 6.023×10^{23} atoms.] [3]

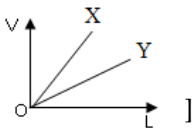
GROUP – C

Give the long answer to the following questions. [3 x 8 =24]

9. a) How plane transmission grating is formed? [2]
- b) Derive an expression for grating equation. [3]
- c) A plane transmission grating having 500 lines per mm is illuminated normally by a light source of 600 nm wavelength. How many diffraction maxima will be observed on a screen behind the grating? [3]

OR

- a) How stationary wave is formed in an organ pipe? [2]
- b) Show that all harmonics are present in open organ pipe [3]

- c) An open pipe 30 cm long and a closed pipe 23 cm long, both of the same diameter are each sounding its first overtone and these are in unison. What is the end correction of these pipes? [3]
10. a) To measure an emf of an unknown cell, a potentiometer wire of uniform cross section is used.
- Why should it be uniform cross section? [1]
 - What will be the effect in the experiment if the polarity of unknown cell is reversed? [1]
- b) The variation of potential difference V with length L in case of two potentiometers X and Y is as shown in diagram. Which one of these two will you prefer for comparing the emf's of two cell? Justify your logic.
- 
- c) In a potentiometer experiment, two primary cells are connected in series to support each other and then connected to oppose each other. The balance point for a cell, in these cases were obtained at 4m and 1m respectively. Calculate the ratio of emf of those two primary cells. [2]
- d) What is the significance of potentiometer working on the basis of null method to measure the potential difference of cell? [2]
11. a) Describe the theory of Millikan's oil drop experiment to determine the charge of an electron. [3]
- b) How does this experiment verify the quantization of charge? [2]
- c) In Millikan's oil drop apparatus, the horizontal plates are 1.5 cm apart. With the electric field switched off an oil drop is observed to fall with the steady velocity $2.5 \times 10^{-2} \text{ cm/s}$. When the field is switched on the upper plate being positive, the drop just remains stationary when the potential difference between the plates is 1500V. Calculate the radius of the drop and the number of electronic charges. (Given, density of oil = 900 kg/m^3 and viscosity of air = $1.8 \times 10^{-5} \text{ Nsm}^{-2}$, neglect air density) [3]



SET D

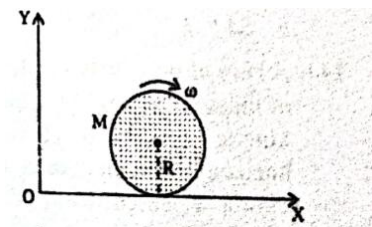
Attempt all questions.

GROUP – A

Circle the best alternative to the following questions.

[11 × 1 = 11]

1. A person standing on a rotating platform has his hands lowered. If he suddenly outstretches his arms, then angular momentum of the platform person system
 - a. Increases
 - b. Decreases
 - c. Remains constant
 - d. Becomes zero
2. An electric fan rotating initially at 300 rpm comes to rest in 10 seconds at constant angular retardation after it is switched off. The total number of rotations made by it till rest, is
 - a. 100
 - b. 50
 - c. 30
 - d. 25
3. A disc of mass M and radius R is rolling with an angular velocity ω on the horizontal plane as shown in fig. The magnitude of the angular momentum of the disc about the origin is :



- a. $\frac{1}{2}MR^2\omega$
 - b. $MR^2\omega$
 - c. $\frac{3}{2}MR^2\omega$
 - d. $2MR^2\omega$
4. Buoyancy depends on
 - a. Shape of the body
 - b. Depth
 - c. Mass of the body
 - d. Mass of the liquid displaced

5. An aeroplane of mass $3 \times 10^4 \text{ kg}$ and total wing area 120 m^2 is in level flight at some height. The difference in pressure between upper and lower surface of wing is
- $2.5 \times 10^3 \text{ N/m}^2$
 - $5 \times 10^3 \text{ N/m}^2$
 - $10 \times 10^3 \text{ N/m}^2$
 - $12.5 \times 10^3 \text{ N/m}^2$
6. According to second law of thermodynamics, an engine cannot perform in the reverse direction if it is working at the constant
- Volume
 - Pressure
 - Temperature
 - Heat
7. 1 mole of mono-atomic ideal gas is mixed with 1 mole of di-atomic ideal gas. The molar specific heat capacity of the mixture at constant volume is
- $4R$
 - $2R$
 - $3R/2$
 - $5R/2$
8. In meter bridge experiment, the ratio of the left gap resistance to right gap resistance is 2:3, the balance point from the left is
- 60cm
 - 50cm
 - 40cm
 - 30cm
9. To convert the galvanometer into voltmeter, the resistor used is:
- high resistance and connected in parallel with galvanometer
 - high resistance and connected in series with galvanometer
 - low resistance and connected in parallel with galvanometer
 - low resistance and connected in series with galvanometer
10. In the given thermocouple, the minimum thermoemf is produced by
- Sb-Bi
 - Fe-Ni
 - Zn-Bi
 - Au-Mo

11. A device which converts AC into DC is
- An oscillator
 - a rectifier
 - an amplifier
 - An Zener diode

GROUP – B

Answer the following questions.

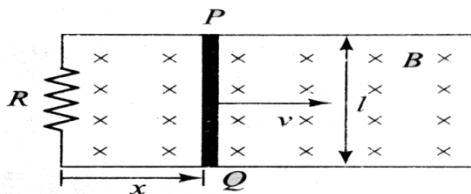
[8 × 5 = 40]

- Why does a refrigerator consumes more power in summer than in winter to cool the same quantity of food by same degree? [2]
 - Find out the expression for coefficient of performance of refrigerator. [3]

OR

- The internal energy of compressed gas is less than that of rarefied gas at the same temperature. Why? [2]
 - The adiabatic equation is $PV^\gamma = \text{constant}$. Starting from this equation, derive the adiabatic equation in terms of (i) temperature and volume and (ii) temperature and pressure. [3]
- Write down the differences between progressive and stationary wave. [3]
 - A wave has the equation $y = 0.02 \sin(30t - 4x)$. Find its frequency, speed and wavelength. [2]
 - We cannot hear echo in a room. Explain. [2]
 - What discrepancy was there in Newton's formula for the velocity of sound in air? What correction was made by Laplace? [1+1]
 - What is the effect of atomicity of gas on speed of sound? [1]
 - Does the value of polarizing angle depends upon colour of incident light? [2]
 - Derive an expression for Brewster's law in polarization and then state it. [2+1]
 - State Faraday's laws of electromagnetic induction. [2]

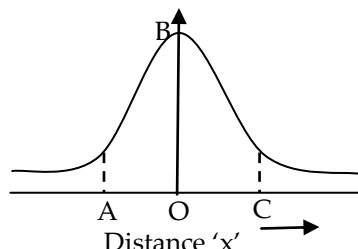
- b) Figure shows the top view of a rod that can slide without friction. The resistance 6Ω and magnetic field 2.5 T is directed perpendicularly downward into the paper. Calculate the force required to move the rod of length 1.20 m to the right at constant speed 2 m/s . [3]



6. a) The graph represents the variation of magnetic field B along the axis of a circular loop of radius R .

i. Write the appropriate equation at point O for which $x = 0$ and at point C of distance x from O .

ii. Also discuss the nature of magnetic fields in both cases.

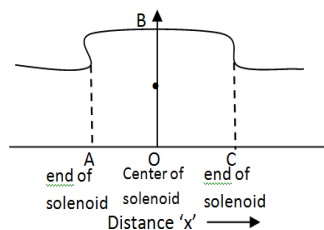


[1]

- b) A vertical conductor carries a downward current of 5 A . What is the flux density due to the current at a point P 10 cm due east of conductor? If the earth's horizontal magnetic flux density has a value $4 \times 10^{-5}\text{ T}$, calculate the resultant flux density at P and its direction. [2]
- c) Stream of charged particles emitted from the sun during periods of solar activity create a disturbance in the earth's magnetic field. How does this happen? [1]

OR

- a) The graph shows the variation of the magnetic field B on the axis of the long straight solenoid with the distance x from the center O .



- i. Write the equations of magnetic field at points O and C. Also find the relation between them. [1+1]
- ii. Describe the nature of magnetic fields inside and outside of such solenoid. [1]
- b) A body is suspended through the spring balance and it measures its mass about 50kg. What physical phenomenon is concluded if the balance is connected to the source? Explain. [2]
7. a) i. An electron & proton enter a transverse electric field with the same velocity. Name the particle whose trajectory is more curved?
ii. Instead of an electron & a proton, if neutron enters normally to the electric field, what will be the nature of trajectory? [1 + 1]
- b) If they have same initial K.E. & then enter normally into an electric field, which one has path more curved? Justify. [2]
- c) Sketch nature of graph between acceleration with applied p.d. for an electron moving in uniform electric field. [1]

OR,

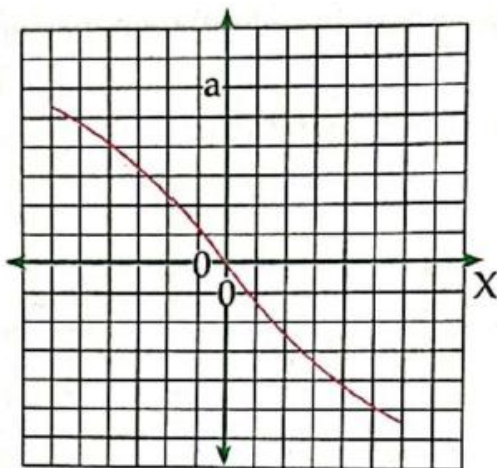
- a) i. What is photon?
ii. Do all photons have same mass? Explain. [2]
- b) Does the mass of a body change when it emits or absorbs photons? Explain. [2]
- c) Calculate the energy of a photon whose (i) frequency is 1000 KHz. Also express the energy of the photon in eV in each case. [Given, $1\text{eV} = 1.6 \times 10^{-19} \text{ J}$, $h = 6.62 \times 10^{-34} \text{ Js}$] [1]
8. a) Does Newton's law of universal gravitation provide existence of gravitational wave? [1]
- b) What are gravitational waves? Explain. [2]
- c) What are the causes of gravitational waves? Mention. [2]

GROUP – C

Give long answer to the following questions. [3 × 8 = 24]

9. a) Define resonance. [1]
- b) What happens to the period of oscillation of a simple pendulum if its bob is made up of ice? Explain. [2]
- c) A mass is undergoing oscillation in a vertical plane.

The variation with displacement x and acceleration a of the mass is shown in figure.



State two reasons why motion of the mass is not simple harmonic. [2]

- d) A tunnel is dug along the diameter of earth. If an object is dropped through one end. How much time would it take to reach other end? ($g = 10$ in SI unit and $R = 6380$ km) [3]

OR

- a) Give the concept of surface tension with an example. [2]
- b) Why does hot soup taste better than cold one? Explain. [2]
- c) A rectangular plate of dimensions 6 cm by 4 cm and thickness 2 mm is placed with its largest face flat on the surface of water.
 - i. Calculate the downward force on the plate due to surface tension assuming zero angle of contact. [2]
 - ii. What is the downward force if the plate is placed vertical so that its longest side just touches the water? (Surface tension of water = 7×10^{-2} N/m) [2]

10. a) What do you mean by impedance of LCR circuit? Write the expression for it. What is the condition for resonance? [1 + 1 + 1]
- b) A 220 V AC is more dangerous than 220 V DC. Why? [2]
 - c) The wiring for a refrigerator contains a starter capacitor. A voltage of amplitude 170 V and frequency 60 Hz is applied across the capacitor is

to produce a current amplitude of 0.85 A through the capacitor. What capacitance C is required? [3]

11. a) What are Bohr's postulates of hydrogen atom? [2]
- b) i. In hydrogen atom we have only one electron, but its emission spectrum shows many lines. Explain.
- ii. If an electron in Hydrogen atom jumps from $n = 1$ to $n = 4$ orbit, what would be the maximum number of photons emitted?
- iii. In the hydrogen atoms, the electrons make transitions from $n = 1$ to $n = 4$. What will be the maximum number of emission lines? [3]
- c) Rydberg's constant is equal to $1.09678 \times 10^7 \text{m}^{-1}$. Calculate the wavelength of the first number of Balmer series. [3]



Attempt all questions.

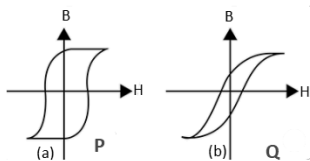
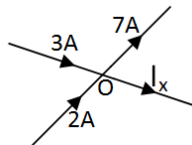
GROUP – A

Circle the best alternative to the following questions.

