**Total No. of Questions : 3]** **[Total No. of Pages : 2**

**P313**

# [4017] - 232

## S.Y. B.Sc. (Sem. - II)

## व्यावहारिक मराठी (नवा अभ्यासक्रम)

## मराठी (MARATHI)

## (2008 पॅटर्न) (53112)

*वेळ : 2 तास]* *[एकूण गुण : 40*

*सूचना: – 1) सर्व प्रश्न आवश्यक आहेत.*

*2) उजवीकडील अंक प्रश्नांचे गुण दर्शवितात.*

---

*प्रश्न 1.*अ) खालील उताऱ्याचे मराठीत भाषांतर करा. **[8]**

The Tiger has adapted to a great variety of environments, from the siberian taiga, where nights can be as cold as – $40^0$C, tigers haunt the ruins of buildings such as courts and temples and are at home in habitats ranging from dry grassland to rainforest. The tiger usually huts by night and preys on a variety of animals but it prefers fairly large prey such as deer (sambar, chital) and wild pigs. A special liking for porcupines, despite the danger of injury from their quills, is an exception. Healthy large mammals are generally avoided, although there have been recorded instances of the tiger's having attacked elephants and adult water buffalo. Cattle are occasionally taken from human habitations, and some tigers can thrive on domestic live stock. After making a kill and consuming what it can, it makes a deliberate attempt to hide the carcase from vultures and other scavengers so that another meal can be obtained. Tigers are not averse to commandeering a kill from other tigers or leopards and they sometimes eat carrion.

ब) खालील उताऱ्याचा शीर्षकासह एक तृतीयांश सारांश लिहा. **[7]**

आपण जेंव्हा महापुरूषांची जयंती किंवा पुण्यतिथी करतो तेंव्हा आपल्या मनात सालाबादा प्रमाणे न चुकता श्राद्धपक्ष करणाऱ्या कर्मकांडी माणसाची रूक्षता नसते. तसेच ही भूमिका केवळ अजागळ भाविकपणामधून निर्माण झालेली असते असेही म्हणता येणार नाही. ती भूमिका भावनेतून जन्म घेते, म्हणून ती त्वाज्य आहे असे म्हणणारांशी आम्ही सहमत होऊ शकत नाही. बुद्धी नावाच्या सम्राज्ञीला सिंहासनावर बसवून भावना नावाच्या दासीला परसदारी पाणी भरायला पाठविणारे आम्ही नव्हेत. आमच्या दृष्टीने प्रत्येक महापुरूष म्हणजे काही उत्कृष्ट गुणांची आणि मूल्यांची मूर्ती असते. त्यांचे कर्तृत्व हेच त्यांचे खरे स्मारक असते. 'मी मेलो तरी दासबोधात मी जिवंत आहे' असा उपदेश रामदासांनी आपल्या शिष्यांना

केला होता. आम्हीही असेच मानतो की प्रत्येक महान व्यक्ती तिच्या मृत्यूनंतर उरते ती कर्तृत्वाच्या आणि मूल्यनिष्ठांच्या रूपाने. म्हणून तर आपल्याही मनामधल्या मूल्यनिष्ठा उजळण्यासाठी आपल्या व्रतांवरचा गंज घासूनपुसून दूर करण्यासाठी महापुरूषांची आठवण नेहमीच जागी ठेवली पाहिजे. तिचा उच्चार मात्र होतो तो जयंती आणि पुण्यतिथीच्या निमित्ताने. सध्याचे आपले जीवन नाना कलंकांनी अंधारे करुन टाकले आहेत. ज्यांच्याकडून समाजाने काही अपेक्षा कराव्या, ते शख्यच आजकाल बेमुर्वतीचे झाले आहेत. आता समाजाला आधार आहे तो घोर काळरात्रीवर प्रकाशाची सरशी होऊ शकते. हे दाखवून देणाऱ्यांच्या चरित्राचा आणि चारित्र्याचा. (शब्दसंख्या–174)

*प्रश्न 2.* अ) खालीलपैकी कोणत्याही दोन प्रश्नांची उत्तरे लिहा. **[15]**

अ) सेंद्रिय शेती या विषयावर वर्तमानपत्रासाठी 300 शब्दांत लेख लिहा.

ब) 'माहितीचा अधिकार' या विषयावर आकाशवाणीसाठी 300 शब्दांचे भाषण तयार करा.

क) 'प्रयोगशाळेतील कामे' या विषयावर दूरचित्रवाणीसाठीच्या लघुपटाचे संहिता लेखन करा. कालावधी – 5 मिनिटे.

*प्रश्न 3.* खालील इंग्रजी शब्दांसाठी मराठीतील पारिभाषिक शब्द लिहा. **[10]**

1) Agroforestry

2) Hybrid

3) Acceptance

4) Due

5) Contestant

6) Dermatology

7) Anatomy

8) Religion

9) Policy

10) Molecule

⌘⌘⌘

**Total No. of Questions : 3]** **[Total No. of Pages : 3**

**P314**

# [4017] - 233

## S.Y. B.Sc. (Sem. - II)

## हिंदी (HINDI)

## (नया पाठ्यक्रम) (सामान्य)(General)

## (2008 Course) (New) (53212)

*समय : 2 घंटे]* *[ पूर्णांक : 40*

*पाठ्यपुस्तकें :–* *1) प्रतिनिधि कहानियाँ*
*संपादक –हिंदी विभाग, एस.एन.डी.टी. विश्वविद्यालय, मुंबई*
*2) छायावाद : प्रतिनिधि रचनाएँ*
*संपादक – नीरा परमार*

*सूचनाएँ : –* *1) सभी प्रश्न अनिवार्य हैं।*
*2) दाहिनी ओर लिखे अंक प्रश्न के पूर्णांक हैं।*

---

*प्रश्न 1.*अ) निम्नलिखित में से किन्हीं दस संक्षिप्तियों के हिंदी पूर्ण पर्याय लिखिए । **[10]**

i) B.B.C.

ii) C.B.

iii) C.I.D.

iv) D.I.R.

v) F.E.R.A.

vi) F.S.S.

vii) I.A.S.

viii) I.D.A.

ix) M.I.D.C.

x) M.L.A.

xi) M.D.S.C.

xii) N.E.T.

*P.T.O.*

आ) निम्नलिखित अनुच्छेद का एक – तिहाई सारांश लिखते हुए उसे उचित शीर्षक दीजिए। **[4]**

कालेज और स्कूल में रिकार्ड रखने और एकाउंटिंग के लिए वर्षों से कंप्यूटरों का इस्तेमाल हो रहा है। अनेक कालेजों ने कंप्यूटर का इस्तेमाल करके पंजीकरण के लिए लंबी कतारों को समाप्त कर दिया है। भारत में अधिकतर पब्लिक स्कूलों में इस्तेमाल के लिए कंप्यूटर उपलब्ध हैं। शिक्षाविद जो एक समय कंप्यूटर को कक्षा में शोभा की वस्तु मान रहे थे, अब इसे एक जरूरी आवश्यकता मानते हैं। अभिभावक भी इस बात को सुनिश्चित कर लेना चाहते हैं कि उनके बच्चे कंप्यूटर युग में पीछे न रह जाएं। इसलिए स्कूलों पर कंप्यूटर हासिल करने और इसके इस्तेमाल के लिए शिक्षकों व छात्रों को प्रशिक्षित करने का दबाव पड़ रहा है।

*प्रश्न 2.* अ) निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर लिखिए। **[8]**

i) हरगोबिन का चरित्र – चित्रण कीजिए।

ii) सोमा बुआ के व्यक्तित्व पर प्रकाश डालिए।

iii) 'जिंदगी और गुलाब' कहानी के शीर्षक की सार्थकता स्पष्ट कीजिए।

iv) 'चीफ की दावत' कहानी की माँ दावत में किस प्रकार रंग भरती है ?

आ) निम्नलिखित अवतरण की ससंदर्भ व्याख्या कीजिए। **[5]**

i) मैं भाई –भाभियों की नौकरी करके पेट पालूँगी। बच्चों के जूठन खाकर एक कोने में पड़ी रहूँगी, लेकिन यहाँ अब नहीं ... अब नहीं रह सकूँगी।

अथवा

ii) सब नामर्द अंदर बैठे हैं। कोई नहीं बाहर निकलता है। यह मेरा वतन है, मेरा वतन। देखता हूँ, कौन जीने से रोकता है ?

*प्रश्न 3.* अ) निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर लिखिए। **[8]**

i) 'जागो फिर एक बार' कविता में कवि किस प्रकार वीरता का आवाहन करता है ?

ii) 'वनबेला' कविता में कवि ने प्रकृति का चित्रण किस प्रकार किया है ?

iii) 'द्रुत झरो' कविता का आशय स्पष्ट कीजिए।

iv) 'कवि भारत माता' कविता द्वारा क्या कहना चाहता है ?

आ) निम्नलिखित अवतरण की ससंदर्भ व्याख्या कीजिए। **[5]**

i) सिंह की गोद से छीनता है शिशु कौन ?

मौन भी क्या रहती वह रहते प्राण
रे अजान,
एक मेषमाता ही
रहती है निर्निमेष–
दुर्बल वह।

अथवा

ii) ज्ञान मूढ
गीता प्रकाशिनी !
पंचशील रत, विश्व शांति व्रत,–
युग–युग से गृह आँगन श्रीहत,
कब होंगे जन उद्यत जाग्रत ? –

⌘⌘⌘

**Total No. of Questions :4]** **[Total No. of Pages : 2**

**P315**

# [4017] - 234

## S.Y. B.Sc. (Sem. - II)

## संस्कृत (SANSKRIT)

## गीर्वाणभारती (Gīrvānabhāratī)

## (2008 Pattern) (53312)

***Time : 2 Hours]*** ***[Max Marks : 40***

---

***Q1)*** Write short answers in 2-4 lines of the following questions. **[16]**

**पुढील प्रश्नांची 2-4 ओळींमध्ये उत्तरे लिहा.**

i) What did old man say to the children ?

**वृद्धमाणसाने मुलांना काय सांगितले ?**

ii) What is an applied Science and state their names ?