[11 × 1 = 11]

1. In which process the internal energy of the system remains constant?
 - a) Adiabatic process
 - b) Isochoric process
 - c) Isothermal process
 - d) Isobaric process
2. The door of the refrigerator is kept open. Which of the following is true?
 - a) Room is cooled.
 - b) Room is heated
 - c) Room is neither heated nor cooled
 - d) Room will be cooled in summer and heated in winter
3. There is no net transmission of energy in:
 - a) electromagnetic wave
 - b) Simple harmonic wave
 - c) Longitudinal wave
 - d) Stationary waves
4. The speed of sound in air is 350 m/s. The fundamental frequency of an open pipe of length 50 cm is
 - a) 100 Hz
 - b) 250 Hz
 - c) 350 Hz
 - d) 400 Hz
5. A weight of 5 Kg required to produce the fundamental frequency of a sonometer wire. What weight is required to produce its octave?
 - a) 10 Kgt
 - b) 20 Kg wt
 - c) 30 Kg wt
 - d) 40 Kg wt

6. If two light waves having same frequency have intensity ratio 4:1 and they interfere the ratio of maximum to minimum intensity will be
- 9:1
 - 3:1
 - 25:9
 - 16:25
7. The angle of incidence at which reflected light is totally polarized for reflection from air to glass (μ) is
- $\sin^{-1}(\mu)$
 - $\sin^{-1}\left(\frac{1}{\mu}\right)$
 - $\tan^{-1}\left(\frac{1}{\mu}\right)$
 - $\tan^{-1}(\mu)$
8. From the given diagram, Using Kirchhoff's law, the value and actual direction of current I_x is:
- 2A and towards O
 - 2A and same as in figure
 - 2A and same as in figure
 - 2A and towards O
9. B-H curve of the sample P and Q of iron are shown in figure, then we may conclude that



- Both P and Q are suitable for making permanent magnet
- P is suitable for making permanent magnet and Q is for making electromagnet.
- P is suitable for making electromagnet and Q for permanent magnet.
- Both P and Q are suitable for making electromagnet.

10. An electron is moving along positive X-direction and the magnetic field is along positive Y-direction. Then the motion of the electron is:
- Straight
 - Circular motion in XY
 - Circular motion in YZ
 - Circular motion in XZ
11. The ratio of the radius of the Bohr's first orbit to that of second orbit is
- 2:1
 - 4:1
 - 1:4
 - 1:8

GROUP – B

Answer the following:

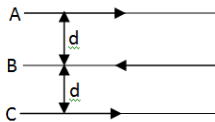
[8×5 = 40]

- State Bernoulli's Theorem and Write one application . [1+1]
 - If winds blows at 30 m/s over the house, what is the net force on the roof if its area is 300 m^2 . (Density of air = 1.29 kgm^{-3}) [3]
- What happens to the mileage per litre of a diesel vehicle when it moves from a hot Terai region to colder Mustang? Explain. [2]
 - A diesel engine performs 2200J of mechanical work and discards 4300J of heat in each cycle. What is the efficiency of the engine? [3]
- What is pressure amplitude? [2]
 - Show that the pressure amplitude is directly proportional to displacement amplitude [3]
- Show that only odd harmonics are present in closed organ pipe. [3]
 - Define overtone and harmonic. [2]

OR,

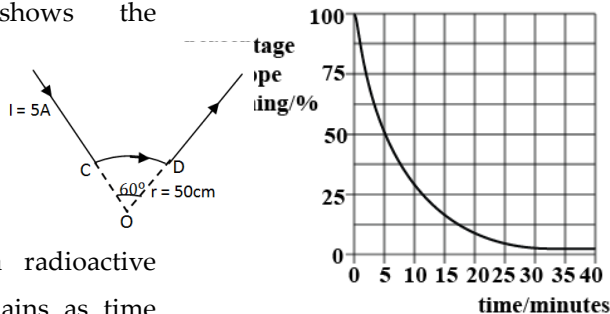
- Compare between Threshold of hearing and threshold of pain? [2]
 - Establish the relation between intensity and loudness of sound. [3]
- Distinguish the dia and para-magnetic substances on the basis of susceptibility. [2]

- b) Discuss the relationship between relative permeability and susceptibility. [3]
6. a) Define one ampere current due to force between two current carrying parallel conductor. [1]
- b) Three parallel wires A, B & C each carry current I in the directions



shown in figure. If the separation between adjacent wires is d , then write the expression of the magnetic force per unit length on wire A due to current in the wire B and C. [2]

- c) In the given figure, r be the radius of circular segment and I be the current. Find the magnetic field at point O due the current. [2]
7. a) Define the terms half life and mean life of a radioactive substance. What is relationship between them? [2]
- b) The graph shows the



percentage of a radioactive isotope that remains as time passes. A student measures the initial rate of emission of this isotope as 40000 emissions per second.

- What is the value of Half-life of given radio-active substance? [1]
- Determine the average life time of given radioactivity material. [1]
- How long does it take for the rate of emission to fall to 5000 emissions per second? [1]

8. a) i. What is Zener diode? [1]
 ii. What is the necessity of reverse biasing in Zener diode? [1]
 b) Draw a circuit diagram for the use of Zener diode as voltage regulator? Describe its working. [3]

GROUP – C

Give long answer to the following questions: [3×8 =24]

9. a) Define moment of inertia of rigid body in terms of K.E. [2]
 b) Derive an expression for kinetic energy of a rolling body. [3]
 c) A disc having moment of inertia 0.1 kg m^2 about its centre and radius 0.2 m is released from a plane inclined at 30° to the horizontal. Calculate the angular velocity after it has rolled 2 m down the plane if its mass is 5 kg . [3]

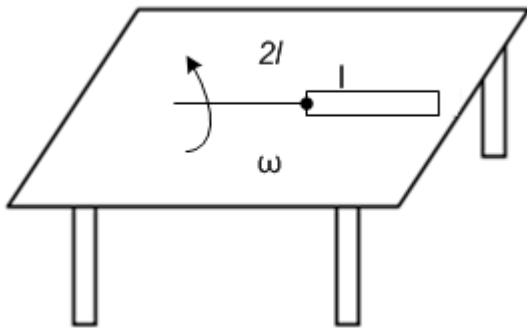
OR

- a) (i) State Stoke's law of viscosity. [1]
 (ii) Draw the graph representing the variation between terminal velocity and time. [1]
 b) Derive an expression of coefficient of viscosity by using Stokes law. [3]
 c) Write an application of Stoke's law related in your daily life. [1]
 d) What is the velocity of surface layer of water in a river, if the river is 2.5 m deep and shearing stress between the horizontal layers of water is $2 \times 10^{-3} \text{ Nm}^{-2}$ ($\eta = 10^{-3} \text{ deca-poise}$) [2]
10. a) State the relationship between peak current I_0 and rms current I_{rms} for sinusoidal alternating current. [1]
 b) The current in ampere of an alternating current is represented by the relation: $I = 2 \sin(50\pi t)$.
 (i) What is the peak value of current? [1]
 (ii) What is the frequency of supply? [1]
 (iii) What is the RMS value of current? [1]
 c) What is the phase relationship between current and voltage in a pure inductive AC circuit? Explain with phasor diagram. [2]
 d) A 50 V , 50 Hz ac supply is connected to a resistor of resistance 40Ω in series with a solenoid whose inductance is 0.2 H . The pd between the

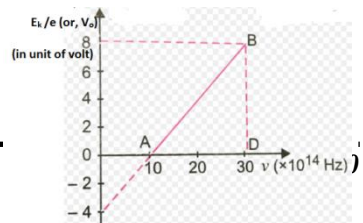
ends of resistor is found to be 20 V. What is the resistance of the wire of solenoid? [2]

OR

- a) A metallic rod of length l is tied to a non-conducting string of length $2l$ and made to rotate with angular speed ω on a horizontal table with one end of string fixed. If there is a vertical magnetic field 'B' in the region, then write the expression for emf induced across the ends of the rod. [2]



- b) Show that the energy stored in an inductor of inductance L when current I is established through it is $\frac{1}{2}LI^2$. [3]
- c) A step up transformer operates on 220V lines and its secondary supplies a current of 1A. The ratio of primary and secondary windings is 1:10. Calculate the voltage across secondary, current in the primary and output power. [3]
11. a) What is the value of Planck's constant? How can you determine its value? [2]
- b) Why, evacuated metal chamber is used in Millikan's experiment? Is it possible to carry experiment using metal chamber in normal pressure without evacuation? [2]
- c) The given graph is the experimental plot obtained in Millikan's experiment for photoelectric effect for a particular metal.



- (i) What does slope of line represent? Determine its value. [1]
- (ii) Write down value of threshold frequency & then obtain the value of work function of metal. [1]
- (iii) Is the nature of plot is found to similar for all alkali metals as in given graph? Discuss. [2]

OR

Consider a hydrogen atom in stationary state n .

- a) Find the relation between r_n and r_1 . [3]
- b) Show that the orbital period of an electron in quantum state n is $T = n^3 T_1$. [3]
- c) On average, an atom stays in the $n=2$ state for 16ns before undergoing a quantum jump to the $n=1$ state. On average, how many revolutions does the electron make before the quantum jump? [2]



Model Questions – 2078 (2022)

Subject: Chemistry (3021)

Full Marks: 75

Time: 3 hrs.

SET A

Attempt all questions.

GROUP – A

Circle the best alternative to the following questions.

[11×1=11]

- Number of moles of solute dissolved in 1000gm of water is
 - Molality
 - Molarity
 - Mole fraction
 - % (W/V)
- Enthalpy of a compound is equal to its
 - Heat of combustion
 - Heat of formation
 - Heat of solution
 - Heat of dilution
- The atomic number is changed by which type of radioactive decay?
 - β
 - α
 - γ
 - All of the above
- Which of the following compound is known as Schweizer's reagent?
 - $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$
 - CaSO_4
 - $[\text{Cu}(\text{NH}_3)_4]\text{SO}_4$
 - Anhydrous Copper
- Which of the following is not true regarding crystal field theory?
 - Action between metal and ligand is electrostatic
 - Ligand are treated as point charge
 - There is no orbital interaction between ligand and metal
 - Hybridization explain the shape of the complexes

6. Ether is always purified before distillation because,
 - a) It is highly poisonous in nature
 - b) It forms poisonous phosgene gas
 - c) It is converted into explosive peroxide
 - d) All of above
7. Which of the following is an organometallic compound?
 - a) CH_3ONa
 - b) CH_3SNa
 - c) CH_3MgCl
 - d) All of the above
8. Solubility of a salt M_2X_3 is "x" moleL⁻¹. The solubility product of the salt will be
 - a) x^5
 - b) $16x^2$
 - c) $96x^5$
 - d) $108x^5$
9. Alcoholysis of acid anhydride gives
 - a) Carboxylic acid and ester
 - b) Ester and alcohol
 - c) Carboxylic acid and alcohol
 - d) Only ester
10. An organic compound 'A' reacts with nitrous acid to form N - Methyl - N - nitrosoethanamine. A can be obtained by the reduction of
 - a) Propanenitrile
 - b) Methylisocyanate
 - c) Ethylisocyanide
 - d) Propylisocyanide
11. Given, $E^0_{\text{Cr}/\text{Cr}^{+3}} = 0.74 \text{ V}$, $E^0_{\text{Fe}^{+2}/\text{Fe}} = -0.42 \text{ V}$. The standard cellpotential for the cell $\text{Cr}/\text{Cr}^{+3} (0.1\text{M})//\text{Fe}^{+2} (0.01\text{M})/\text{Fe}$ is,
 - a) 1.14V
 - b) 0.492 V
 - c) 0.329 V
 - d) -0.26 V

GROUP – B

Give short answer to the following questions.

[8×5=40]

1. Zinc blende is the major ore of Zinc from where the metal is extracted by pyro metallurgical process.
 - a) Draw and explain vertical retort process for reduction of ZnO into Zn. [3]
 - b) Could we use sodium hydroxide to separate zinc and silver from each other? If yes how? [1]
 - c) What happens when, zinc is exposed to moist air for long time? [1]
2. We need food, clothes, medicine, dyes etc. all these compounds are obtained from either naturally or artificially. Many large compounds are synthesized from combination of small compounds under suitable conditions. Some of them are classified as polymers or drugs or dyes or fertilizers etc. So that, give the answer to the following questions.
 - a) Define polymerization.
 - b) Write the reaction involved in the preparation of polyester. [2]
 - c) What is an ideal requirement for a dye? [1]
 - d) Azobenzene is a colored compound but not a dye Explain. [1]
3. Transition elements are defined as elements that have partially filled d-orbitals.
 - a) What is d-orbital degeneracy? [1]
 - b) Give a possible reason for a fact that transition metal have high heat of atomization. [1]
 - c) A transition metal forms alloy with other transition metal easily, Explain. [1]
 - d) $K_4[Fe(CN)_6]$, Potassium hexacyanoferrate(II) is a complex salt formed by iron. Write the complex ion present in it. [1]
 - e) Why $[Ti(H_2O)_6]^{3+}$ is violet in color in $[Ti(H_2O)_6]Cl_3$, but when water molecules are removed it becomes colorless? [1]
4. The sum of the powers of concentration terms in the rate law equation is called the order of reaction.
 - a) Write the three possible rate laws for the given second order reaction. [3]
 $A + B \rightarrow \text{product}$

- b) A reaction is of first order in reactant P and second order in reactant Q.
How is the rate of reaction affected when
- Concentration of Q alone is increased 3 times. [1]
 - The concentrations of P as well as Q are doubled. [1]
5. Cement is one of the major component of construction field. Nepal have many cement factories. Limestone is a dominant raw material used for the manufacture of cement. When cement comes in contact with water, it sets to hard mass showing exothermic reaction.
- You are asked to bring 1500 tons of cement for the dam construction of 400 MW hydropower station. What type of cement do you prefer and why? [2]
 - While manufacturing the Portland cement, the % composition of MgO is not exceeded than 6%, why? [1]
 - After preparing the cement clinker it is cooled to a temperature of 60-150°C before grinding, why? [1]
 - What is the role of Fe_2O_3 in the Portland cement? [1]
6. In an organic chemistry some reactions are known as their names such reactions are called name reactions and they have great synthetic utility. Write down the reaction of the following name reactions. [5x1=5]
- Perkin condensation
 - Fehling reaction
 - Wolff-Kishner reduction
 - Clemmenson's reduction
 - Cannizzaro's reaction

Or

Give a suitable chemical reaction for the preparation of ethanoic acid from

- Ethane nitrile
- Methyl magnesium chloride
- Ethanol

Also, convert ethanoic acid to propanoic acid. [3+2]

7. An organic compound 'A' reacts with sodium metal to give hydrogen gas. The compound A on treatment with alkaline iodine forms yellow crystalline substance and on oxidation with acidified potassium dichromate forms aldehyde with molecular formula $\text{C}_2\text{H}_4\text{O}$. Identify the compound and write a chemical equation for these reactions. [5]

8. 12 gm of impure Zn is made to react with excess of dilute H_2SO_4 . The total volume of H_2 gas liberated was found to be 4.2L at 570 mm of Hg pressure and 279K temperature. Determine the percentage purity of Zinc.

OR

Common ion effect provides the most important method to monitor the concentration of precipitant for the selective precipitation of metallic ion and solubility product principle helps to predict whether the salt precipitate or not in qualitative analysis. Explain, the application of Solubility product principle and common ion effect in qualitative salt analysis. [5]

GROUP – C

Give long answer to the following questions.

[3×8=24]

9. In laboratory, chloroform is prepared by reacting ethyl alcohol or acetone using bleaching powder.
- Write the principle reactions of oxidation, chlorination and hydrolysis process using ethyl alcohol.
 - Why is chloroform always stored in a dark colored bottle?
 - It is used as anaesthetic in past but now discouraged. Why?
 - Chloroform forms chloretone drug with acetone in presence of aqueous alkali. Write the chemical reaction and mention any one use of this drug.
 - What happens when, chloroform reacts with conc. Nitric acid? Write an important application of such product. [2+1+1+2+2]

Or

An aromatic compound 'A' on diazotization gives compound 'B' which is warmed with water to give compound 'C'. The compound 'C' is heated with acetyl chloride in presence of pyridine gives 'D' which undergoes rearrangement in presence of anhydrous AlCl_3 and CS_2 as solvent gives a mixture of 'E' and 'F'. The compound 'C' is heated with zinc dust to give parent hydrocarbon benzene. Identify A, B, C, D, E and F with their name and suitable chemical reaction involved for it.

- What happens when, compound C is heated with conc. HNO_3 and conc. H_2SO_4 ?
- Write any two important uses of Compound 'C'. [6+1+1]

10. a) The solubility product of barium sulphate (BaSO_4) is 1×10^{-10} at 298K. Calculate its solubility in
- pure water
 - $1 \times 10^{-3} \text{M H}_2\text{SO}_4$ solution. [1+3]
- b) Write the equation for the formation of naphthalene. Calculate the increase in entropy in the evaporation of 1 mole of water at 100°C . [Latent heat of vaporization of water is 2.26 KJgm^{-1}]. [1+3]
11. Aniline is the most common member of aromatic amines which is used to prepare drugs, dyes etc. [1+2+1+2+2]
- Give the preparation of aniline from nitrobenzene.
 - Aniline is less basic than aliphatic amine. Give reason.
 - Why is it necessary to protect $-\text{NH}_2$ group before nitration of aniline?
 - What is diazotization reaction? Why is diazotization always carried out at ice cold temperature?
 - Convert, Aniline into (i) p-aminoazobenzene (ii) Acetanilide



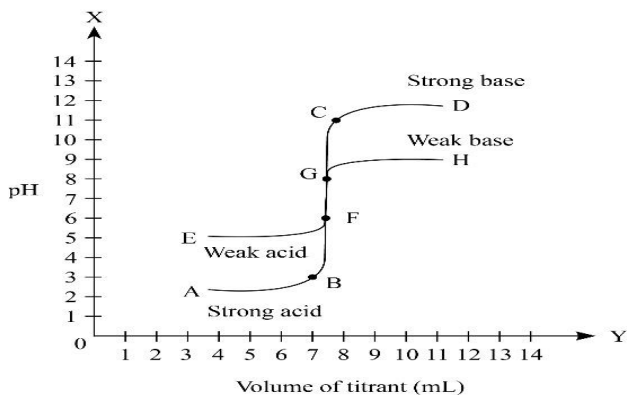
Attempt all questions

GROUP –A

Circle the best alternative to the following questions.

[11×1=11]

- The unit of rate constant for zero order reaction is
 - $\text{mol}^{-1}\text{Ls}^{-1}$
 - mols^{-1}
 - $\text{molL}^{-1}\text{s}^{-1}$
 - Ls^{-1}
- When an alkyl halide reacts with sodium alkoxide to form symmetrical as well as unsymmetrical ether. This reaction is called,
 - Hoffmann's reaction
 - Reamer-Tiemann's reaction
 - Kolbe's reaction
 - Williamson's reaction
- The curve obtained by plotting the pH of the solution during titration against the volume of alkali added from burette is known as a titration curve. The curve ABGH in the following curve represent:



- Titration curve of strong acid Vs strong base
- Titration curve of strong acid Vs weak base
- Titration curve of weak acid Vs strong base
- Titration curve of weak acid Vs weak base

4. An adiabatic process is the one in which
 - a) System is closed to energy transfer
 - b) System is closed to heat transfer
 - c) The system is closed to both heat and energy transfer
 - d) There is no enthalpy change
5. Haloarenes are less reactive than benzene toward electrophilic substitution reaction due to,
 - a) Positive inductive effect
 - b) Resonance effect
 - c) Negative inductive effect
 - d) Steric effect
6. Which of the following compound is generally used to prepare paper?
 - a) Protein
 - b) Fibers
 - c) Cellulose
 - d) Vitamins
7. All transition element exhibit in general electronic configuration of
 - a) $(n-1)d^{1-10} ns^{1-2}$
 - b) $(n-1)d^0 ns^{1-2}$
 - c) $ns^2 (n-1)d^{10}$
 - d) None of above
8. Which of the following is the normality of 50mL of HCl required to neutralize 10 g of $CaCO_3$?
 - a) 2N
 - b) 4N
 - c) 5N
 - d) 1N
9. Based on the systematic formula of Iron carbonyl, $Fe(CO)_5$, its conductivity is expected to be
 - a) Zero
 - b) One
 - c) Five
 - d) None

10. Which of the following reagent is used to make nitroethane from haloethane?
 - a) Alc. AgNO_3
 - b) Alc. AgNO_2
 - c) Alc. KNO_2
 - d) Alc. NaNO_2
11. Ethanoyl chloride on treating with methyl magnesium chloride followed by acidic hydrolysis gives
 - a) Propan-2-ol
 - b) Propan-1-ol
 - c) 2-methylpropan-2-ol
 - d) 2-methylpropan-1-ol

GROUP – B

Give long answers to the following questions

[8×5=40]

1. Define the following terms: [1+1+1+1+1]
 - a) Isolated system
 - b) Internal energy
 - c) Enthalpy
 - d) Entropy
 - e) Isochoric process
2. Sulphide ore is used in the extraction of mercury. Aristotle had named this element liquid silver.
 - a) Name the chief ore of mercury.
 - b) Why does mercury forms alloy with gold and silver?
 - c) How do you convert mercury into Nessler's reagent?
 - d) Though Mercury is metal, it exists in liquid state at room temperature. Why?
 - e) Instead of electrolytic refining, Hg is purified by treating it with 5% dil. HNO_3 . Write reaction involved in it. [1+1+1+1+1]
3. A polymer is a giant molecule with high molecular mass which is made up of a number of small repeating units called monomers which are usually obtained from low molecular mass molecules. So, give the answer to the following questions.

- a) Differentiate between condensation polymers and addition polymers. [2]
- b) Why is nylon-6,6 called copolymers? [1]
- c) Which polymer is obtained when phenol is treated with formaldehyde in the basic medium? Show pertinent reaction. [2]
4. In electrochemical series different electrodes are arranged in order of their increasing standard reduction potential. By using following data
 $E^0_{Zn/Zn^{++}} = 0.76V$
 $E^0_{Cu^{++}/Cu} = 0.34V$
- a) Write the cell reaction
- b) Construct a galvanic cell
- c) Calculate the standard emf of the cell.
- d) Can you store the $CuSO_4$ in Zinc vessel? [2+1+1+1]
5. Write the structure of the organic compound A, B, C, D and E with their name in the following sequence of reaction. [5]

6. What are the main assumptions of CFT (crystal field theory)? Explain, the crystal field splitting in octahedral complex. [2+3]

OR

The compound **A** is an ore of copper called tenorite. Compound **A** reacts with dil. Sulphuric acid to give **B**. The saturated solution of compound **B** when heated to crystallization point gives a hydrated product **C**. Compound **C** when heated above $750^\circ C$ produces an oxide **D** which is used to provide light blue or green color to glass. Find A, B, C and D. Also write the use of compound D. [1+1+1+1+1]

7. A When propene reacts with HBr in presence of organic peroxide, it gives major product just opposite to Markovnikov's rule.
- Identify major product.
 - State the rule and write a chemical equation for peroxide effect.
 - Why HCl & HI do not give Anti-Markovnikov's addition?
 - What happens when major product is heated with sodium metal in presence of dry ether? [1+2+1+1]
8. An organic compound 'A' reacts with HCN to give 'B'. On hydrolysis of B in acidic medium gives 'C'. Compound A also produce propane when heated with zinc amalgam and HCl. Identify A, B and C with reaction and give their IUPAC name. What product would you expect when A is treated with trichloromethane in alkaline medium?

Or

Nitrobenzene is used to prepare trinitrobenzene which is largely used as an explosive substance in peace work, construction and engineering field.

- Write the principle reaction for the preparation of nitrobenzene from benzene.
- Starting from nitrobenzene how would you prepare,
 - Trinitrobenzene
 - Para-aminophenol
 - N-phenyl hydroxylamine

GROUP –C

Give long answers to the following questions

[8×3=24]

9. a) How would you distinguish propan-1-ol, propan-2-ol and 2-methyl propan-2-ol by Victor Meyer's method? [5]
- b) What happens when, phenol is treated with
- Aqueous bromine
 - FeCl₃ solution
 - Dilute HNO₃ [1+1+1]
10. What happens when?
- Methanoic acid is warmed with ammoniacal AgNO₃ solution?
 - Ethanoic acid reacts with Cl₂ in red phosphorous?
 - Ethanoyl chloride is reduced with LiAlH₄?
 - Ethanoic anhydride reacts with ammonia?

e) Ethyl ethanoate is hydrolyzed in acidic medium?

Justify with reasons.

(i) Acetic acid is weaker acid than formic acid.

(ii) Amide is amphoteric in nature.

(iii) Acyl halide is most reactive acid derivatives.

[5+3]

11. a) The process of determining the concentration of unknown solution is titration. Define redox titration. Calculate the molality of one liter of 93% H_2SO_4 solution (weight by volume). The density of the solution is 1.84g mL^{-1} .

[1+3]

b) Calculate the pH of 1 molar solution of acetic Acid. To what volume, one litre of this solution be diluted so that the pH of the solution that is formed will be twice of the original value. ($K_a = 1.8 \times 10^{-5}$)

[4]

OR

a) You are given a two acid having equimolar Concentration with ionization constant as:

Acid	CH_3COOH	HCN
Concentration	1M	1M
Ionization Constant (K_a)	1.8×10^{-5}	4.0×10^{-10}

Calculate the pH of these Acids & Identify, which acid is stronger?

[2+2+2]

b) Acids A, B, C & D have a following pKa Values

Acid	pKa
A	4.74
B	3.69
C	3.34
D	4.21

Arrange these acids in increasing order of their acidic strength.

[2]

Attempt all questions.

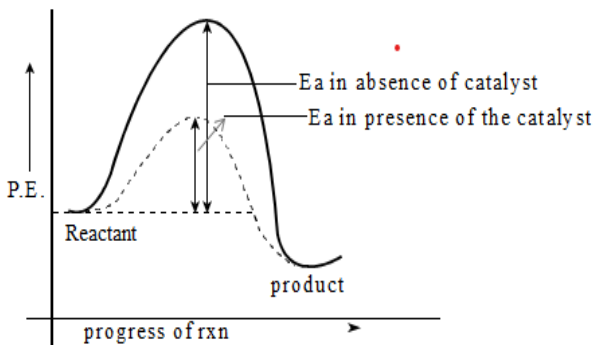
GROUP –A

Circle the best alternative to the following questions.