**व्यवहारोपयोगी शास्त्र म्हणजे काय ? आणि ती कोणती ?**

iii) How many types of **चुम्बक** and what are they ?

**चुम्बकाचे प्रकार किती व कोणते ?**

iv) State the three main types of **विमान** ?

**विमानाचे मुख्य तीन प्रकार सांगा ?**

v) State the two books of **भास्कराचार्य**.

**भास्कराचार्यांच्या दोन ग्रंथांची नावे लिहा.**

vi) In which condition savarkar was when his wife saw him ?

**सावरकरांना त्यांच्या पत्नीने पाहिले तेव्हा ते कोणत्या अवस्थेत होते ?**

vii) Explain the meaning of **'दैवं विधानमनुगच्छति कार्य सिद्धिः'**

**'दैवं विधानमनुगच्छति कार्यसिद्धिः' याचा अर्थ स्पष्ट करा.**

viii) What did poet say about **याचक** ?

**याचकाविषयी कवी काय म्हणतो ?**

***P.T.O.***

***Q2)*** Write short notes on any two of the following in 8-10 lines each. **[8]**

**पुढीलपैकी कोणत्याही दोहोंवर 8 ते 10 ओळीत संक्षिप्त टीपा लिहा.**

i) **पदार्थविज्ञानम् ।**

ii) **नगररचना.**

iii) **रसशाला.**

***Q3)*** Write short notes on any two of the following in 8-10 lines each. **[8]**

**पुढीलपैकी कोणत्याही दोहोंवर 8 ते 10 ओळींत संक्षिप्त टीपा लिहा.**

i) **भास्कराचार्यः ।**

ii) **सुभाषितानि ।**

iii) Maghas description about friend & enemy .

**माघाने केलेले मित्र व शत्रुचे वर्णन.**

***Q4)*** Answer any one of the following questions in 16-20 lines. **[8]**

**पुढीलपैकी कोणत्याही एका प्रश्नाचे उत्तर 16-20 ओळीमध्ये लिहा.**

i) Explain the story of **'सद्धर्मपुण्डरीक'**.

**'सद्धर्मपुण्डरीक कथा' स्पष्ट करा.**

ii) Write the summary of lesson **'अमरसन्देशः'**.

**'अमरसंदेशः' या पाठाचा सारांश लिहा.**

⌘⌘⌘

**Total No. of Questions : 4]** **[Total No. of Pages : 2**

**P283**

# [4017]-201

## S.Y. B.Sc.

## MATHEMATICS

## MT - 221 : Linear Algebra

## (Sem. - II) (Paper - I) (2008 pattern) (51112)

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

***Q1)*** Attempt any five of the following : **[10]**

a) Find the value of $k$, so that the vectors $v_1 = (1, -2)$ and $v_2 = (-5, k)$ are linearly dependent in $R^2$.

b) If $S = \{e_1 - e_2, e_1 + e_2\}$, where $e_1 = (1, 0)$, $e_2 = (0, 1)$ then find L(S).

c) Let $T : V \rightarrow W$ be linear transformation. If T is one to one then show that ker $T = \{0\}$.

d) State dimension theorem for matrices and hence find nullity of matrix A, if A is of rank 3 and order is $5 \times 10$.

e) If $(a, 4)$ and $(3, 5)$ are orthogonal vectors in $R^2$ then find the value of $a$.

f) Find the eigenvalues of the matrix $A = \begin{bmatrix} 2 & 7 \\ 1 & -2 \end{bmatrix}$.

g) If $u$ and $v$ are orthonormal vectors in an inner product space V, then find $\| u + v \|$.

***Q2)*** Attempt any two of the following : **[10]**

a) If a vector space V has a basis of $n$ elements then show that any set of $n + 1$ vectors is linearly dependent.

b) Find the standard matrix for the linear transformation T where $T(x, y, z) = (x + y + 2z, x + z, 2x + y + 3z)$. Hence find dim kerT.

c) If $u = (3, -1, 2)$ and $v = (2, 1, -2)$ then find $< 2u + 3v, 3u - v >$.

***P.T.O.***

***Q3)*** Attempt any two of the following : **[10]**

a) Let V be a vector space and dim V = *n.* Then show that any linearly independent set of *n* vectors in V is a basis of V.

b) If *u*, *v* are vectors in an inner product space *v* and *k* is any scalar then prove that

i) $\| ku \| = |k| \, \|u\|$.

ii) $\| u + v\| \leq \|u\| + \|v\|$.

c) Find eigenvalues of matrix given below. Also find eigenspace corresponding to the largest eigenvalue. $A = \begin{bmatrix} 2 & -1 & 1 \\ 0 & 3 & -1 \\ 2 & 1 & 3 \end{bmatrix}$.

***Q4)*** Attempt any one of the following : **[10]**

a) If V and W are finite dimensional vector spaces and T : V $\rightarrow$ W is a linear transformation, then prove that dim V = dim ker (T) + dim Im(T).

b) Explain Gram - Schmidt process for transforming a basis of an inner product space V to the orthogonal basis for V. Hence transform the basis S of $R^3$ to the orthonormal basis set where S = { (1, 1, 1), (0, 1, 1), (0, 0, 1)}.

♦♦♦♦

**Total No. of Questions : 4]** **[Total No. of Pages : 2**

**P284**

# [4017]-202

## S.Y. B.Sc. (Sem. - II)

## MATHEMATICS

## (MT - 222) (A) : Vector Calculus

## (Paper - II) (2008 pattern) (511A2)

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

***Q1)*** Attempt any five of the following : **[10]**

a) A function $\bar{f}(t)$ is defined by $\bar{f}(t) = \begin{cases} \left(\dfrac{t^2-1}{t-1}\right)\bar{i} + t^3\ \bar{j}; & t \neq 1 \\ 2\bar{i} + \bar{j}; & t = 1 \end{cases}$

show that $\bar{f}(t)$ is continuous at $t = 1$.

b) If $\bar{u} = t\bar{i} + 2\bar{j} - t^2\bar{k}$ and $\bar{v} = e^t\bar{i} - e^{-t}\bar{j}$ then find $\dfrac{d}{dt}(\bar{u}.\bar{v})$.

c) If $\phi(x, y) = \dfrac{x^3}{3} - xy^2$, find $|\nabla\phi|$.

d) Define directional derivative at a point of a scalar point function.

e) Find the value of '$a$' if the vector field $\bar{u}(x, y, z) = (2x + y)\bar{i} + (y - 2z)\bar{j} + (x - az)\bar{k}$ is solenoidal.

f) State stoke's theorem.

g) Evaluate $\int_c (3x^2 + 6y)dx - 14yz\,dy + 20xz^2\,dz$ along the straight line path from (1, 0, 0) to (1, 1, 0).

***P.T.O.***

***Q2)*** Attempt any two of the following : **[10]**

a) If $\bar{f}(t)$ is differentiable at $t_0$ then show that it is continuous at $t_0$. Is the converse true? Illustrate by an example.

b) A particle moves along the curve $x = e^{-t}$, $y = 2\cos 3t$, $z = 2\sin 3t$. Find its velocity and acceleration at any time $t$. Also find their magnitudes at $t = 0$.

c) Find curl(curl $\bar{a}$), when $\bar{a} = xy\bar{i} - yz\,\bar{j} + 2xz\bar{k}$.

***Q3)*** Attempt any two of the following : **[10]**

a) If $\bar{u}$ and $\bar{v}$ are two vector functions possessing first partial derivatives, then prove that $\text{div}(\bar{u} + \bar{v}) = \text{div}\,\bar{u} + \text{div}\,\bar{v}$.

b) If the gradient of the scalar point function $\phi(x, y, z)$ is given by

$\nabla\phi = (Z\cos\pi y + 2xy)\bar{i} - (\pi xz\sin\pi y + x^2)\,\bar{j} + (x\cos\pi y)\bar{k}$ and

$\phi(1,1,1) = 0$, find $\phi(x, y, z)$.

c) If $\bar{a} = \alpha x\bar{i} + \beta y\,\bar{j} + \gamma z\bar{k}$, show that $\nabla(\bar{a}.\bar{r}) = 2\bar{a}$. State whether $\bar{a}$ is irrotational.

***Q4)*** Attempt any one of the following : **[10]**

a) i) By using Gauss - divergence theorem, prove the following Green's identity $\iiint_v (\phi\nabla^2\psi - \psi\nabla^2\phi)dv = \iint_s (\phi\nabla\psi - \psi\nabla\phi).\hat{n}\,ds$

ii) Show that the area bounded by a simple closed curve C is given by $\frac{1}{2}\int_c (x\,dy - y\,dx)$ and hence find the area of an ellipse.

b) Verify divergence theorem for $\bar{F} = (x^2 - yz)\bar{i} + (y^2 - zx)\,\bar{j} + (z^2 - xy)\bar{k}$ taken over the rectangular parallelopiped $0 \le x \le a$, $0 \le y \le b$, $0 \le z \le$ c.

♦♦♦♦

**Total No. of Questions : 4]** **[Total No. of Pages : 2**

**P293**

# [4017]-211

## S.Y. B.Sc.

## ZOOLOGY

## ZY - 222 : Applied Zoology - II

## (Apiculture & Sericulture)

## (Sem. - II) (Paper - II) (2008 pattern) (51522)

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Neat labelled diagrams must be drawn wherever necessary.***

***Q1)*** Attempt the following : **[10]**

a) What is rereeling?

b) What is supersedure?

c) Mention the significance of deflossing.

d) What is nuptial flight?

e) Define Moriculture.

f) Mention the use of smoker.

g) Enlist any two bacterial diseases of silkworm.

h) What is the role of bee venom.

i) Define prunning.

j) Mention biological name of Eri silkworm.

***Q2)*** Write short notes on (any two) : **[10]**

a) Muscardine disease of silkworm.

b) Tail - wagging dance.

c) Morphology of adult mulberry silk moth.

***P.T.O.***

***Q3)*** Attempt the following (any two) : **[10]**

a) Describe management of bees in rainy and winter season.

b) Describe any two methods of stiffling.

c) Sketch and label honey extractor.