[11×1=11]

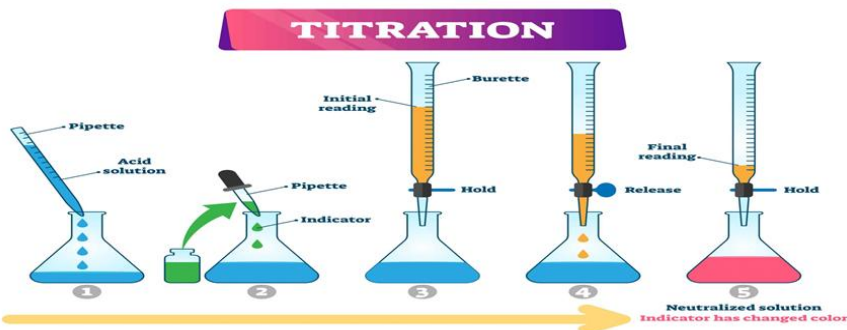
1. Salt bridge contains
 - a) Calomel
 - b) Corrosives sublimate
 - c) H_2O
 - d) agar – agar paste
2. The reaction of benzene with alkyl halide in presence of anhydrous $AlCl_3$ is called,
 - a) Wurtz's reaction
 - b) Friedel Craft's alkylation
 - c) Carbylamine reaction
 - d) Friedel Craft's acetylation
3. Which thermodynamic property provides a measure of randomness in the system?
 - a) Enthalpy
 - b) Entropy
 - c) Free energy
 - d) PV-work
4. Most of the transition metal easily forms complex because...
 - a) of smaller size
 - b) of high positive charge density
 - c) of presence of empty d-orbital
 - d) All of above
5. Mercury is transported in metal container made of
 - a) Gold
 - b) Copper
 - c) Lead
 - d) Iron

6. By observing the following graph



A presence of positive catalyst increases the rate of a chemical reaction by

- Increasing the kinetic energy of reactants
 - By decreasing the value of activation energy
 - By providing the reactants with an alternate path where the value of activation energy is low
 - By increasing the temperature
7. During titration, a pipette is used to transfer a base into a conical flask sitting under a burette filled with acid. The pipette, the conical flask and the burette should be rinsed with ...



- Base, distilled water and acid
- Distilled water, base and acid.
- Base, distilled water and base.
- Base, distilled water and base.

8. Which of the following compound cannot reduce Fehling's reagent?
- Ethanal
 - Benzaldehyde
 - Formic acid
 - Methanal
9. When ethyl alcohol is treated with acidified potassium dichromate then aldehyde is formed. This is an example of,
- Oxidation reaction
 - Hydrolysis reaction
 - Reduction reaction
 - Rearrangement reaction
10. In the nitration of benzene Conc. HNO_3 acts as ...
- base
 - acid
 - reducing agent
 - catalyst
11. Order of basic strength of primary, secondary and tertiary amines in aqueous phase is
- $1^\circ > 2^\circ > 3^\circ$
 - $3^\circ > 2^\circ > 1^\circ$
 - $2^\circ > 1^\circ > 3^\circ$
 - $2^\circ > 3^\circ > 1^\circ$

GROUP –B

Give short answer to the following questions.

[8×5=40]

1. Write one example of each:
- Bronsted Lowery Acid
 - Bronsted Lowery Base
 - Lewis Acid
 - Lewis Base
 - Conjugate acid and base of NH_3

2. Gold, Silver, Copper are classified as coinage metals. All coinage metals are extracted from their ore. Copper pyrite is the chief ore of Copper from which Copper is extracted.
 - a) Why is blister copper called so?
 - b) Write the composition of bronze.
 - c) When a strip of metal "X" is inserted in copper sulphate solution, blue color of CuSO_4 fades away. Which is more reactive copper or metal "X"? Write the reaction involved. [1+1+1+2]
3. Describe the electrochemical theory for the rusting of iron. List any two method of prevention of rusting. [3+2]
4. Write a chemical equation for; [5×1=5]
 - a) Aldol condensation
 - b) Benzoin condensation
 - c) Rosenmund's reduction
 - d) Oxidation reaction of acetaldehyde
 - e) Reaction of acetone with hydrazine
5. Write an example of primary and secondary alcohol of $\text{C}_4\text{H}_{10}\text{O}$ with IUPAC name. How would you apply Victor Meyer's method to distinguish them? [2+3]

OR

Write a chemical reaction for;

[5×1=5]

- a) Chloroethane reacts with moist silver oxide.
- b) Ethanamine reacts with nitrous acid in cold condition.
- c) Propan-2-ol is oxidized with acidified KMnO_4 solution.
- d) Ethanol is warmed with iodine in presence of NaOH .
- e) Ethyl alcohol is heated with acetic acid in presence of Conc. H_2SO_4 .
6. Aniline is million times more reactive than benzene towards the electrophilic substitution reaction. Aniline gives coupling reaction with azodye.
 - a) Show your familiarity with coupling reaction.
 - b) Why is diazotization reaction carried out in ice cold temperature?
 - c) Write the structure and name of the compounds A, B and C in the given sequence of reactions. [1+1+3]

7. An aromatic compound "A" gives parent hydrocarbon "B" when heated with Zn dust. The compound "B" can also be obtained by polymerization of acetylene. The compound "A" gives characteristic violet color with FeCl_3 solution. Identify "A" and "B" with their names and suitable chemical reaction. Why is compound "A" slightly acidic in nature? [4+1]
8. A commercial sample of sulphuric acid has a specific gravity 1.8 gm/cc. 10 mL of this acid was diluted to 1 litre with water. 10 mL of the diluted acid required 30 mL of decinormal NaOH for complete neutralization. Calculate the percentage purity of H_2SO_4 in the commercial sample. [5]

Or

In the titration of acidified KMnO_4 and oxalic acid, KMnO_4 is reactant as well as indicator.

- a) Is the titration redox or acid base? [1]
- b) Why does KMnO_4 act as self-indicator? Define indicator? [2]
- c) KMnO_4 is not primary standard substance, why? [1]
- d) If 100 cc of N/10 KMnO_4 solution is to be prepared, what mass of KMnO_4 is required. [1]

GROUP –C

Give long answer to the following questions. [3×8 =24]

9. a) State Hess's law of constant heat summation. Calculate the enthalpy change for the combustion of butane.

Given

- i. $\text{C(s)} + \text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g})$, $\Delta H = -393.5 \text{ kJ mol}^{-1}$
- ii. $\text{H}_2(\text{g}) + \frac{1}{2}\text{O}_2(\text{g}) \rightarrow \text{H}_2\text{O(l)}$ $\Delta H = -285.5 \text{ kJ mol}^{-1}$
- iii. $4\text{C} + 5\text{H}_2(\text{g}) \rightarrow \text{C}_4\text{H}_{10}(\text{g})$ $\Delta H = -126 \text{ kJ mol}^{-1}$ [1+3]

- b) What is reference electrode? How is standard hydrogen electrode constructed? Write the electrode reaction when SHE act as anode and cathode. [1+1+1+1]

10. Show your acquaintance with habit forming drug and drug addiction. If your friend is having high fever since last night, name the class of drug that you recommend to lower his body temperature. What is penicillin? What medicinal effect does it produce on human body? [1+1+1+1]
11. A carbonyl compound 'A' reduce Tollen's reagent and itself reduced with metal hydride to give compound 'B'. Similarly another carbonyl compound 'C' does not reduce Tollen's reagent and itself reduced with metal hydride to give compound 'D'. The compound A and C can be obtained by the ozonolysis of compound 'E'. The compound B and D both response positive iodoform test. The compound C can also be obtained by catalytic hydration of propyne. Identify A, B, C, D and E with suitable chemical reaction.

Write a suitable chemical test to distinguish A from C. [6+1+1]

OR

An organic compound A ($C_4H_6O_3$) on treating with an organic compound B gives compounds C and D. Compound C on acid hydrolysis gives compounds B and D. When compound D is heated with P_2O_5 it gives compound A. Reduction of compounds A, C and D with $LiAlH_4$ give compound B. Identify A to D with necessary chemical reactions.

Convert, methanoic acid into ethanoic acid. [5+3]



Attempt all questions

GROUP –A

Choose the best alternative to the following questions.

[11×1 =11]

1. Hydrolysis of ester to give carboxylic acid and alcohol is an example ofreaction.
 - a) Zero order
 - b) Pseudo first order
 - c) Second order
 - d) Third order
2. A process can be termed spontaneous at ordinary condition, if
 - a) $\Delta S = +ve$ and $\Delta H = -ve$
 - b) $\Delta S = -ve$ & $\Delta H = -ve$
 - c) $\Delta S = -ve$ & $\Delta H = +ve$
 - d) $\Delta H = +ve$ & $\Delta S = +ve$
3. Primary and secondary valency in $[Zn(NH_3)_4]^{2+}$ is
 - a) 4 and 2
 - b) 2 and 4
 - c) 3 and 2
 - d) all of above
4. Percentage of silver in German silver is
 - a) Zero
 - b) 0.25
 - c) 0.5
 - d) 0.75
5. First prepared organometallic compound is
 - a) Grignard reagent
 - b) Organolithium
 - c) Ferrocene
 - d) Organocadmium
6. In the reaction, $NH_3 + H_2O \rightleftharpoons NH_4^+ + OH^-$, which of the following is the conjugate acid-base pair?
 - a) $NH_3 + H_2O$
 - b) $NH_4^+ + OH^-$
 - c) $NH_3 + NH_4^+$
 - d) $NH_3 + OH^-$

7. Which of the following is wrong statement?
 - a) Chloroform is used in surgery as an anaesthetic drug
 - b) Chloroform is prepared from chlorination of chloral
 - c) Chloroform on exposure to air and sunlight gives carbonyl chloride
 - d) Insecticide chloropicrin is prepared from nitration of chloroform
8. The first step of manufacturing paper is
 - a) Logs are conveyed to the chipper
 - b) Debarking of raw material
 - c) Digestion in pressure cooker (digester)
 - d) All of the above
9. Which of the following does not show acidic nature?
 - a) Primary nitroalkane
 - b) Secondary nitroalkane
 - c) Tertiary nitroalkane
 - d) All of the above
10. Phenol is more acidic than alcohols due to,
 - a) Resonance stabilization of phenoxide ion
 - b) Weak bond of $-OH$ group
 - c) Electron releasing nature of $-OH$ group
 - d) All of above
11. How much sodium chloride is produced when 100 mL of N/10 HCl is mixed with 200 mL of N/10 sodium hydroxide?
 - a) 58.5gm
 - b) 5.85gm
 - c) 0.585gm
 - e) 0.0585gm

GROUP –B

Give short answer to the following questions.

[8×5=40]

1. Silver is commonly used for ornamental purpose. Its chief ore is Argentite (Ag_2S) from where the metal can be extracted economically and conveniently.
 - a) Discuss cyanide process for extraction of silver from horn silver.

- b) Why does indelible ink made of silver nitrate is used to produce stain during election or polio drop campaign? Elucidate showing valid reaction. [3+2]
2. Chemical kinetics is the branch of chemistry that deals with rate and mechanism of the reaction. There are numerous factors that alter the rate of chemical reaction.
- a) How does the surface area of the reactant affect the rate of reaction? [1]
 b) What is the role of temperature in the rate of reaction? [2]
 c) What do you mean by a catalyst? What is role of catalyst in kinetics? [2]
3. Define S_N1 and S_N2 reaction. "Haloarenes are less reactive than haloalkane toward nucleophilic substitution reaction", Give reason. What happens when chlorobenzene reacts with aqueous NaOH followed by acidic hydrolysis? [2+2+1]
4. Radioactivity is a nuclear phenomenon exhibited by radioactive element and their compounds and the radiation emitted by radioactive substance are α , β and γ radiation.
- a) How α and β - rays are produced? [2]
 b) For nuclear reaction, α - particles and protons are accelerated but neutrons must be slowed down. Explain. [2]
 c) Write the medical uses of radioisotopes. [1]
5. Describe chemical method for the separation of primary, secondary and tertiary amines by Hoffmann's method. [5]

Or

Identify A, B, C, D and E with their names.

6. An organic compound 'P' reacts with nitrous acid under ice cold condition gives 'Q'. The compound 'Q' is heated with Lucas reagent gives 'R' and R is boiled with aqueous alkali gives again 'Q'. The compound Q is primary alcohol that gives positive iodoform test. Identify P, Q and R with their IUPAC name and write a suitable chemical reaction involved for it. [5]
7. What happens when
 a) Methanoic acid is warmed with ammonical $AgNO_3$?