***Q4)*** Describe in detail bee pests and predators. **[10]**

OR

Explain in detailed bed cleaning methods applied in sericulture.

♦♦♦♦

**Total No. of Questions : 4]** **[Total No. of Pages : 2**

**P294**

# [4017]-212

## S.Y. B.Sc. (Sem. - II)

## GEOLOGY

## GL - 221 : Petrology

## (51612) (2008 Pattern) (Paper - I)

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

***Q1)*** Answer the following questions: **[10]**

a) Name two minerals of low - silication.

b) What is eutectic?

c) Define competence.

d) What is dedolomitisation?

e) What is bauxite?

f) Define the term metasilicates.

g) What is mean by blasto - porphyritic?

h) What is felsic?

i) What is crush breccia?

j) Define metasomatism.

***Q2)*** Write notes on (any two) : **[10]**

a) Stress and antistress minerals.

b) Crystallisation of unicomponent magma.

c) Roundness and sphericity of sediments.

***P.T.O.***

***Q3)*** Explain the following (Any two) : **[10]**

a) Crystallinity and granularity.

b) Origin and environmental significance of graded bedding.

c) Perlitic & Expansion cracks.

***Q4)*** What are chemical deposits. Explain carbonate and ferruginous sedimentary deposits. **[10]**

OR

Define thermal metamorphism. Explain the effects of thermal metamorphism on pure and impure limestones.

♦♦♦♦

**Total No. of Questions : 4]** **[Total No. of Pages : 2**

**P295**

# [4017]-213

## S.Y. B.Sc.

## GEOLOGY

## GL - 222: Palaeontology & Stratigraphy

## (Paper - II) (Sem. - II) (51622) (2008 Pattern)

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Draw neat diagrams wherever necessary.***
3) ***Figures to the right indicate full marks.***

***Q1)*** Answer the following questions: **[10]**

a) Define Stratigraphy.

b) Define Chronozone.

c) What are Varves?

d) What is marine transgression?

e) Define macroevolution in organisms.

f) What are marker beds?

g) Define glabella in Trilobites.

h) Give the class & phylum of Foraminiferida.

i) Define Palynology.

j) Give the name of male & female carapace in ostracods.

***Q2)*** Write notes on (any two) : **[10]**

a) Biostratigraphic units.

b) Classification of unconformities based on Moradical change in environment.

c) Logging as a method for collection of stratigraphic data.

***P.T.O.***

***Q3)*** Write notes on (any two) : **[10]**

a) Uses of microfossils in palaeoenvironment & ecological studies.

b) Types of hinges in ostracods.

c) Types of apertures in spores.

***Q4)*** Explain the role of Non - uniform deposition in controlling stratification. **[10]**

OR

Describe the morphology of spores. Add a note on uses of pollers and spores.

♦♦♦♦

**Total No. of Questions : 4]** **[Total No. of Pages : 3**

**P296**

# [4017]-214

## S.Y. B.Sc.

## STATISTICS

## ST - 221 : Statistical Methods and National Income

## (Semester - II) (2008 pattern) (51712)

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of calculator and statistical tables is allowed.***
4) ***Symbols and abbreviations have their usual meaning.***

***Q1)*** Attempt each of the following :

a) Choose the correct alternative in each of the following : **[1 Each]**

i) If $2x_1 - 7x_2 + 21x_3 = 105$ is the equation of regression plane of $x_2$ on $x_1$ and $x_3$, then $b_{21.3}$ is equal to,

1) 2 2) $2/7$

3) $7/2$ 4) –7

ii) Rejecting $H_0$ when it is false is,

1) Type - I error. 2) Type - II error.

3) Correct decision. 4) None of the above.

iii) Testing $H_0 : \mu = 0$ against $H_1 : \mu > 0$ is a,

1) One sided left tailed test. 2) One sided right tailed test.

3) Two sided test. 4) None of the above.

b) State whether the given statement is true or false in each of the following : **[1 Each]**

i) $b_{12.3} \times b_{21.3} = r_{12.3}$

ii) Level of significance is a probability.

iii) Index numbers are unitless.

***P.T.O.***

c) A manufacturer of ball - bearing guarantees that 2% of items are defective. Set up the null hypothesis and alternative hypothesis to test the claim. **[1]**

d) State any two methods of measuring national income. **[1]**

e) State fisher's Z - transformation. **[1]**

f) If $r_{12} = r_{13} = 0$, find $R_{1.23}$ **[1]**

***Q2)*** Attempt <u>any two</u> of the following : **[5 Each]**

a) Derive an expression for partial correlation coefficient ($r_{12.3}$) in terms of total correlation coefficients.

b) Describe large sample test for testing $H_0 : \mu = \mu_0$ against

i) $H_1: \mu > \mu_0$

ii) $H_1 : \mu < \mu_0$

iii) $H_1 : \mu \neq \mu_0$,

Where $\mu$ is the population mean from which the sample is drawn, the population variance is known.

c) With usual notations prove that,

$$b_{12} = \frac{b_{12.3} + b_{13.2}\, b_{32.1}}{1 - b_{13.2}\, b_{31.2}}$$

***Q3)*** Attempt <u>any two</u> of the following : **[5 Each]**

a) Discuss any two problems that arises in the construction of cost of living index number.

b) Explain

i) Gross National Product (GNP)

ii) Gross Domestic Product (GDP)

c) A quality- control manager of an electronic plant thinks that, ladies do better work than that of gents. A sample of 400 items produced by ladies found to have 20 defectives. On the other hand a sample of 500 items produced by gents contained 32 defectives. Do the above data support manager's claim? Justify the answer at 1% level of significance.

***Q4)*** Attempt <u>any one</u> of the following :

a) i) Derive the equation of least square regression plane of $x_1$ on $x_2$ and $x_3$. **[7]**

ii) Following are the index numbers of wages of industrial workers in two companies, compare the two series and comment. **[3]**

| Year | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|
| Index numbers of Company A(Base year - 2002) | 60 | 90 | 100 | 140 | 160 | 200 |
| Index numbers of Company B(Base year - 2005) | 210 | 230 | 250 | 300 | 250 | 400 |

b) i) Explain how to construct 95% confidence interval for population proportion (p). **[4]**

ii) With usual notations prove that, $\sigma^2_{1.23} = \sigma^2_1 \frac{|R|}{R_{11}}$ **[4]**

iii) If the salary of a person during the year 2009 was Rs. 12900 per month and the cost of living index number for this year was 250, calculate the real salary of the person. **[2]**

♦♦♦♦

**Total No. of Questions : 4]** **[Total No. of Pages : 3**

**P297**

# [4017]-215

## S.Y. B.Sc.

## STATISTICS

## ST - 222: Continuous Probability Distributions - II and Demography

## (51722) (Paper - II) (2008 Pattern) (Sem. - II)

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of calculator and statistical tables is allowed.***
4) ***Symbols and abbreviations have their usual meaning.***

***Q1)*** Attempt each of the following:

a) Choose the correct alternative in each of the following: **[1 Each]**

i) If a moment generating function of continuous random variable X is given by $M_X(t) = (1-2t)^{-3}$ then variance of X is

1) 6
2) 4
3) 12
4) 3

ii) Which of the following is true?

1) N.R.R. is generally greater than G.R.R.
2) N.R.R can never exceed G.R.R.
3) N.R.R. and G.R.R. usually equal.
4) None of the above.

iii) The mean of t - distribution with 'n' degrees of freedom is

1) 0
2) 1
3) n
4) n – 1

***P.T.O.***

b) State whether the given statement is true or false in each of the following: **[1 Each]**

i) Statistic is a function of sample values involving unknown population parameter.

ii) Chi – Square test for goodness of fit is always right tailed test.

iii) If $X \to \chi^2_{n_1}$, $Y \to \chi^2_{n_2}$ are independent random variables then (X – Y) is also Chi - Square random variable.

c) State mean and variance of Chi - Square distribution with n degrees of freedom. **[1]**

d) State confidence interval for the population mean when population variance is unknown. **[1]**

e) Give one real life situation where pair t – test can be used. **[1]**

f) Define infant mortality rate. **[1]**

***Q2)*** Attempt any <u>two</u> of the following : **[5 Each]**

a) Let $X \to \chi^2_n$ . Find the mode of X.

b) Obtain the sampling distribution of mean of a random sample drawn from normal distribution.

c) A company has installed new color video display terminals to replace old ones. A batch of 22 operators was trained to use new machine. They required on an average 17.2 hours with variance 35.8 square hours for achieving satisfactory performance. In order to learn old terminals the company had trained 20 operators for on the average 21.3 hours with variance 49 square hours. Should the supervisor of the company claim that new terminals are easier to operate at 5% level of significance.

***Q3)*** Attempt any <u>two</u> of the following: **[5 Each]**

a) If a random variable T follows t – distribution with 'n' degrees of freedom, find the $(2r)^{th}$ order central moment of T. Hence find its variance.

b) Explain the test procedure for testing equality of two population variances.

c) The number of births classified, according to age of mother, together with the female population, in each group of the child bearing period in one of Indian State in 2010 is as shown below:

| Age group | 15-20 | 20-25 | 25-30 | 30-35 | 35-40 | 40-45 | 45-50 |
|---|---|---|---|---|---|---|---|
| Female population | 8000 | 10,000 | 12,000 | 6000 | 3000 | 5000 | 4000 |
| Number of births | 56 | 100 | 84 | 36 | 15 | 05 | 04 |

Compute : i) General fertility rate.

ii) Total fertility rate.