- b) Ethanoic acid reacts with Cl_2 in red phosphorous?
 - c) Ethanoyl chloride is reduced?
 - d) Ethanoic anhydride reacts with ammonia?
 - e) Ethyl ethanoate reacts with LiAlH_4 ?
8. Write the action of
- a) Calomel with ammonia
 - b) Corrosive sublimate with potassium thiocyanate
 - c) Mercuric sulphate when grinded with sodium chloride in presence of MnO_2 .
 - d) Mercury with excess chlorine
 - e) Mercury(II)chloride with potassium iodide. [1+1+1+1+1]

OR

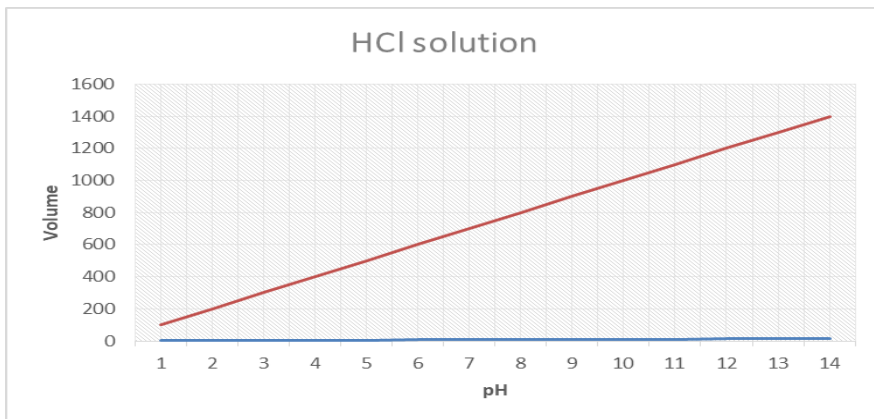
Give reason:

- a) Open hearth process provides better quality of steel than any other method.
- b) A piece of Al or Zn can partially protect iron tank from rusting.
- c) Presence of acidic gases in the atmosphere increases the rate of rusting.
- d) Haematite ore is separated by gravity separation method but not with froth floatation method. [1+1+1+2]

GROUP –C

Give long answer to the following questions **[8×3 =24]**

9. Generally, Alcohol is the best chemical for the preparation of haloalkane by using different reagents. Write any three methods of preparation of haloalkane from alcohols.
- a) What is Lucas reagent?
 - b) Is ZnCl_2 necessary for tertiary alcohol with HCl? If not why?
 - c) Haloalkane are slightly soluble in water. Give reason?
 - d) What is the order of boiling point for n-propyl chloride, isopropyl chloride and tertiary butyl chloride? Describe with suitable reason. [3+1+1+1+2]
10. a) The volume vs pH plot of HCl solution is given as:



The volume at pH 2 of HCl is added to 300ml of NaOH with pH 12. What will be the resultant pH of the mixture solution? If the solution having pH 5 is diluted 1000 times with water, find the pH of the resulting solution. The concentration of above solution of acid given in graph cannot be expressed more than 7 in pH scale, why? [2+2+1]

- b) The standard reduction potential of Cu and Ag electrodes are 0.34V and 0.80V respectively. Construct a galvanic cell and calculate the standard emf.

$$E^0_{\text{Cu}^{++}/\text{Cu}} = 0.34\text{V}$$

$$E^0_{\text{Ag}^+/\text{Ag}} = 0.80\text{V}$$

Why is KCl not used in salt bridge in Cu-Ag cell? [1+1+1]

11. Concentration terms are related with each other. How normality is related with molarity. Derive normality equation. A piece of Al weighing 2.7 gm is heated with 75 mL of H_2SO_4 (sp. gravity= 1.18 containing 24.7% of H_2SO_4 by wt.). After the metal was carefully dissolved, the solution is diluted to 400mL. Calculate the molarity of the free H_2SO_4 in the resulting solution? [1+2+5]

OR

Derive the Gibb's Helmholtz's equation. Explain the spontaneity of endothermic and exothermic reactions in terms of enthalpy change, entropy change and Gibb's free energy change. [3+5]



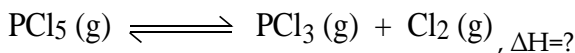
Attempt all questions

GROUP –A

Circle the best alternative to the following question

[11×1 =11]

1. Conversion of ester into β - keto ester is
 - a) Perkin condensation
 - b) Aldol condensation
 - c) Benzoin condensation.
 - d) Claisen condensation
2. Which of the following is an insecticide?
 - a) BHC
 - b) DDT
 - c) Zinc Phosphide
 - d) Pentachlorophenol
3. For the reaction,



- a) $\Delta E+2RT$
 - b) $\Delta E-2RT$
 - c) $\Delta E+RT$
 - d) $\Delta E-RT$
4. Lead storage battery is
 - a) Primary cell
 - b) Secondary cell
 - c) Fuel cell
 - d) Leclanche cell
 5. Iron becomes passive when treated with
 - a) Water
 - b) Conc. H_2SO_4
 - c) Hot and Conc. Fuming HNO_3
 - d) Aquaregia

6. Aqueous solution of sodium acetate is
- Neutral
 - Weakly acidic
 - Strongly acidic
 - Alkaline
7. Mercurous ion is best represented as
- Hg^+
 - Hg_2^+
 - Hg^{2+}
 - Hg_2^{2+}
8. The product in this reaction is
- Methane
 - Methanamine
 - Ethanamine
 - Propane
9. Urotropine is used in medicine as a
- tranquilizer
 - urinary antiseptic
 - sulpha drug
 - sedative
10. Compound 'A' reacts with alkaline iodine to form yellow crystals of iodoform. An IUPAC name of compound A is,
- Ethyl alcohol
 - Acetaldehyde
 - Ethanol
 - Acetone
11. The amount of water that is to be added to change the strength of a 100mL HCl solution from 0.5 N to 0.2 N is:
- 150 mL
 - 400mL
 - 300 mL
 - 500 mL

GROUP –B

Give Short answers to the following questions

[8×5= 40]

1. State and explain Ostwald dilution law. Also write the limitation of this law. [1+3+1]
2. How diethyl ether is prepared by using Williamson's synthesis? What happens when diethyl ether is exposed to atmospheric air in presence of sunlight? Why it is dangerous to boil old sample of ether? [2+2+1]
3. What is activation energy?
Distinguish between.
 - a) Order and molecularity
 - b) Rate law and rate constant [1+2+2]

OR

For the reaction $A_2(g) + B_2(g) \rightarrow 2AB(g)$, the following data are obtained:

S.N	$[A_2]$ Mol L ⁻¹	$[B_2]$ Mol L ⁻¹	Rate(MolL ⁻¹ Sec ⁻¹)
1.	0.50	0.50	1.6×10^{-4}
2.	0.50	1.00	3.2×10^{-4}
3.	1.00	1.00	3.2×10^{-4}

Determine the order of reaction with respect to A_2 , B_2 , overall order & rate law for the reaction. Also calculate the rate constant. [1+1+1+1+1]

4. Explain the following giving reasons
 - a) Mercury is a transition element but Lithium is not.
 - b) Zn^{++} salt are white but Cu^{++} salt are blue.
 - c) Transition metal easily forms complex ion and metal complexes.
 - d) Cu^{++} is more stable than Cu^+ .
 - e) Iron is used as a catalyst in the Haber's process for the synthesis of Ammonia. [1+1+1+1+1]
5. Consider a reaction sequence,

The compound E has positive iodoform test. Identify A, B, C, D and E with their IUPAC name and write suitable chemical reaction involved. [5]

6. Grignard's reagent is an important organometallic compound which is widely used in much organic synthesis.
 - a) How can you prepare Grignard's reagent? [1]

- b) How can you prepare i) ethanol
ii) propan-1-ol
iii) propan-2-ol
iv) 2-methylpropan-2-ol

by using suitable Grignard's reagent? [4]

7. How is steel manufactured by open hearth process? What is used to oxidize the impurities in Basic oxygen process? Write the composition of stainless steel. [3+1+1]
8. Write a chemical equation for;
- a) 2,4-DNP test for aldehyde or ketone
 - b) Tollen's test for aldehyde
 - c) Fehling's test for aldehyde
 - d) Diazotization reaction for aniline
 - e) Coupling reaction for phenol [5×1=5]

OR

An organic compound 'P' reduce Tollen's reagent and an oxidation with potassium dichromate forms a compound 'Q'. Q reacts with aqueous Na_2CO_3 to give carbon dioxide. Q on reaction with ethanol in presence of sulphuric acid forms an ester having molecular formula $\text{C}_4\text{H}_8\text{O}_2$ 'R'. Identify P, Q and R and write their IUPAC name. [5]

GROUP –C

9. Applied Chemistry is the scientific field for understanding basic chemical properties of materials and for producing new materials with well-controlled functions
- a) Draw the flow sheet diagram for the manufacture of Portland cement.
 - b) Show the advantages of Pozzolana Portland cement over Ordinary portlandcement.
 - c) What is the technical difference between Sulphate (Kraft) and sulphite process?
 - d) What are the major steps in production of paper? Explain each process in detail. [2+2+1+3]

10. Volumetric analysis is a quantitative method where a known solution is used and react it with a solution of chemical being tested. A typical method of volumetric analysis is titration.
- Define titration. [1]
 - Why do you need to repeat titration until concurrent consecutive titres are obtained? [1]
 - When indicator show the change in color acid is added to base slowly until end point is reached. Define end point and distinguish it with equivalence point. [3]
 - In a titration between H_2SO_4 and NaOH which indicator is used? Give reason. [2]
 - What is primary standard substance? [1]
11. Chlorobenzene is an important starting material for the preparation of insecticides like DDT which used in agricultural field.
- How would you prepare chlorobenzene by Sandmeyer's and Gattermann's reaction?
 - Write a chemical reaction for the preparation of DDT by using chlorobenzene.
 - What happens when chlorobenzene is heated with (i) sodium metal in presence of dry ether (ii) Methyl chloride in presence of sodium and dry ether?
 - What happens when chlorobenzene is reduced with Ni-Al alloy in presence of NaOH ?
 - Write any two important uses of chlorobenzene. [2+2+2+1+1]

OR

Generally alcohols are used in drinking purpose during ancient time and nowadays it is largely used in industries and laboratories as solvent.

- What do you mean by fermentation process?
- How ethyl alcohol is prepared in industries by fermentation of molasses?
- What is the favorable condition for fermentation of molasses during ethyl alcohol synthesis?
- Oxo process is important method to prepare alcohols in industries. Write a chemical reaction for it.
- What happens when ethyl alcohol is heated with conc. H_2SO_4 at 140°C and 170°C ? [1+2+1+2+2]



Model Questions – 2078 (2022)

Subject: Biology (2021)

Full Marks: 75

Time: 3 hrs.

SET A

Attempt all questions.

PART I (BOTANY)

GROUP – A

Circle the correct one from given alternatives.

[5×1=5]

1. The age of the tree can be determined by
 - a) Measuring its diameter
 - b) Counting the number of annual rings
 - c) Counting the number of leaves
 - d) Finding out the number of branches
2. Green manure plants are
 - a) Poaceae
 - b) Solanaceae
 - c) Leguminosae
 - d) Compositae
3. Where does the light reaction take place?
 - a) Grana
 - b) Stroma
 - c) Cytoplasm
 - d) Endoplasmic reticulum
4. The other name for gynoecium is
 - a) Pistil
 - b) Stigma
 - c) Androecium
 - d) Style
5. Who is known as the Father of Genetics?
 - a) Erich Tschemark
 - b) Carl Correns
 - c) Gregor Johann Mendel
 - d) Hugo de Vries

GROUP – B

Give short answer to the following questions.

[4×4=16]

11. What is vascular bundle? Mention its type in brief. [1+3]
12. What is light reaction? Explain cyclic photophosphorylation in brief. [1+3]
13. What is green manure? Mention the advantage of green manure over the chemical fertilizer. [1+3]
14. What is crossing over? Explain its mechanism in brief. [1+3]

OR

What is dihybrid cross? Explain the law of independent assortment with its reference. [1+3]

GROUP – C

Give long answer to the following questions.

[2×8=16]

15. Response to the following questions:
 - a. "Transpiration is a necessary evil." Justify the statement. [4]
 - b. How can you evaluate glycolysis as anaerobic part of respiration? [4]
16. What is mutation? Explain polyploidy with suitable example and mention its significance as well. [1+4+3]

OR

What is semi-conservative DNA replication? Explain the mechanism with suitable diagram. [1+5+2]

PART II (ZOOLOGY)

GROUP – A

Circle the correct one from given alternatives.

[6×1=6]

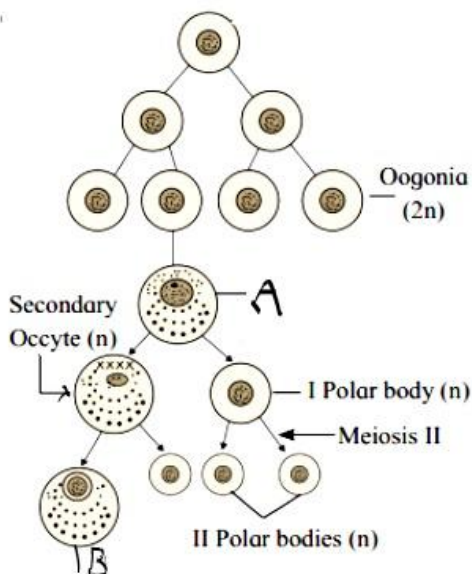
1. Urinary bladder is stretchable because it is lined with
 - a) stratified epithelium
 - b) pseudo stratified epithelium
 - c) simple epithelium
 - d) transitional epithelium
2. Gastrulation in frog involves:
 - a) Epiboly
 - b) Emboly
 - c) Invagination
 - d) All of these
3. Find the best reason why the SA node acts as heart's natural pacemaker.
 - a) Because it has a poor cholinergic innervations.
 - b) Because it has a rich sympathetic innervations.
 - c) Because of its capability of generating impulses for heart beat.
 - d) Because it stops impulses.
4. Identify the form by which most of the carbon dioxide produced in the tissues is transported to the lungs.
 - a) carbonates
 - b) bicarbonates
 - c) dissolved in the blood
 - d) attached to hemoglobin
5. Which of the following structure at a synapse has the neurotransmitter?
 - a) Schwan cells
 - b) Synaptic cleft
 - c) Synaptic knobs
 - d) Synaptic vesicles
6. Judge an incorrect statement
 - a) Rhodopsin is the purplish-red protein situated in rods only
 - b) Retinal is a derivative of Vitamin C
 - c) Retinal is the light-absorbing part of visual photo pigments
 - d) The rods in the retina have rhodopsin, a photo pigment while cones have three different photo pigments.

GROUP – B

Give short answer to the following questions.

[4×4=16]

7. Differentiate between smooth muscles and skeletal muscles. [2+2]
8. Study the figure and answer the questions.
- a) Label A & B [1]
- b) Which event stimulates the formation of B? [1]
- c) This figure shows the detail process of oogenesis. Describe this process in brief. [2]



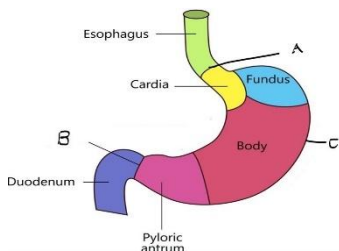
9. Develop the biological reasons why *Cannabis* (Hemp plant) should not be legalized? Also give another example of psychedelic drug that can cause psychosis, a severe mental effect. [1+1+2]

OR

How can you interpret that vaccines are important methods to combat with diseases? Demonstrate it with the help of different types of vaccines.

10. Answer the questions based on the figure.

- a) What kind of sphincters are present in A & B? [1]
- b) What happens when HCl is not secreted in the lumen of C? [1]
- c) Construct the steps how curdling of milk takes place inside the C. [2]



GROUP – C

Give long answer to the following questions.

[2×8=16]

11. What are the primary sex organs of male? Make a list of other male reproductive organs. Describe the structure and function of these organs with the help of diagram.

Or

What is double circulation? Demonstrate the working of human heart along with course of blood circulation with well labeled diagram. [1+2+2+3]

12. When the ELISA test was conducted on an immune-suppressed person, he tested positive for a pathogen. [1+1+1+3+2]
- a) Identify the disease the patient is suffering from.
 - b) Name the causative entity.
 - c) Mention the cells of the body that are attacked by the pathogen.
 - d) **Exposit its symptoms**
 - e) Elucidate why "Prevention is better than cure"?



Attempt all questions.

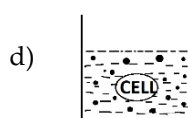
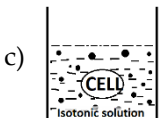
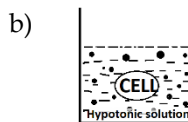
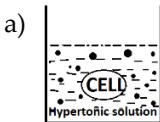
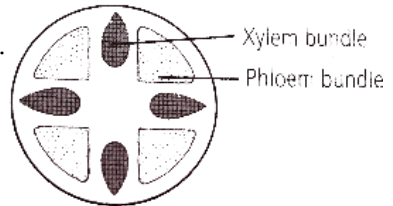
PART I (BOTANY)

GROUP – A

Circle the correct one from given alternatives.

[5×1=5]

- In which of the following case does phenotypic ratio and genotypic ratio is same?
 - Linkage
 - Codominance
 - Multiple allelism
 - Incomplete dominance
- 45+ XY means ____ syndrome?
 - Turner
 - Klinefelter's
 - Mongolian
 - None
- The diagram shows ____ vascular bundle.
 - collateral
 - radial
 - bicollateral
 - concentric
- The phenotypic ratio of monohybrid cross between red and white flowered *Mirabilis jalapa* plant is _____.
 - 1:2:2
 - 3:1
 - 2:1:2
 - 1:2:1
- In which of following case does plant cell will be turgid?



GROUP – B

Give short answer to the following questions.

[4×4=16]

6. Draw a well labelled diagram of Dicot stem (no description). [4]
7. Mutations are not always harmful. Explain it with suitable examples.
Describe how *Triticum aestivum* was developed. [2+2]

OR

Illustrate 'law of segregation' of Mendel and state why Mendel did not observe linkage in his experiment? [3+1]

8. What is IAA? How does Auxin help plants in their growth and development? [1+3]
9. Write the salient features of a dicot embryo in reference to its development pattern with diagram. [2+2]

GROUP – C

Give long answer to the following questions.

[2×8=16]

10. Why does a DNA need to replicate? Describe the DNA replication in which half of the parental strand is conserved in each daughter DNA with well labelled diagram. [1+5+2]

OR

What are the general characteristics of sex-linked inheritance? When a colourblind man marries a normal woman, what result will you expect? Analyse briefly with the help of different crosses. [2+2+2+2]

11. How does aerobic respiration differ from anaerobic respiration? Describe the cycle that involves breakdown of two carbon compound Acetyl co-A in aerobic respiration with necessary diagram. [3+3+2]

PART II (ZOOLOGY)

GROUP – A

Circle the correct one from given alternatives.

[6×1=6]

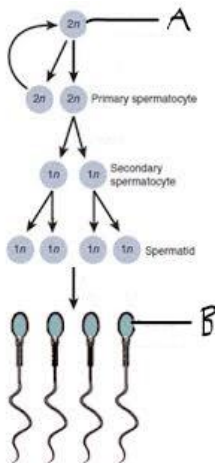
1. Nissl's granules are very useful for protein synthesis also help to transport these proteins. These granules are present in
 - a) bone
 - b) cartilage
 - c) neuron
 - d) muscle cell
2. The process, during the development of frog, in which three germ layers form is called:
 - a) cleavage
 - b) blastulation
 - c) gastrulation
 - d) organogenesis
3. Find the part from where ventricular muscles accept impulses of heart beat.
 - a) AV node
 - b) Bundle of His
 - c) Right and left bundle branches
 - d) Purkinje system
4. Identify the correct statement for the partial pressure of oxygen in alveoli?
 - a) less than carbon dioxide
 - b) less than the blood
 - c) more than the blood
 - d) equal to that of the blood
5. How do neurons (nerve fibers) communicate with one another?
 - a) Electrically
 - b) Chemically
 - c) Through weak, radio-wave-like impulses
 - d) a and b
6. Judge the character of fovea centralis of human eye
 - a) the optic nerve exits the eye
 - b) only rods are found
 - c) more rods than cones are found
 - d) no rods but a high density of cones occur

GROUP – B

Give short answer to the following questions.

[4×4=16]

7. Compare and contrast adipose tissue with areolar tissue. [4]
8. Study the figure and answer the given questions.
 - a) Label A & B. [1]
 - b) Which hormone from adenohypophysis stimulates this process? [1]
 - c) This figure shows the detail process of spermatogenesis. Describe this process in brief. [2]

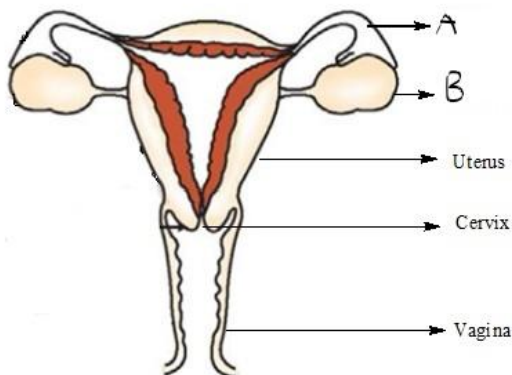


9. Give your analytical perspective on the population growth models represented by J & S- shaped curves. [4]

OR

List down the importance of fish and poultry farming in Nepal.

10. Answer the questions based on the given figure.



- a) Label **A&B** [1]
- b) If the lumen of part A is blocked in both left and right side, can that female conceive baby normally? [1]
- c) In which of the above given part sperm fuses with ovum if the female's reproductive tract is intact? [1]
- d) Identify the part which is cut and tied or clipped for permanent contraception in females. [1]

GROUP – C

Give long answer to the following questions. [2×8=16]

11. Where are adrenal glands located? With the help of sketch show the different parts of these glands. How do you justify that this gland is related with blood pressure, sugar metabolism, sex characters and even adaptation to emergency situations? [1+3+4]

OR

With the help of neat labeled diagram of human female reproductive system, depict the following sites with structural description:

- a) Production of gamete [3]
 - b) Site of fertilization [1]
 - c) Site of implantation [2]
 - d) Birth canal [2]
12. Once there was a global emergency of **T.B.** What is the cause? Discuss the causative agent, mode of transmission, sign and symptoms and prevention of the disease. [1+1+2+2+2]



Attempt all questions.

PART I (BOTANY)

GROUP – A

Circle the correct one from given alternatives.

[5×1=5]

1. The process of formation of permanent tissue from meristematic tissue is:
 - a. Differentiation
 - b. Dedifferentiation
 - c. Redifferentiation
 - d. None of the above
2. In a monohybrid cross between two heterozygous individuals (Tt), the percentage of pure homozygous individuals obtained in F₁ generation is:
 - a. 25 %
 - b. 50 %
 - c. 75 %
 - d. 100 %
3. An angiospermic plant have 16 chromosomes in the leaf cell. The number of chromosomes in the endosperm and antipodal cells will be:
 - a. 8 and 16
 - b. 16 and 8
 - c. 24 and 16
 - d. 16 and 24
4. A student found that a seed failed to germinate due to seed dormancy. The application of which of the following hormone would promote the seed to germinate?
 - a. Auxin
 - b. Gibberellin
 - c. Cytokinin
 - d. Absciscic acid
5. A plant breeder wants haploid plants for his breeding program. Which of the following methods of tissue culture should the plant breeder adopt in order to obtain haploid plants?
 - a. Embryo culture
 - b. Anther culture
 - c. Callus culture
 - d. Protoplast culture

GROUP – B

Give short answer to the following questions.

[4×4=16]

6. What is manure? Describe its types and importance in Agriculture [1+3]
7. Where does ETS occur? Give an account of Krebs cycle. [1+3]

OR

What is plant growth hormone? Mention the role of cytokinin in the development of plant. [1+4]

8. What is complex tissue? Draw a neat and well labelled detailed diagram of T.S of Dicot Root. [1+3]
9. What is pollination? Differentiate between self and cross pollination. [1+3]

GROUP – C

Give long answer to the following questions.

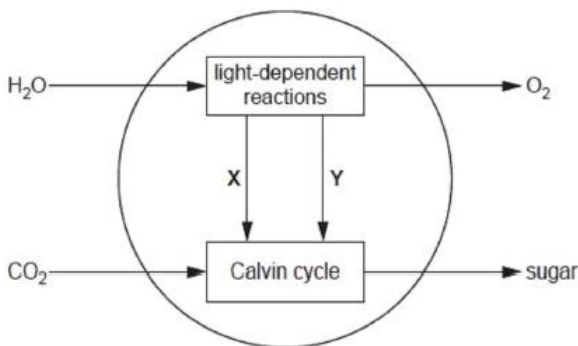
[2×8=16]

10. How can you differentiate dihybrid cross with mono hybrid cross? Describe and explain the law of independent assortment. [2+6]

OR

Elaborate the types, mechanism and significance of crossing over. [2+4+2]

11. The figure shows the relationship between the light-dependent and light-independent reactions in a chloroplast.



- a) Name the substances X and Y (2)
- b) Describe the process of light-independent reactions (6)

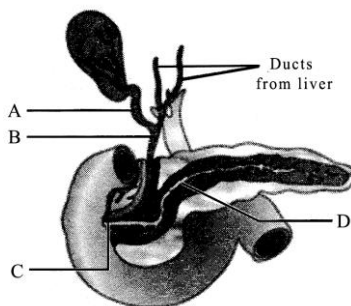
PART II (ZOOLOGY)

GROUP – A

Circle the correct one from given alternatives.

[6×1=6]

- Respiratory centre which control inspiration and expiration are located in
 - Medulla oblongata
 - Hypothalamus
 - Spinal cord
 - Cerebellum
- The duct systems of liver, gall bladder and pancreas are given below, correctly identify labeling A to D.



a)	b)	c)	d)
A–Cystic duct	A–Common bile duct	A–Pancreatic duct	A–Hepato-pancreatic duct
B–Common bile duct	B–Cystic duct	B–Hepato-pancreatic duct	B–Pancreatic duct
C–Pancreatic duct	C–Common bile duct	C–Hepato-pancreatic duct	C–Cystic duct
D–Cystic duct	D–Common bile duct	D–Hepato-pancreatic duct	D–Pancreatic duct

- Type of cleavage in frog's zygote is:
 - Holoblastic and equal
 - Holoblastic and unequal
 - Meroblastic
 - Diploblastic

4. The DNA molecule to which the gene of interest is integrated for cloning is called **d**:
 - a) Vector
 - b) Template
 - c) Carrier
 - d) Transformer
5. Keratinised stratified squamous epithelium is found in
 - a) Trachea
 - b) Lining of blood vessel
 - c) Mouth cavity
 - d) Epidermis
6. Insufficient supply of blood to organ **is**:
 - a) Ischemia
 - b) Necrosis
 - c) Euphoria
 - d) Apoptosis

GROUP – B

Give short answer to the following questions.