***Q4)*** Attempt any one of the following :

a) i) State the inter - relations among normal, Chi-Square, t and F distribution. **[4]**

ii) Define crude death rate and standard death rate. Also explain direct method of standardization. **[4]**

iii) Let $X_1, X_2, .....X_{20}$ be a random sample from normal population with mean 5 and variance16.Determine the distribution of

$$Y = \sum_{i=1}^{20} \left( \frac{X_i - 5}{4} \right)^2 .$$ **[2]**

b) i) The following information is collected on two characters:

| | Cinegoers | Non – cinegoers |
|---|---|---|
| Literate | 83 | 57 |
| Illiterate | 45 | 65 |

Based on this information can you conclude that there is no association between habit of watching cinema going (cinegoers) and literacy at 5% level of significance. **[5]**

ii) Let X follows F distribution with 2 and 8 degrees of freedom. If $P(X \leq a) = 0.01$and $P(X \geq b) = 0.99$, find a and b. **[5]**

♦♦♦♦

**Total No. of Questions : 4]** **[Total No. of Pages : 2**

**P298**

# [4017]-216

## S.Y. B.Sc. (Sem. - II)

## GEOGRAPHY

## Gg - 221: Distribution, Development and Planning of Resources

## (51812) (Paper - I) (2008 Pattern)

*Time : 2 Hours]* *[Max. Marks : 40*

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat diagrams and sketches wherever necessary.***
4) ***Use of map stencil is allowed.***

***Q1)*** Answer the following questions in two to three sentences each : **[10]**

a) Name any four important coal producing countries of the world.

b) List any four leading petroleum producing countries of the world.

c) Name any two countries producing natural gas.

d) Name any two leading nuclear power producing countries.

e) How is the density of population calculated?

f) Name any four sparsely populated countries of the world.

g) What are the various industrial uses of water resources?

h) What is over population?

i) What are the various uses of mineral resources?

j) What is the need of resource planning?

***Q2)*** Write short notes on the following (Any Two): **[10]**

a) Distribution and production of petroleum in India.

b) Optimum population.

c) Role of energy resources in economic development.

***P.T.O.***

***Q3)*** Answer the following questions (Any Two) : **[10]**

a) Give an account of wind energy in India.

b) What is the significance of solar energy?

c) Describe the state of resource planning in India.

***Q4)*** Give an account of distribution and production of iron ore in major countries of the world. **[10]**

OR

Explain the role of water resources in the economic development of a country.

♦♦♦♦

**Total No. of Questions : 4]** **[Total No. of Pages : 2**

**P299**

# [4017]-217

## S.Y. B.Sc.

## GEOGRAPHY (Sem. - II)

## Gg - 222: Surface Water And Ground Water Hydrology

## (Paper - II) (2008 Pattern) (51822)

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat diagrams and sketches wherever necessary.***
4) ***Use of map stencil is allowed.***

***Q1)*** Answer the following questions in two to three sentences each : **[10]**

a) Define transpiration.

b) What is meant by sublimation?

c) What do you mean by run - off ?

d) Define flood.

e) What is meant by infiltration?

f) What do you mean by aquifer?

g) Define salt water intrusion.

h) What is hydrograph?

i) Give the long form of SWMM.

j) Define urban hydrology.

***Q2)*** Write short notes on the following (Any Two): **[10]**

a) Evapotranspiration.

b) Stream flow.

c) Approaches to the urban hydrology.

***P.T.O.***

***Q3)*** Answer the following questions (Any Two) : **[10]**

a) Explain the surface distribution of water.

b) Describe the causes of flood.

c) What is ground water hydrology?

***Q4)*** Explain the effects of urbanization on run - off. **[10]**

OR

Describe the factors affecting evaporation.

♦♦♦♦

**Total No. of Questions : 4]** **[Total No. of Pages : 2**

**P300**

# [4017]-218

## S.Y. B.Sc.

## MICROBIOLOGY

## MB - 221 : Bacterial Systematics and Analytical Microbiology

## (51912) (Paper - I) (Sem. - II) (2008 Pattern)

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat labeled diagrams wherever necessary.***
4) ***Use of calculators, log tables and statistical tables is allowed.***
5) ***Use graph paper if necessary.***

***Q1)*** Attempt the following : **[10]**

a) Define DNA hybridization.

b) State True or False :
The standard deviation is equal to the positive square root of variance.

c) Find the value of $\log_2 16$.

d) Which one of the following scale is the best scale in measurement of data.

i) Ratio scale. ii) Ordinal scale.
iii) Interval scale. iv) Nominal scale.

e) The mid point of the class interval 34.5 to 44.5 is

i) 01.5 ii) 39
iii) 39.5 iv) 40.5

f) What is a dendogram?

g) State True or False:
Primary data are more reliable than any other data type.

h) Write the formula for G + C%

i) Determine Mode

| $x$ | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|
| $f$ | 2 | 5 | 10 | 21 | 12 | 13 |

j) Bergey's Manual of systematic Bacteriology uses _____ approach to classify bacteria.

***P.T.O.***

***Q2)*** Attempt any two of the following : **[10]**

a) Write the significance of 16 s rRNA in bacterial classification.

b) Solve the following :

i) Evaluate $\int (3x-7)^5 dx$

ii) Find the equation of straight line passing through two points (1, –2) & (5, 6).

c) Calculate the standard deviation for the frequency distribution given below:

| Class interval | 0-20 | 20-40 | 40-60 | 60-80 | 80-100 |
|---|---|---|---|---|---|
| Frequency | 5 | 12 | 32 | 40 | 11 |

***Q3)*** Attempt the following (Any Two) **[10]**

a) Comment on chemotaxonomy with reference to cell wall composition.

b) Find the derivative of

$$f(x) = (x^2 - 5x + 1)(2x + 3)$$

c) Draw a frequency polygon for the following data :

| No. of Coliforms | 100-300 | 300-500 | 500-700 | 700-900 | 900-1100 | 1100-1300 |
|---|---|---|---|---|---|---|
| No. of Samples | 6 | 16 | 24 | 20 | 10 | 04 |

***Q4)*** Attempt the following (Any Two) : **[10]**

a) Comment on Numerical taxonomy.

b) 4 rabbits are selected for an experiment from a group of 6 white & 4 brown. In how many ways can the selection be made so that the selected group contains 2 brown rabbits?

c) In a random sample of 800 persons from rural area 200 were found to be anaemic. In a sample of 1000 persons from urban area 350 were found to be anaemic. Test whether proportion of anaemic, is same for both populations. (use 1% level of significance.)

♦♦♦♦

Total No. of Questions : 4] [Total No. of Pages : 3

P316

# [4017] - 235
## S.Y. B.Sc. (Sem. - II)
## ARABIC (Functional)
## (53712) (2008 Pattern)

*Time : 2 Hours]* *[Max. Marks :40*

1. Translate into Eng/Urdu/Marathi any two of the following Passages: 10

(الف) هٰذا الرّسم جميلٌ جدّاً - مَا فِي الرّسم يا عزيزُ؟ فِي الرّسم قفصٌ - مَا فِي القفص؟ فِي القفص طائرٌ - أذالك الطّائر ببغاءُ؟ نعم - ذالك الطّائر ببغاءُ - كيف ذالك الطّائر؟ هو جميلٌ جدّاً -

(ب) هٰذا فارٌ - هٰذا الفارُ صغيرٌ - ذالك قطٌّ - ذالك القطّ كبيرٌ وهو أبيضُ - ذالك طائرٌ ذالك الطّائر غرابٌ - وهو أسودُ - هٰذا درسٌ - هٰذا الدّرس جديدٌ - وهو سهلٌ لا صعبٌ -

(ج) أنا ولدٌ - أنت ولدٌ - أنا قصيرٌ - أنت طويلٌ - أنا سمينٌ - أنت هزيلٌ - أنا جالسٌ على الكرسيّ - وهو واقفٌ على الأرض - أنا مشغولٌ بالقراءة و هو مشغولٌ باللّعب - أنا مسلمٌ - وهو اليهوديّ مسلمٌ - أنا في القراءة وهو في اللّعب -

*P.T.O.*

2. Translate and explain any Five couplets of the following : 10

① شَمسُ السَّمَاءِ السَّاطِعَةِ
فِي كُلِّ يَومٍ طَالِعَةْ

② نَبدُو لَنَا فِي المَشرِقِ
بَعدَ الضِّيَاءِ المُشرِقِ

③ فَكُلٌّ حَيٍّ يَنهَضُ
وَلِلحَيَوٰةِ يَركَضُ

④ حَيَاتُنَا هِيَ العَمَلُ -
وَسَعْيُنَا هُوَ الأَمَلُ -

⑤ أَيُّهَا النَّحْلَةُ مَاذَا -
لِيَشْغُلُ النَّاسُ بِحُبِّكِ

⑥ إِنَّنِي فِي حُسْنِ شَكْلِي
لَسْتُ مَحْبُوبًا كَحُبِّكِ

⑦ شَمسُ السَّمَاءِ السَّاطِعَةْ
فِي كُلِّ يَومٍ طَالِعَةْ

3. Answer in Arabic any Five of the following : 10

① مَنْ نَبِيُّكَ ؟

(٢) أَيُّ لِسَانٍ ضَرُورِيٌّ لِلْمُسْلِمِ ؟

(٣) أَيْنَ هُوَ ؟

(٤) هَلِ الْفَارُ كَبِيرٌ ؟

(٥) مَا لَوْنُ الْبَبَغَاءِ ؟

(٦) أَيُّ حَيَوَانٍ طَوِيلٌ ؟

(٧) مَتَى إِمْتِحَانُكَ ؟

4. Write the Letter in Arabic to the Bank Manager : 10

أُكْتُبِ الرِّسَالَةَ فِي الْعَرَبِيَّةِ

إِلَى مُدِيرِ الْبَنْكِ -

❄❄❄

**Total No. of Questions : 4]** **[Total No. of Pages : 2**

**P285**

# [4017] - 203
# S.Y. B.Sc. (Sem. - II)
# MATHEMATICS
## MT - 222 (B) : Discrete Mathematics
## (2008 Pattern) (Paper - II (B)) (511B2)

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of single memory, non-programmable scientific calculator is allowed.***

***Q1)*** Attempt any five of the following : **[10]**

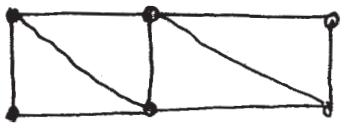
a) How many ways are there to pick a sequence of two different letters of the alphabet that appear in the word 'MATHEMATICS'?

b) Prove the statement, '$5^n - 1$ is divisible by 4, for $n \geq 1$' using principle of mathematical induction.

c) Solve the recurrence relation $a_n = 2.a_{n-1} + 3.a_{n-2}$; given $a_0 = 1$, $a_1 = 11$.

d) Verify hand shaking lemma for the graph

G :



e) Draw all simple non-isomorphic graphs on three vertices.

f) Give an example of a graph which is Eulerian but not Hamiltonian.

g) Define :

i) Spanning tree.

ii) Minimal spanning tree of a graph.