[4×4=16]

7. Human ear is also known as stato-acousting organ. Justify the statement in reference to the working mechanism of ear. [1 +3]
8. Nepal is rich in water resources. Enlist the various scopes of fish farming in Nepal. Also mention the various types of fish farming practices are adopted in Nepal. [3+1]

OR

Alcoholism is a very serious problem of Nepal in present situation. Identify the reasons and various effects of alcoholism. What can you contribute to control the excessive use of alcohol. [2+2]

9. What is organogenesis? Describe the process of neurulation and notogenesis in frog. [2+2]
10. Discuss the structure and function of cardiac muscle with diagram. How is it differing from skeletal muscles? [2+1+1]

GROUP – C

Give long answer to the following questions.

[2×8=16]

11. Fungal infection is a very common among living things. Name the fungal disease you have studied with causative agent. Also analyze the mode of transmission, symptoms and control measures. [1+1+2+2+2]
12. Nervous system is an important system of animals which control and coordinate the various activities of body. In which form the **message** conduct from the receptor cell to CNS and from CNS to effector organs? Describe the mechanism of conduction of nerve impulses in human being. [1+ 5+2]

OR

Name the excretory product and site of production in human beings. Draw well labeled diagram of nephron and describe the mechanism of urine formation in human. [1+2+5]



Attempt all questions.

PART I (BOTANY)
GROUP – A

Circle the correct one from given alternatives.

[5×1=5]

1. The process of formation of permanent tissue from meristematic tissue is:
 - a) Differentiation
 - b) Dedifferentiation
 - c) Redifferentiation
 - d) None of the above
2. In a monohybrid cross between two heterozygous individuals (Tt), the percentage of pure homozygous individuals obtained in F₁ generation is:
 - a) 25 %
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 - c) 75 %
 - d) 100 %
3. An angiospermic plant has 16 chromosomes in the leaf cell. The number of chromosomes in the endosperm and antipodal cells will be:
 - a) 8 and 16
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 - c) 24 and 16
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4. A student found that a seed failed to germinate due to seed dormancy. The application of which of the following hormone would promote the seed to germinate?
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5. A plant breeder wants haploid plants for his breeding program. Which of the following methods of tissue culture should the plant breeder adopt in order to obtain haploid plants?
 - a) Embryo culture
 - b) Anther culture
 - c) Callus culture
 - d) Protoplast culture

GROUP – B

Give short answer to the following questions.

[4×4=16]

6. Define genetic code. Explain the characteristics of genetic code. [1+3]

OR

Define phytohormone. Mention the physiological roles of Auxin in plants. [1+3]

7. The anatomical structure of a root of a vascular plant is shown in the given **Figure 'A'**. Study the given diagram and answer the following questions.

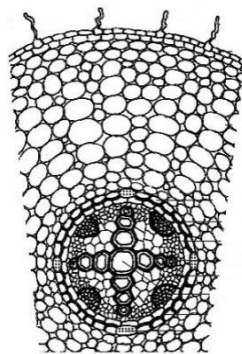


Figure 'A'

- a) Discuss the features from which you know that it is a TS of root and not a TS of stem. [2]
b) Identify whether it is that of a dicot or a monocot root. Explain. [2]

8. What is plasmolysis? How do the phenomenon of plasmolysis justify the semipermeable nature of cell membrane and permeable nature of cell wall? Discuss the uses of the knowledge of plasmolysis in daily life. [1+1+2]
9. A farmer wants to grow a good variety mango plant which he found while visiting the neighbouring village. He enquires you about the best technique for the quick production of mango fruit. Which technique of asexual reproduction would you suggest and why? [1+3]

GROUP – C

Give long answer to the following questions.

[2×8=16]

10. Life on earth solely depends on the ability of producers to produce food. One of the process food production is to harness the light energy of sun and produce food through a process called photosynthesis. Based on your study regarding photosynthesis, answer the following questions.

- a) Why does light reaction occur ahead of the dark reaction in photosynthesis? [1]
 - b) Explain the steps how glucose is produced during dark reaction in C₃ plants. [4]
 - c) Discuss about the reason that makes the C₃ plants less efficient than C₄ plants in photosynthetic efficiency? [3]
11. In the human population, there are people with colour vision deficiency who find it difficult to identify and distinguish between certain colours. This inability observed in the human population is called **colour blindness**.
- a) Justify, using genetic crosses, that colour blindness observed in humans is a case of sex linked inheritance. [4]
 - b) Examine how color blindness is a case of criss cross inheritance. [2]
 - c) Can human males be a carrier of the above trait? Justify your answer. [2]

OR

According to Mendelism, the segregation in one pair of allele is independent of the segregation in another pair of allele. Which law does the above statement refer to? Using genetic crosses explain the above statement showing cross up to second filial generation with chart and also predict the phenotypic and genotypic ratio. [1+5+2]

PART II (ZOOLOGY)

GROUP – A

Circle the correct one from given alternatives.

[6×1=6]

1. The cranial nerve responsible for taste sensation from tongue is :
 - a) Vagus & fascial
 - b) Glossopharyngeal & fascial
 - c) Hypoglossal and vagus
 - d) Trigeminal and vagus
2. Fertilization in most mammals occurs in :
 - a) Uterus
 - b) Ureter
 - c) Vagina
 - d) Fallopian tube
3. Gastrulation in frog covers step wise :
 - a) Epiboly, involution, cleavage
 - b) Invagination, involution, cleavage
 - c) Epiboly, invagination, involution
 - d) Involution, epiboly, exvagination
4. Biconcave erythrocyte of mammals helps :
 - a) In easy release in blood stream
 - b) In quick coagulation
 - c) In easy rolling
 - d) In providing maximum surface area
5. In Nepal , amniocentesis is banned due to :
 - a) Knowing of the foetal sex
 - b) Genetic diseases
 - c) Chromosomal abnormalities
 - d) Finding genetic disorder
6. The symptoms of Corona (COVID-19) are similar to :
 - a) Influenza
 - b) Flu
 - c) Both a and b
 - d) Hepatitis

GROUP – B

Give short answer to the following questions.

[4×4=16]

7. Compare and contrast cartilage and bone tissue. [2+2]
8. What is coelom? How is it form with reference to frog? [1+3]

Or

Discuss the various steps of pond maintenance in fish farming. [4]

9. Draw a well labelled diagram of internal structure of human heart. [4]
10. Suggest effective methods of control of population growth. [4]

GROUP – C

Give long answer to the following questions.

[2×8=16]

11. What are communicable diseases? Discuss the causative agents, symptoms, effects and control measures of anyone communicable disease you have studied. [1+7]
12. Draw a well labelled diagram of the alimentary canal of a human being. Explain the mechanism of the digestion of foods that a person under takes. What would happen in digestion when the pancreas is removed? [3+4+1]

Or

Draw a well labelled drawing of respiratory system of a human being. Why and how oxygen and carbon dioxide are exchanged rapidly in the lungs? What would happen if a person moves to high altitude? Write your views on how to solve it. [2+4+1+1]

Attempt all questions.

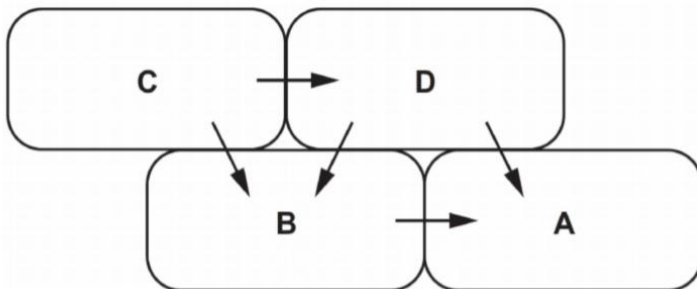
PART I (BOTANY)

GROUP – A

Circle the correct one from given alternatives.

[5×1=5]

1. The tissue that helps in secondary growth is _____
 - a. Apical meristem and lateral meristem
 - b. Intercalary meristem and apical meristem
 - c. Lateral meristem
 - d. Apical meristem
2. Anticodon of the nitrogenous base sequence TAC on template strand of DNA is _____
 - a. UAC
 - b. AUG
 - c. ATG
 - d. None
3. Which of the four cells gain more water by osmosis?



4. Which of the following methods of tissue culture should be adopted to raise virus free varieties of paddy plants?
 - a. Embryo culture
 - b. Anther culture
 - c. Meristem-tip culture
 - d. Protoplast culture
5. In _____, pollination is brought about by bat.
 - a. Ornithophily
 - b. Entomophily
 - c. Malacophily
 - d. Chiropterophily

GROUP – B

Give short answer to the following questions.

[4×4=16]

6. If you are given a photomicrograph of a plant part, what will help you to be confirmed that it is of stem, but not root? How will you be sure that it is dicot stem? [2+2]
7. Write short notes on the following:
Development of dicot embryo. [4]

OR

Different methods of grafting. [4]

8. Incomplete dominance is the phenomenon in which an allele of a gene dominates the expression of its recessive allele incompletely. So, both characters are expressed partially.
- a. Andalusian fowls are found in three different body colours – black, blue and white. Blue is the most common variant among three. The gene responsible for these colours has two alleles. The dominant allele 'B' incompletely dominant over its recessive allele is 'b'. Both of these alleles in their homozygous conditions 'BB' and 'bb' develop black and white colours respectively.
- Describe the monohybrid cross between these two contrasting homozygous parents to show phenotypic and genotypic ratio in F₂ generation. [2]
- b. The colour of flower in *Mirabilis jalapa*, 4 O'clock plant is another example of incomplete dominance. Like all other plants, it is photoautotrophic in mode of nutrition. What are the pigments that help them to be alike to other plants? [2]
9. Define genetic engineering. Describe the applications of genetic engineering in the field of agriculture. [1+3]

GROUP – C

Give long answer to the following questions.

[2×8=16]

10. Respiration is a very complex catabolic process in which food (glucose molecule) is oxidized and broken down to release energy in the form of Adenosine triphosphate (ATP).

When respiration occurs in presence of oxygen, it is called aerobic respiration. The process of aerobic respiration completes in four different steps that include glycolysis, oxidative decarboxylation of pyruvic acid, Krebs's cycle and oxidative phosphorylation.

- a) How does glycolysis help in the generation of ATP? [2]
- b) When one molecule of glucose is oxidized, how many ATP molecules are produced from Krebs's cycle? [3]
- c) What is the fate of pyruvic acid in those cells that do not have mitochondria? [2]
- d) What is oxidative phosphorylation? [1]

OR

Green plants are photoautotrophs that synthesize organic compound during a complex physiological process called photosynthesis. It completes in two major steps including light reaction and dark reaction.

- a) In dark reaction, also called Calvin cycle, CO₂ is reduced to glucose. How many Calvin cycles does it need to occur to synthesize one molecule of glucose. [1]
- b) Water is another chemical that is used as reducing agent in photosynthesis. When and where is water used? [2]
- c) During light reaction, photosynthetic pigments present in the membrane of thylakoid and stroma lamellae of chloroplast converts light energy into chemical energy and reducing power. Describe the process in which it occurs. [5]

11. What is DNA replication? Describe how it occurs in semi-conservative mode? [1+5+2]

PART II (ZOOLOGY)

GROUP – A

Circle the correct one from given alternatives.

[6×1=6]

1. Predict the stage in development of frog in which blastopore is found.
 - a. Morula
 - b. Blastula
 - c. Gastrula
 - d. Neurula
2. Identify which of the following is related with Hamburger's phenomenon?
 - a. O₂ dissociation
 - b. Chloride shift
 - c. CO₂ dissociation
 - d. bicarbonate shift
3. The largest cranial nerve is
 - a. Vagus
 - b. Auditory
 - c. Abducens
 - d. Facial
4. Solve the location of Henle's loop in mammalian kidney.
 - a. Cortex
 - b. Medulla
 - c. Pelvis
 - d. Columns of Bertini
5. Outline the correct option of the structure between uterus and vagina.
 - a. Uterine tube
 - b. Cervix
 - c. Vulva
 - d. Hymen
6. Camel's hump is composed of tissue which provides water when oxidized. It is _____
 - a. Skeletal tissue
 - b. Areolar tissue
 - c. Adipose tissue
 - d. Muscular tissue

GROUP – B

Give short answer to the following questions.

[4×4=16]

7. Fill the missing data in the table depicting diseases, their causatives and symptoms.

Name of disease	Causative organisms	Symptoms	Diagnosis
Typhoid	Salmonella		
	HBV	Nausea, vomiting, urine and stool discolouration, swelling of abdomen	Liver Function test
Cholera		Watery diarrhea with rice-watery stool, sunken eyes, dehydration, electrolyte imbalance.	
	Myxovirus influenzae		RDT
Candidiasis			Culture of fungus

8. Describe the structure of internal ear with labelled diagram. [2+2]
9. Design the process of amniocentesis. Also formulate its beneficial and harmful aspects. [2+2]
10. Find the solutions to avoid overpopulation. [4]

OR

- Construct a note on renal disorders. [4]

GROUP – C

Give long answer to the following questions.