***Q2)*** Attempt any two of the following : **[10]**

a) There are 6 different English books, 8 different Hindi books and 5 different Marathi books. How many ways are there to arrange the books in a row on a shelf with all books of the same language grouped together?

b) Prove by induction that $x$-$y$ is a factor of $x^n - y^n$; for $n \geq 1$.

c) If 5 points are chosen within an equilateral triangle of side length unity. Prove that there are two points in the selection, which are at a distance at most $\frac{1}{2}$ unit farthest apart.

***P.T.O.***

***Q3)*** Attempt <u>any two</u> of the following : **[10]**

a) Prove that, the maximum number of edges in a simple graph with $n$ vertices and $k$ components is $\frac{(n-k)(n-k+1)}{2}$.

b) A matrix of marriage suitability relation between 5 boys and 5 girls is

$$M_R = \begin{bmatrix} 1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 1 \\ 1 & 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 & 1 \\ 0 & 1 & 0 & 1 & 0 \end{bmatrix}$$

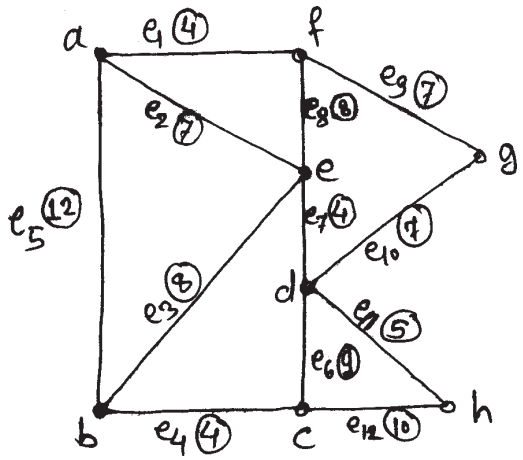
State whether each boy can marry a suitable girl. Justify.

c) Define complement of a graph. If a graph G contains exactly one vertex of even degree, then find the number of odd degree vertices in complement $\overline{G}$.

***Q4)*** Attempt any one of the following : **[10]**

a) By using Kruskal's algorithm, find the shortest spanning tree of the graph.

G :




b) i) Find the particular solution of the difference equation.

$$a_n = -5a_{n-1} - 6a_{n-2} + 42 \times 4^n.$$

ii) A committee of 5 is to be selected from 6 boys and 5 girls. Determine the number of ways of selecting the committee, if it is to consists of at least one boy and one girl.

❖ ❖ ❖ ❖

**Total No. of Questions : 4]** **[Total No. of Pages : 2**

**P286**

# [4017] - 204
## S.Y. B.Sc.
## PHYSICS
## PH - 221 : Oscillations, Waves and Sound
## (2008 Pattern) (Paper - I) (Sem. - II) (51212)

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of calculator and log table is allowed.***
4) ***Neat diagrams must be drawn wherever necessary.***

***Q1)*** Attempt all of the following :

a) What is neutral equillibrium? **[1]**

b) Define S.H.M. Give the differential equation of S.H.M. **[1]**

c) What is meant by over-damped motion? **[1]**

d) Define quality factor. **[1]**

e) What is velocity resonance? **[1]**

f) Define half width of amplitude resonance curve. **[1]**

g) Define intensity of wave. Give its unit. **[1]**

h) What is red shift? **[1]**

i) Define threshold audibility. **[1]**

j) Calculate the change in intensity level in dB(decibels) when the intensity of sound increases by 100 times the original intensity. **[1]**

***Q2)*** Attempt <u>any two</u> of the following :

a) Define the term log decrement. Derive the expression for it. **[5]**

b) Show that the rate of absorption of energy is equal to the rate of dissipation of energy in case of forced oscillator. **[5]**

c) Obtain an expression for velocity of longitudinal waves propagating through a medium of density $\rho$ and bulk modulus of elasticity k. **[5]**

***P.T.O.***

***Q3)*** Attempt <u>any two</u> of the following :

a) A particle is subjected to two rectangular directions such that the displacement at any instant is given by $x = 2\sin(wt + \pi/4)$ and $y = 2\sin wt$. Find the nature and equation of the path. **[5]**

b) The equation of Forced oscillations is given by

$$2\left(\frac{d^2x}{dt^2}\right) + 3\left(\frac{dx}{dt}\right) + 16x = 30 \sin 2t$$

Find the velocity amplitude and maximum kinetic energy. **[5]**

c) A person blowing a whistle is moving with a speed of 10 m/s towards a rocky hill. Determine the apparent rise in frequency of echo heard by the person due to reflection from the hill assume air at rest, speed of sound 330 m/s and frequency of whistle sound 200 Hz. **[5]**

***Q4)*** Attempt the following :

a) i) Obtain the expression of period and velocity for linear S.H.M. **[4]**

ii) Set up the differential equation for damped oscillations in LCR series circuit. **[4]**

OR

i) Write a note on seismic waves. **[4]**

ii) Define and explain reverberation time. **[4]**

b) Attempt <u>any one</u> of the following : **[2]**

i) What is Doppler effect? Give its applications.

ii) Determine the reverberation time of a hall having volume 25000 cubic feet, if it contains sound absorbing material of area 1500 square feet having absorption coefficient 0.25.

❖ ❖ ❖ ❖

**Total No. of Questions : 4]** **[Total No. of Pages : 2**

**P287**

# [4017] - 205
# S.Y. B.Sc.
# PHYSICS - II
# PH - 222 : Optics
# (2008 Pattern) (Sem. - II)

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of calculator and log table is allowed.***
4) ***Neat diagrams must be drawn wherever necessary.***

***Q1)*** Attempt all of the following :

a) Write Len's Maker's formula. **[1]**

b) State the cause of chromatic aberration. **[1]**

c) Define the terms, optical centre and principal focus of a convex lens. **[1]**

d) What is an eyepiece? **[1]**

e) Define grating element. **[1]**

f) State Brewster's law. **[1]**

g) Two thin lenses of focal lengths 20 cm and 12 cm are placed co-axially at a certain distance apart. Calculate the distance between the lenses if these lenses form an achromatic combination. **[1]**

h) State advantages of reflecting type telescope over refracting type telescope. **[1]**

i) If movable mirror of Michelson's interferometer is moved through a distance of 0.00295 cm, a shift of 100 fringes is observed. Calculate the wavelength of light used. **[1]**

j) Glass plate is to be used as a polarizer. Find angle of polarization for it ($\mu$ for glass = 1.54). **[1]**

***Q2)*** Attempt any two of the following :

a) Explain the construction and working of Huygen's eyepiece. **[5]**

b) Explain the Stoke's treatment of the phase change on reflection of light. **[5]**

c) State and explain law of Malus. **[5]**

***P.T.O.***

***Q3)*** Attempt any two of the following :

a) Two thin converging lenses of focal lengths 15 cm and 20 cm are co-axially 10 cm apart. Find **[5]**

i) equivalent focal length.

ii) position of principal points.

b) A parallel beam of light of wavelength 5890Å is incident on a thin film of refractive index 1.5, such that the angle of refraction into the film is 60°. Calculate the smallest thickness of the film which will make it appear dark by reflection. **[5]**

c) A converging lens of focal length 6.25 cm is used as a magnifying glass. If the near point of the observer is 25 cm from the eye and the lens is held close to the eye. Calculate **[5]**

i) distance of the object from the lens.

ii) the angular magnification.

***Q4)*** Attempt the following :

a) i) What are cardinal points of a co-axial lens system? What is their importance? **[4]**

ii) Explain how spherical aberration is reduced using plano convex lens. **[4]**

OR

i) Show that the distance of the first principal plane from the first lens of an optical system is $\alpha = \frac{xf}{f_2}$.

ii) What is distortion? State the cause and explain how it is reduced to minimum.

b) Attempt any one of the following :

i) Distinguish between interference and diffraction. **[2]**

ii) Find the resolving power of grating which can just resolve the wavelengths 5890Å and 5896Å. **[2]**

❖ ❖ ❖ ❖

**Total No. of Questions : 4]** **[Total No. of Pages : 2**

**P288**

# [4017] - 206
# S.Y. B.Sc.
# CHEMISTRY - I
# CH - 221 : Inorganic Chemistry
# (2008 Pattern) (51312) (Sem. - II)

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Neat diagrams must be drawn wherever necessary.***

***Q1)*** Answer the following : **[10]**

a) Explain the term 'Ore'.

b) Give the composition of cryolite.

c) Which is the purest form of iron?

d) Draw the structure of $Al_2 Br_6$.

e) Which disease is caused due to $cd^{2+}$ ion?

f) What is an oxy-acid?

g) Why transition metals show magnetic properties?

h) Define Atmospheric corrosion.

i) Arrange the following in the increasing order of acid strength.

$HClO_3$, HOCl, $HClO_4$, $HClO_2$.

j) Give the general electronic configuration of transition metals.

***Q2)*** Attempt <u>any two</u> of the following : **[10]**

a) Write the names, symbols and electronic configuration of VI A group. Explain the trends in the following properties of group VI A elements:

i) Atomic size.

ii) Electronegativity.

***P.T.O.***

b) Explain the concept of acids and bases according to Lewis theory. What are merits and demerits of this theory?

c) Explain the following :

i) Thermite process.

ii) Biochemical effect of $Pb^{2+}$.

***Q3)*** Attempt <u>any two</u> of the following : **[10]**

a) What are transition elements? Comment on the following properties.

i) Magnetic properties.

ii) Density.

b) Give purification of Bauxite by Baeyer's process? Give uses of Aluminium.

c) Explain any two factors which affect electro-chemical corrosion.