[2×8=16]

11. Analyze and examine various processes involved in Human alimentary canal. [6+2]

OR

Explain human heart as Myogenic. Demonstrate a well labeled diagram of internal structure of heart with its description. [1+3+4]

12. Influenza is a contagious respiratory illness that causes mild to severe illness. Elaborate the disease with its causative agent, mode of transmission, symptoms and control measures. [1+1+3+3]



Model Questions – 2078 (2022)

Subject: Computer Science (Com. 4281)

Full Marks: 50

Time: 2 hrs.

SET A

GROUP – A

Multiple Choice Questions

[9×1 = 9]

Tick the best alternative.

- Which of the statements are used in DDL?
 - Create, alter and drop
 - Create, insert and select
 - Insert, update and delete
 - Delete, alter and drop
- With SQL, how do you select all the records from a table named “Persons” where the value of the column “FirstName” ends with an “a”?
 - SELECT * FROM Persons WHERE FirstName="a"
 - SELECT * FROM Persons WHERE FirstName LIKE "a%"
 - SELECT * FROM Persons WHERE FirstName LIKE "%a"
 - SELECT * FROM Persons WHERE FirstName="%a%"
- Which of the following statements is true about a star network topology?
 - Each device is connected to a switch or hub
 - Each device is connected to each other
 - Each device is connected in a trunk
 - Each device is connected to a terminal
- Which of the following is the correct syntax to display "Stay Safe" in an alert box using JavaScript?
 - alert-box("Stay Safe");
 - confirm("Stay Safe");
 - msgbox("Stay safe");
 - alert("Stay Safe");

5. What is the use of <A>tag?
- A) To insert an image
 - B) To create a link
 - C) To create a hyperlink
 - D) To create a list
6. What is the output of given C program?
- ```
void main()
{
char str1[] = "FIRST";
char str2[20];
strcpy(str2,str1);
printf("%s %s ",str1,str2);
printf("%d", (str1!=str2));
printf("%d", strcmp(str1,str2));
}
```
- A) FIRST FIRST 0 0
  - B) FIRST FIRST 1 1
  - C) FIRST FIRST 1 0
  - D) FIRST FIRST 0 1
7. Where is a class derived in inheritance?
- A) Superclass
  - B) Subclass
  - C) Subsetclass
  - D) Relativeclass
8. Which of these is the correct order of the SDLC?
- A) Analysis, Design, Coding, Testing, Implementation
  - B) Analysis, Design, Testing, Implementation, Coding
  - C) Implementation, Coding, Analysis, Design, Testing
  - D) Design, Testing, Implementation, Coding, Analysis
9. Why is cloud computing popular nowadays?
- A) Cost-sharing and easily accessible
  - B) As modern technology and costly
  - C) Accessible and freely available
  - D) Affordable to all

### GROUP –B

**Give short answer to the following questions.**

**[5×5=25]**

1. Explain 2NF and 3NF with examples.

OR

Demonstrate the basic DML statement with an example.

2. Write a function to add any two numbers in Javascript.

OR

Demonstrate the external CSS implemented in the web page.

3. Describe any five features of OOPs.
4. What are the different stages of software planning? Describe.
5. Define the concept of AI and IoT.

### GROUP –C

**Give long answer to the following question**

**[2×8=16]**

6. How do you implement the Class C IP address in the local area network? Describe.
7. Write a program to enter ten integer numbers into an array, sort and display them in ascending order.

OR

Write a program to read the marks of any 5 students in a subject and count how many students are pass and fail.



**Multiple Choice Questions****[9×1=9]****Tick the best alternative.**

1. To insert a record into a table, we use
  - a) Insert
  - b) Delete
  - c) Alter
  - d) All of the above
2. Which is a database software?
  - a) SQL
  - b) MYSQL
  - c) Oracle
  - d) All of the above
3. A topology where all the nodes are connected to each other.
  - a) Star
  - b) Bus
  - c) Tree
  - d) Mesh
4. In JavaScript, switch control structure supports
  - a) Integer values for case
  - b) Floating values for case
  - c) String values for case
  - d) All of the above
5. To use css codes in our HTML files, we enclose it between
  - a) <script> and </script>
  - b) <style> and </style>
  - c) <head> and </head>
  - d) None of the above

6. What would be the output?

```
#include <stdio.h>
int f(int x)
{
 return x;
}
int main()
{
 f(7);
 printf("result=%d",f(8));
 return 0;
}
```

- a) 0
- b) 9
- c) 2
- d) 8

7. The process of creating multiple classes from an existing class is called ... inheritance.

- a) Single
- b) multiple
- c) hierarchical
- d) multilevel

8. 'SDLC' stands for

- a) System Development Life Cycle
- b) Standard Development Life cycle
- c) Special Development Life Cycle
- d) All of the above (a,b,c)

9. Which is the example of cloud?

- a) Amazon Web Services (AWS)
- b) Dropbox
- c) Cisco WebEx
- d) All of the above

## GROUP –B

**Give short answer to the following questions.**

**[5×5=25]**

1. Define the term 'normalization'. Explain about 1N.

[1+4]

OR

Explain about create, delete and alter commands used in SQL.

[2+1+2]

2. What is a function in JS? Write a program to create a button, onclick of which displays an alert message. Use function.

[2+3]

OR

Make a simple webpage using HTML and CSS. Include:

[2+3]

->header for image

->two columns of width 25% and 75%

3. Differentiate between procedure Oriented programming and Object-Oriented programming.
- [5]
4. What is a software development model? Explain about spiral model.
- [2+3]
5. Explain any two fields where we can use AI.
- [5]

## GROUP –C

**Give long answer to the following question**

**[2×8=16]**

6. What is an IP address? What are its types? Under IPv4, how many classes are there? List them out. Differentiate between static and dynamic IP.
- [1+1+2+4]
7. Write a C program using structure to input employees' id, name and salary. Then print that entered data in sorted format on the basis of salary (from highest to lowest).
- [8]

OR

Let, a datafile named "book.txt" contains information of books (name, price, edition). Write a program in C language to add some more data and then print all the records of books having price >900.

[4+4]





**Multiple Choice Questions****[9×1=9]****Tick the best alternative.**

1. Which of the following is the basic structure of SQL to create table in data base.....?
  - a. CREATE table (field1 data\_type, field2 data\_type,.....)
  - b. CREATE table table\_name (field1 data\_type, field2 data\_type,.....)
  - c. CREATE table table\_data (field1 data\_type, field2 data\_type,.....)
  - d. All of the above
2. Which of the following is not example of DML(Data Manipulation Language)?
  - a. INSERT
  - b. UPDATE
  - c. DELETE
  - d. GRANT
3. Computer Network is
  - a. Collection of hardware components and computers
  - b. Interconnected by communication channels
  - c. Sharing of resources and information
  - d. All of the Above
4. .... is not the phase of waterfall model.
  - a. Requirement analysis
  - b. Testing
  - c. Build prototype
  - d. Maintenance
5. Which of the following syntax is correct to embed JavaScript to HTML?
  - a. <script type="text/javascript"></script>
  - b. <script language type="text/javascript"></script>
  - c. <script type="text/javascript language"></script>
  - d. All of the above
6. The prevention of data from unauthorized access is.....
  - a. Data security
  - b. Data integrity
  - c. Data misuse
  - d. All of above

7. The delivery of computing services over the internet rather than having local servers or personal devices handle applications is called.....
  - a. Cloud Computing
  - b. Analog Computing
  - c. Mobile Computing
  - d. All of the above
8. A variable which holds memory address of another variable is.....
  - a. Function
  - b. Pointer
  - c. Array
  - d. Structure
9. Binding the data with the code that manipulates it is .....
  - a. Polymorphism
  - b. Encapsulation
  - c. Inheritance
  - d. Abstraction

#### **GROUP –B**

**Give short answer to the following questions.**

**[5×5=25]**

1. Explain Cloud Computing with its characteristics. [2+3]
2. What is DBMS? Write its advantages and disadvantages. [1+4]

OR

What is normalization? Write its advantages. [1+4]

3. WAP to display largest among three numbers using JavaScript. [5]
4. Explain OOP with its features. [5]
5. Explain SDLC with its phases. [5]

#### **GROUP –C**

**Give long answer to the following question**

**[2×8=16]**

6. Explain guided and unguided transmission media with its types. [4+4]
7. WAP to input name and address of 10 employees and sort them in ascending alphabetic order according to their name. [8]

OR

WAP to enter name, roll no and marks of 10 students and store them in a file. [8]



**Multiple Choice Questions****[9×1=9]****Tick the best alternative.**

1. The key that identifies each record uniquely, is called
  - a) Primary key
  - b) Unique key
  - c) Key record
  - d) Field name
2. Which forms simplifies and ensures that there are minimal data aggregates and repetitive groups:
  - a) 1NF
  - b) 2NF
  - c) 3NF
  - d) All of the mentioned
3. Which of the following is/are the main goals of a distributed database?
  - a) Interconnection of database
  - b) Incremental growth
  - c) Reduced communication overhead
  - d) All of the above
4. Which of the following is a ternary operator in JS?
  - a) -
  - b) ?:
  - c) +
  - d) :
5. PHP stands for ...
  - a) Hypertext Processor
  - b) Hyper Markup Processor
  - c) Hyper Markup Preprocessor
  - d) Hypertext Preprocessor

6. What is the first octet value of class A IP?
- a) 0-126
  - b) 128-191
  - c) 224-239
  - d) 192-223
7. The function
- ```
int fibo()
{
    Statements;
}
```
- Is called
- a) Function declaration
 - b) Function definition
 - c) Function end
 - d) None of the above
8. What is an abstraction in object-oriented programming?
- a) Hiding the implementation and showing only the features
 - b) Hiding the important data
 - c) Hiding the implementation
 - d) Showing the important data
9. Agile Software Development is based on which of the following type?
- a) Iterative Development
 - b) Incremental Development
 - c) Both Incremental and Iterative Development
 - d) Linear Development

GROUP –B

Give short answer to the following questions.

[5×5=25]

1. Differentiate between centralized and distributed database. [5]

OR

What is RDBMS? Explain relational model of a database. [2+3]

2. Write the difference between server side scripting and client side scripting. [5]

OR

Write steps to connect PHP code to your database. Let, database name is 'test'. [5]

3. What are the different types of inheritance? Explain them. [5]
4. Describe in brief the process of prototype model. [5]
5. Define e-commerce and e-business. What are the advantages and disadvantages of e-commerce? [5]

GROUP –C

Give long answer to the following question

[2×8=16]

6. Define communication system. Explain each component of communication system with necessary diagram. [1+2+5]

OR

Define OSI reference model. Explain each layer of OSI model. [1+7]

7. Differentiate between library and user defined function. Write a program to display largest among three numbers by using pointer. [4+4]



Multiple Choice Questions**[9×1=9]****Tick the best alternative.**

1. Which of the following is a group of one or many attributes that uniquely identifies a row?
 - a) Key
 - b) Determinant
 - c) Tuple
 - d) Relation
2. In general, a file is basically a collection of all related
 - a) Rows & Columns
 - b) Fields
 - c) Database
 - d) Records
3. Give an example of half duplex mode of data communication.
 - a) TV
 - b) Radio
 - c) Walkie-Talkie
 - d) Internet
4. Which of the following can't be done with client-side JavaScript?
 - a) Validating a form
 - b) Sending a form's content by email
 - c) Storing the form's contents to a database file on the server
 - d) None of the above
5. Which one of the following should not be used while sending password or other sensitive information?
 - a) GET
 - b) POST
 - c) REQUEST
 - d) NEXT

6. What will fopen will return if there is any error while opening a file?
 - a) Nothing
 - b) NULL
 - c) EOF
 - d) Depends upon compiler
7. Which feature of OOP indicates code reusability?
 - a) Abstraction
 - b) Polymorphism
 - c) Encapsulation
 - d) Inheritance
8. Which of the following is the first step in SDLC framework?
 - a) Feasibility Study
 - b) Requirement Gathering
 - c) Communication
 - d) System Analysis
9. Which segment of e-commerce model does eBay belong to?
 - a) B2B
 - b) B2C
 - c) C2B
 - d) C2C

GROUP –B

Give short answer to the following questions.

[5×5=25]

1. What is RDBMS? Explain relational model of a database. [2+3]

OR

What is primary key? What are the features of good primary key? [1+4]

2. What is event handling in JavaScript? Explain with example. [2+3]

OR

What is variable? Write rules to variable in PHP. [1+4]

3. Define data abstraction and encapsulation. Mention their main advantages in OOP. [2+3]

4. Explain internet of thing (IOT) along with advantages and disadvantages. [5]

5. Describe in brief the process of agile model. [5]

GROUP –C

Give long answer to the following question.

[2×8=16]

6. Define network topology. Describe star and ring topology with necessary diagram. [2+6]
7. Write a c program to input name, salary, and post of 'n' employee and sort them in alphabetical order according to their name. [8]

OR

Write a program to create a data file named 'student.dat' and store roll number, name and address of 10 students and display the record in proper format. [8]