***Q4)*** a) Attempt <u>any one</u> of the following : **[6]**

i) With the help of neat diagram and chemical reactions, explain the manufacture of cast iron.

ii) What is steel? Explain basic Bessmer process of manufacture of steel.

b) Attempt <u>any one</u> of the following : **[4]**

i) What are the cause anamalous behaviour? Explain anamalous behaviour of fluorine.

ii) What are conjugate acid-base pairs? Explain with suitable example.

iii) Explain the terms 'Tinning' and 'galvanising'.

❖ ❖ ❖ ❖

**Total No. of Questions : 4]** **[Total No. of Pages : 2**

**P289**

# [4017] - 207
# S.Y. B.Sc.
# CHEMISTRY
## CH - 222 : Analytical Chemistry
## (2008 Pattern) (51322) (Sem. - II) (Paper - II)

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of logarithmic tables and calculator is allowed.***
4) ***Neat diagrams must be drawn wherever necessary.***

***Q1)*** Answer the following : **[10]**

a) Which mineral acids are used for decomposition of samples?
b) On what basis group II is further divided as IIA and IIB.
c) Draw a labelled diagram for carius' tube for estimation of halogens.
d) What are mixed indicators?
e) Starch indicator solution should be freshly prepared, explain.
f) Define the terms deviation and mean deviation.
g) Which is a group reagent for IIIA group?
h) What is efficiency of extraction?
i) What is a displacement titration?
j) How is Tollen's reagent prepared?

***Q2)*** Answer <u>any two</u> of the following : **[6]**

a) i) What is solubility product? Explain one application of it in inorganic qualitative analysis.
   ii) Explain the terms 1) Distribution coefficient and 2) Distribution ratio. What are the limitations of distribution coefficient?
   iii) How will you prepare 0.1N iodine solution? Explain the method of standardization of $I_2$ solution with sodium thiosulphate solution.
b) 0.3 gm of an organic compound gave on combustion 32ml of moist nitrogen at 22°C and 720 mm pressure. Calculate the percentage of nitrogen in the compound. (aqueous tension at 22°C = 20 mm). **[4]**

***P.T.O.***

***Q3)*** a) Answer <u>any two</u> of the following : **[6]**

i) Define the following terms with reference to acid-base titration

I) Neutralisation point.

II) Best indicator.

III) Equivalence point.

ii) Define the term error. What are the sources of indeterminate errors?

iii) What is a functional group? How is aldehyde detected and confirmed?

b) Solve <u>any one</u> of the following : **[4]**

i) For a single extraction of an acid, calculate the percent extracted for a volume ratio $\frac{Va}{Vo} = 5$. Given distribution ratio D = 7.

ii) Four different samples brass were analysed for copper and were found to be 2.00, 2.10, 2.15 and 2.19 gram. Calculate mean deviation and standard deviation.

***Q4)*** a) Explain the titration curve of strong acid and strong base. Which indicator will you choose for this titration? Why? **[6]**

OR

Explain the liebig's method of estimating carbon and hydrogen in an organic compound.

b) Answer <u>any one</u> of the following : **[4]**

i) Explain the method of estimation of copper in crystallised copper sulphate.

ii) Discuss the use of NaOH / KOH in inorganic qualitative analysis.

❖ ❖ ❖ ❖

**Total No. of Questions : 4]** **[Total No. of Pages : 2**

**P290**

# [4017] - 208
## S.Y. B.Sc.
## BOTANY
## BO - 221 : Structural Botany
## (Anatomy, Embryology and Palynology)
## (2008 Pattern) (Paper - I) (Sem. - II) (Theory) (51412)

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat and labelled diagrams wherever necessary.***

***Q1)*** Attempt the following : **[10]**

a) Define embryology.
b) What is megasporogenesis?
c) Define anatropous ovule.
d) What is syngamy?
e) Enlist any two types of endosperm.
f) Give any two applications of palynology.
g) What is NPC system?
h) Define anatomy.
i) What is endosperm?
j) What is tapetum?

***Q2)*** Answer any two of the following : **[10]**

a) Describe the distribution of mechanical tissue in dicot stem.
b) What is anomalous secondary growth? Explain anomalous secondary growth in Bignonia stem.
c) Describe the development of monosporic embryo sac.

***P.T.O.***

***Q3)*** Write short notes on <u>any two</u> of the following : **[10]**

a) Apertures in pollen grain.

b) Types of microspore tetrad.

c) Anomalous secondary growth in <u>Dracena</u> stem.

***Q4)*** What is tissue? Describe the ground tissues studied by you. **[10]**

OR

Describe the process of fertilization in angiosperms.

❖❖❖❖

**Total No. of Questions : 4]** **[Total No. of Pages : 2**

**P291**

# [4017] - 209
## S.Y. B.Sc.
## BOTANY
## BO - 222 : Fundamentals of Plant Biotechnology
## (2008 Pattern) (Paper - II) (Sem. - II) (51422)

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat labelled diagrams wherever necessary.***

***Q1)*** Attempt the following : **[10]**

a) Give the names of any two substrates for biotechnology.

b) Define genome.

c) What is bioprocess technology?

d) Define plasmid.

e) Give any two applications of enzymes.

f) What are petrocrops?

g) Name any two wastes used for SCP production.

h) Define totipotency.

i) What is waste?

j) What is incubation?

***Q2)*** Answer any two of the following : **[10]**

a) Describe scaling-up in bioprocess technology.

b) Describe mitochondrial genome.

c) Explain the role of biotechnology in developing world.

***P.T.O.***

***Q3)*** Write short notes on <u>any two</u> : **[10]**

a) Dialysis a method of enzyme purification.

b) Oxidation pond.

c) Moral and ethical aspects of genetic engineering.

***Q4)*** Define plant tissue culture. Describe various applications of plant tissue culture. **[10]**

OR

What are SCPs? Explain the production of SCP from algae.

❖❖❖❖

**Total No. of Questions : 4]** **[Total No. of Pages : 2**

**P292**

# [4017] - 210
## S.Y. B.Sc.
## ZOOLOGY
## ZY - 221 : General Zoology & Biological Techniques - II
## (2008 Pattern) (Paper - I) (Sem. - II) (51512)

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Neat labelled diagrams must be drawn wherever necessary.***

***Q1)*** Attempt the following : **[10]**

a) Mention the food of Scoliodon.

b) Write any two examples of birds with perching feet.

c) Enlist any two aquatic adaptations in vertebrates.

d) Name any two eye ball muscles of scoliodon.

e) What is mould?

f) Enlist any two veins of Scoliodon.

g) Mention the example of fish with ganoid scale.

h) Define heterocercal tail.

i) What is longitudinal migration?

j) What is serial dilution?

***Q2)*** Write short notes on (any two) : **[10]**

a) Compound microscope.

b) Insectivorous and tearing and piercing beak.

c) External features of Scoliodon.

***P.T.O.***

***Q3)*** Attempt the following (any two) : **[10]**

a) Method of preparation of haematoxyline.

b) Sketch and label female reproductive system of Scoliodon.

c) Describe parental care in Pipa.

***Q4)*** Describe in detail the structure of brain of scoliodon. Mention the functions of each part. **[10]**

OR

Describe the method of determination of haemoglobin. Add a note on its clinical significance.

❖ ❖ ❖ ❖

**Total No. of Questions : 4]** **[Total No. of Pages : 2**

**P301**

# [4017] - 219
# S.Y. B.Sc.
# MICROBIOLOGY
## MB - 222 : Applied Microbiology - I
## (2008 Pattern) (51922) (Paper - II) (Sem. - II)

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat labelled diagrams wherever necessary.***

***Q1)*** Attempt the following : **[10]**

a) Two antifoam agents are _____ and _____.

b) An example of a dual fermentation is _____.

c) What is meant by HEPA filter?

d) What is the use of baffles in a typical fermenter?

e) Enlist methods of air sampling.

f) Name the medium and temperature for Eijkman test.

g) State true or false : septic tank is aerobic method of waste water treatment.

h) Name the pH indicator used in Endo agar.

i) Define : surface water.

j) What is meant by droplet nuclei?

***Q2)*** Attempt <u>any two</u> of the following : **[10]**

a) Justify : <u>Campylobacter</u> and <u>Clostridium</u> <u>Perfringenes</u> are indicators of faecal pollution.

b) Describe different approaches used for controlling the air flora of a hospital.

c) Comment on the primary methods used for screening of an antibiotic producer.

***P.T.O.***

***Q3)*** Attempt any two of the following : **[10]**

a) Describe the monitoring of aeration and agitation in a fermentation process.

b) Describe the physical parameters used in the analysis of waste water.

c) Elaborate on the different carbon sources used in fermentation media.

***Q4)*** Attempt any two of the following : **[10]**

a) Compare a batch and continuous fermentation give one example of each.

b) Illustrate diagramatically : a trickling filter.

c) Elaborate on confirmed and completed test used in analysis of water, for potability.

❖❖❖❖

**Total No. of Questions : 4]** **[Total No. of Pages : 1**

**P302**

# [4017] - 220
# S.Y. B.Sc. (Sem. - II)
# PSYCHOLOGY
## Health Psychology
## (2008 Pattern) (Paper - I) (52012)

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Draw the figures and diagrams wherever necessary.***
3) ***Figures to the right indicate full marks.***

***Q1)*** Answer in <u>two</u> or four sentences : **[16]**

a) Define health Psychology.
b) What is burn out?
c) What is the concept of coping?
d) How do you indulge yourself?
e) What are the effects of overeating?
f) What is defensive coping?
g) State the effects of drinking on health.
h) What are the effects n-lack of exercise?

***Q2)*** Attempt <u>any two</u> of the following in 8/10 sentences : **[8]**

a) Explain the nature of stress.
b) Explain the common coping patterns.
c) Describe the concept of poornutrition in light of habits.

***Q3)*** Write short note on <u>any two</u> of the following : **[8]**

a) Behavior & Aids.
b) Problem-focused constructive coping.
c) Bio-medical model of illness.

***Q4)*** Describe fully the nature and scope of health psychology. **[8]**

OR

Explain the major types of stress.

❖❖❖❖

**Total No. of Questions : 4]** **[Total No. of Pages : 2**

**P303**

# [4017] - 221
# S.Y. B.Sc. (Sem. - II)
# PSYCHOLOGY
## Counseling Psychology
## (2008 Pattern) (Paper - II) (52022)

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Draw the figures and diagrams wherever necessary.***
3) ***Figures to the right indicate full marks.***

***Q1)*** Answer in two or four sentences : **[16]**

a) What is counseling?

b) What is the codes of professional ethics?

c) What is the systematic training for effective parenting?

d) What is confidentiality?

e) State the use of play in counseling.

f) Differentiate ethics and law.

g) How physiological changes that affect counseling?

h) Who is associated with person centered counseling?

***Q2)*** Attempt any two of the following in eight or ten sentences : **[8]**

a) Explain the purpose of assessment.

b) Explain the patterns of erroneous thinking.

c) Describe the nature at people in the light of cognitive counseling.

***Q3)*** Write short note on any two of the following : **[8]**

a) Gestalt counseling.

b) Predictable counseling agendas.

c) Communicating.

***P.T.O.***

***Q4)*** Explain the characteristics of counsellor. **[8]**

OR

Explain the characteristics of older adults as clients.

❖❖❖❖

**Total No. of Questions : 4]** **[Total No. of Pages : 3**

**P304**

# [4017] - 222
## S.Y. B.Sc.
## STATISTICAL TECHNIQUES
## STT - 221 : Statistical Techniques - III
## (Paper - I) (Sem. - II) (52112) (2008 Pattern)

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of calculator and statistical tables is allowed.***
4) ***Symbols and abbreviations have their usual meaning.***

***Q1)*** Attempt each of the following :

a) Choose the correct alternative in each of the following : **[1 Each]**

i) Let $x_1, x_2, \ldots\ldots, x_n$ be a random sample from N(μ, $\sigma^2$) then $\frac{nS^2}{\sigma^2}$ follows

A) $\chi^2_n$ B) $\chi^2_{n-1}$ C) $\chi^2_{2n}$ D) $\chi^2_{2n-1}$

ii) If X → N(0, 1), Y → $\chi^2_{16}$ and X, Y are independent variates then $\frac{4X}{\sqrt{Y}}$ has *t*-distribution with degrees of freedom.

A) 4 B) 8 C) 16 D) 32

iii) In one way classification with N observations and K treatments, the degrees of freedom for error is

A) N B) N−1 C) K−1 D) N−K

b) State whether the given statement is true or false in each of the following : **[1 Each]**

i) A null hypothesis is a hypothesis of no difference.

ii) The critical region in $\chi^2$ test of goodness of fit is always left tailed.

iii) Level of significance is a probability.

***P.T.O.***

c) Define sampling distribution of a statistics. **[1]**

d) Define standard error of a statistics. **[1]**

e) State the test statistics for testing equality of population means in large sample test, where $\sigma_1$ and $\sigma_2$ are known. **[1]**

f) Define critical region. **[1]**

***Q2)*** Attempt <u>any two</u> of the following : **[5 Each]**

a) Describe Chi-Square test of goodness of fit.

b) Describe large sample test for testing $H_0 : P_1 = P_2$ against $H_1 : P_1 \neq P_2$, where $P_1$ and $P_2$ are population proportions of two independent populations.

c) If T has students *t*-distribution with 12 degrees of freedom, find c such that i) $P[-c \leq T \leq c] = 0.8$

ii) $P[T^2 \geq c] = 0.05$

***Q3)*** Attempt <u>any two</u> of the following : **[5 Each]**

a) Define Chi-Square variable. State mean and variance of Chi-Square variate with '*n*' degrees of freedom. Also state additive property of Chi-Square distribution.

b) Describe *t*-test for testing of population mean.

c) Let $X_i$, $i = 1, 2,....., 8$ be a random sample from N (8, 9) distribution.

Find mean and variance of $Y = \sum_{i=1}^{8} (X_i - 8)^2$.

***Q4)*** Attempt <u>any one</u> of the following :

a) i) Complete the following ANOVA table and carry out the analysis of variance at 5% level of significance. **[7]**

| Source of Variation | Degrees of freedom | Sum of Squares | Mean Sum of Squares | F-ratio |
|---|---|---|---|---|
| Row | – | 54 | – | – |
| Column | – | – | – | 2 |
| Treatment | – | 162 | – | – |
| Error | 6 | – | 12 | |
| Total | – | – | | |

ii) $X_i$, $i = 1, 2, 3, 4, 5$ be independent N(0, 1) variates. Identify the distribution $Y = \frac{4X_1^2}{X_2^2 + X_3^2 + X_4^2 + X_5^2}$. Hence find the value of '$c$' such that $P(Y \geq c) = 0.01$. **[3]**

b) i) State the mathematical model used in analysis of variance in a two way classification. Also state the hypothesis to be used. **[4]**

ii) Describe F-test for testing the hypothesis of equality of two population variances. State the assumptions clearly, if any. **[6]**

❖ ❖ ❖ ❖

**Total No. of Questions : 4]** **[Total No. of Pages : 2**

**P305**

# [4017] - 224
## S.Y. B.Sc.
## ELECTRONIC SCIENCE
## EL - 221 : Digital System Design
## (2008 Pattern) (Paper - I) (Sem. - II)

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

***Q1)*** Answer all of the following :

a) What is parity generator? **[1]**

b) Define fan-out of a digital IC. **[1]**

c) List the advantages of open collector devices. **[1]**

d) What is universal shift register? **[1]**

e) "The Flash ADC is the fastest ADC". Comment. **[2]**

f) "The multiplexed displays are commonly used". Comment. **[2]**

g) A 4-bit magnitude comparator has inputs A = 1101 and B = 0110. Determine its outputs. **[2]**

h) Draw the state diagram for T-Flip-Flop. **[2]**

***Q2)*** Attempt any two of the following :

a) Design a combinational logic circuit for half adder. **[4]**

b) Explain the operation of TTL to CMOS converter. **[4]**

c) Design a mod-5 counter by using 3-bit ripple counter. **[4]**

***Q3)*** Attempt any two of the following :

a) Design a logic circuit for 4 to 2 line priority encoder. **[4]**

b) What is tristate buffer? Explain its use in bus oriented systems. **[4]**

c) Explain the use of shift register as a time delay generator. **[4]**

***P.T.O.***

***Q4)*** Attempt all of the following :

a) Draw the block diagram of automobile parking control system and explain its operation. **[6]**

b) Explain the working of successive approximation ADC using block diagram. Give the relation for conversion time of it. **[6]**

OR

a) Design a logic circuit for 3 bit binary to gray code converter. **[4]**

b) Design a 3 bit binary synchronous up counter using Jk Flip-Flops. **[4]**

c) A 4-bit R-2R ladder DAC has 0 = 0V, 1 = 10V. Find the full scale output voltage and resolution of it. **[4]**

❖ ❖ ❖ ❖

**Total No. of Questions : 4]** **[Total No. of Pages : 2**

**P306**

# [4017] - 225
## S.Y. B.Sc.
## ELECTRONIC SCIENCE
## EL - 222 : Communication System
## (52222) (Paper - II) (Sem. - II) (2008 Pattern)

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw the neat diagram wherever necessary.***
4) ***Use of non-programmable calculator is allowed.***

***Q1)*** Attempt all of the following :

a) What is ATM? **[1]**

b) Define sensitivity of radio receiver. **[1]**

c) What is Ask? **[1]**

d) State different types of noise. **[1]**

e) "For long distance communication single mode step index fiber cables should be used". Comment. **[2]**

f) "Credit card system is not really a e-cash". Comment. **[2]**

g) If receiver has input signal power of 1.5 μw and the noise power is 0.2μw then find the signal to noise ratio. **[2]**

h) If vertical retrace time is 1.280 ms, how many horizontal lines are scanned using vertical retrace. **[2]**

***Q2)*** Attempt <u>any two</u> of the following :

a) What do you mean by propagation? State different types of propagation. **[4]**

b) Explain the purpose of synchronizing pulses, blanking pulses, front porch and back porch in T.V. **[4]**

c) Differentiate between pulse and DTMF dialing. **[4]**

***P.T.O.***

***Q3)*** Attempt any two of following :

a) Describe shielded twisted pair cable and unshielded twisted pair cable in details. **[4]**

b) What are different tones in telephone system. Explain with proper waveform. **[4]**

c) Write a short note on radio paging. **[4]**

***Q4)*** Attempt the following :

a) What is demodulation? With the help of neat diagram explain working of Foster seeley discriminator. **[6]**

b) Draw block diagram T.V. Transmitter and T.V. Receiver and explain it in brief. **[6]**

OR

Attempt the following :

a) The output voltage of a transmitter is given by $e = 200 (1 + 0.5 \sin 520t) \sin 3.14 \times 10^7 t$. This voltage is fed to a load of 500Ω resistance. Determine. **[4]**

i) Carrier frequency ii) Modulating frequency

iii) Carrier power iv) Total power output

b) In a superheterodyne receiver having no RF amplifier the loaded Q of antenna coupling circuit is 90. If the If is 455kHz. Calculate the image frequency and image frequency rejection at 950 kHz. **[4]**

c) If a FM wave is represented by the equation $e = 10 \sin (8 \times 10^8 t + 4 \sin 1500t)$. Calculate the **[4]**

i) Carrier frequency ii) Modulating frequency

iii) Mf and iv) Maximum δ.

What power will this FM wave will dissipate in a 8Ω resistor.

❖ ❖ ❖ ❖

**Total No. of Questions : 4]** **[Total No. of Pages : 1**

**P307**

# [4017] - 226
## S.Y. B.Sc.
## DEFENCE AND STRATEGIC STUDIES - I
## DS - 201 : Strategic issues in International Relations
## (Sem. - II) (2008 Pattern) (52312)

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

***Q1)*** Answer in 2 to 4 sentences each : **[16]**

a) What is meant by Military pacts.
b) Name the countries members to SAARC.
c) What do you understand by War?
d) Define Human Rights.
e) What do you understand by CTBT?
f) Explain the term Foreign policy.
g) What do you understand by Arms control?
h) What is meant by MIC?

***Q2)*** Answer in 8 to 10 sentences each (any two) : **[8]**

a) Explain regional integration process in Europe.
b) Write in brief on State sponsored Terrorism.
c) Examine major Arms Control Agreements since 1960s.

***Q3)*** Write short notes on (any two) : **[8]**

a) Explain the term National Interest.
b) Role of non-state actors in International Relations.
c) Explain the problems of Disarmament.

***Q4)*** Answer in 16 to 20 sentences (any one) : **[8]**

a) Evaluate different types of New Diplomacy in the twentieth century.
b) Should India follow a favorable policy towards USA? Discuss.

❖❖❖❖

**Total No. of Questions : 4]** **[Total No. of Pages : 1**

**P308**

# [4017] - 227

## S.Y. B.Sc.

## DEFENCE AND STRATEGIC STUDIES - II

## DS - 202 : India's National Security

## (Sem. - II) (2008 Pattern) (52322)

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

***Q1)*** Answer in Two to Four sentences: **[16]**

a) State the meaning of internal security.
b) Write the meaning of Terrorism.
c) What do you mean by secessionist force?
d) State the meaning of Food security.
e) Write the meaning of maritime management.
f) What do you mean by nuclear strategy?
g) Define the concept of Air space security.
h) Define national values.

***Q2***) Answer in Eight to Ten sentences (Any Two): **[8]**

a) India's National Value.
b) India-China war.
c) India's military objectives.

***Q3)*** Write short notes on (Any Two): **[8]**

a) Food security.
b) Maritime security.
c) India's Land Border.

***Q4)*** Answer in Eight to Ten sentences (Any One): **[8]**

a) Write a note on National security problems in India.
b) Write an essay on India's nuclear policy and its programme.

**Total No. of Questions : 4]** **[Total No. of Pages : 1**

**P309**

# [4017] - 228

## S.Y. B.Sc.

## DEFENCE AND STRATEGIC STUDIES

## DS - 203 : Military Geography

## (Sem. - II) (Paper - III) (52332) (2008 Pattern)

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

***Q1)*** Answer in 2 or 4 sentences each: **[16]**

a) State the Weapons of Desert Warfare.
b) What do you understand by Military Geography?
c) State any two uses of Military Geography.
d) Write anyone example of use of creature for war purpose.
e) State the ideal period for plain warfare.
f) Define "Grand Strategy".
g) State any two principles of logistics.
h) What do you mean by A.P.C.?

***Q2***) Answer in 8 or 10 sentences (Any Two): **[8]**

a) In Desert Warfare why the operations are conducted during night only?
b) Why the soldiers suffering from skin diseases during High Attitude Warfare.
c) Explain in brief aim & action of strategy.

***Q3)*** Write short notes on (Any Two): **[8]**

a) Characteristics of plain warfare.
b) Concept of Military Geography.
c) Linkages between Environment & National Security.

***Q4)*** Answer in 16 to 20 sentences (Any One): **[8]**

a) Write an essay on "Impact of war on Environment".
b) Explain in detail the process of formation of Grand Strategy with example.

**Total No. of Questions : 4]** **[Total No. of Pages : 2**

**P310**

# [4017] - 229

## S.Y. B.Sc.

## ENVIRONMENTAL SCIENCE - I

## ENV - 201 : Biological Diversity

## (Sem. - II) (2008 Pattern) (52412)

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Draw neat & labelled diagram wherever necessary.***
3) ***Figures to the right indicate full marks.***

***Q1)*** Attempt the following in 1 or 2 lines each: **[10]**

a) Enumerate the 3 main types of biodiversity.

b) What are flagship species?

c) Enlist any 2 extinct species.

d) Define domestication.

e) Give any 2 Protected Areas in Maharashtra.

f) Write the full form of UNEP.

g) What is meant by species richness?

h) Define community.

i) Name any 2 keystone species.

j) What is the full form of DNA?

***Q2***) Write notes on <u>any 2</u> of the following: **[10]**

a) Centres of diversity.

b) Sacred groves.

c) Western Ghat as a hot-spot.

***P.T.O.***

***Q3)*** Answer any 2 of the following: **[10]**

a) Describe any one DNA based marker technique used to measure genetic diversity.

b) What is in-situ conservation? Describe.

c) Describe how genetic drift is a factor causing loss of diversity.

***Q4)*** Answer any one of the following: **[10]**

a) Give the biogeographical profile of India. Discuss the characteristics of each zone.

b) Discuss the various factors responsible for the loss of biodiversity.

**Total No. of Questions : 4]** **[Total No. of Pages : 2**

**P311**

# [4017] - 230

## S.Y. B.Sc.

## ENVIRONMENTAL SCIENCE

## ENV - 202 : Soil Science

## (Sem. - II) (2008 Pattern) (52422)

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

***Q1)*** Attempt the following in one or two lines each: **[10]**

a) What is soil profile?

b) Give any 2 functions of micronutrients.

c) Define soil pollution.

d) State the difference between physical & chemical weathering.

e) Enlist any 4 factors affecting soil structure.

f) What are Biofertilisers?

g) Give any 4 sources of soil pollution.

h) Define soil structure.

i) What is meant by soil fertility?

j) What is Bioremediation of soil?

***Q2***) Answer <u>any two</u> of the following: **[10]**

a) Describe mechanical & biological practices for soil conservation.

b) Give the sources & discuss the effects of soil pollution.

c) Explain various components of soil along with their role.

***P.T.O.***

***Q3)*** Write notes on <u>any two</u> of the following: **[10]**

a) Role of soil macronutrients in plant growth.

b) Soils of Maharashtra.

c) Soil moisture.

***Q4)*** Answer <u>any one</u> of the following: **[10]**

a) Describe different methods of soil conservation followed in India.

b) Explain the following:

i) Soil as important environmental component.

ii) Control of soil pollution.

**Total No. of Questions : 4]** **[Total No. of Pages : 3**

**P312**

# [4017] - 231

## S.Y. B.Sc.

## OPTIONAL ENGLISH

## Enriching Oral and Written Communication in English

## (Sem. - II) (2008 Pattern) (53012)

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

***Q1)*** Attempt **any two** of the following: **[10]**

a) Gaurav, Pallavi, Jameer and Alka are participants in a group discussion on the topic 'Education System Today'. Write a transcript of the discussion using the following points:

Introduction – education today and in the past – growth in literacy – growth in higher and professional education – female education – less job oriented – more exam oriented – human values – fulfilment of aims and objectives – future expectations – conclusion

b) You applied for the post of a Scientist in a research institute and have been asked to appear for an interview. Write down five questions that you could be asked and their possible answers.

c) Imagine that you are the 'University Representative' of your college. Prepare the script of meeting called by you to discuss over the activities to be conducted on the account of Annual Social Day of your college.

***Q2***) Attempt **any two** of the following: **[10]**

a) Write a paragraph of about 15 sentences on 'Superstitions'.

b) Punctuate the following dialogue.

salesgirl good afternoon madam what can i do for you

sangita good afternoon id like to buy some t shirts

salesgirl cotton or synthetic madam

sangita terrycot if you have some

salesgirl sure madam please come over here

***P.T.O.***

c) Summarize the following paragraph to one third of its length. Suggest a suitable title. Prepare a rough draft also.

Civilized man is aware of the more obvious symptoms of water pollution: scum-covered rivers, stinking bays, and shorelines littered with bloated fish. The cause is equally clear: the indiscriminate dumping of raw sewage and industrial sludge into the nearest body of water has exceeded the capacity of the environment. Because the symptoms of this overflow are so compelling, it seems that we shall finally attempt to do something about it. But population growth makes it improbable.

Unfortunately the most serious water pollution threats are those, which cannot be seen, smelt or picked up by the handful. The organic content in domestic water supplies is apparently still high enough to protect viruses from the effects of chlorine. Hence tap water is a suspected transmission route for the alarming rise of infectious hepatitis today. Moreover, the vast types of chemicals which industry throws into the environment in many cases cannot be filtered. These chemicals mow pervade not only rivers, lakes and even oceans but also vast reservoirs of ground water. Many, of course, are known to be fatal to fish, the mainstay of high quality supplies in much of the world.

***Q3)*** Attempt **<u>any two</u>** of the following: **[10]**

a) Write a review of a book that you liked most taking into account its importance, message, social/moral implication, and your opinion.

b) Choose the more powerful of the two words or phrases given.

i) (Grabbing/holding) my shoulder, he asked me to sit down.

ii) The lion gave a (loud/ear splitting) roar.

iii) India Today is a (well-known / popular) magazine.

iv) Who is your (favourite / loving) hero?

v) The new plan will be (starting / implemented) from next month.

c) Write a creative description of a place of tourist attraction.

***Q4)*** Attempt **<u>any two</u>** of the following: **[10]**

a) You want to discuss your future plans with your friend. Write a short telephone conversation on this situation.

b) Send an e-mail to the director of National Chemical Laboratory, Pune for seeking permission to visit the laboratory.

c) Prepare 5 slides of about 20 words each for power point presentation that you would like to make in a seminar on the topic 'Air Pollution: Causes, Effects and Remedies'.

**Total No. of Questions : 4]** **[Total No. of Pages : 2**

**P317**

# [4017] - 237

## S.Y. B.Sc. (Vocational Course)

### INDUSTRIAL CHEMISTRY

### VOC : 221 - Unit Processes in Organic Industries

### (Paper - I) (Sem. - II) (55612) (2008 Pattern)

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat diagrams wherever necessary.***

***Q1)*** Give balanced equations with conditions for the following reactions / synthesis. **[16]**

a) Benzene $\longrightarrow$ Toluene

b) Acetanilide $\longrightarrow$ p-Nitroacetanilide

c) Nitrobenzene $\longrightarrow$ m-Dinitrobenzene

d) p-Chloro aniline $\longrightarrow$ p-Chloronitrobenzene

e) Acetic acid $\longrightarrow$ Chloroacetic acid

f) Benzene $\longrightarrow$ Chlorobenzene

g) Cellulose $\longrightarrow$ Cellulose acetate

h) Nitrobenzene $\longrightarrow$ Aniline

***Q2***) Attempt <u>any two</u> of the following: **[8]**

a) Discuss the orientation effects in the sulphonation of substituted benzene with suitable examples.

b) What is oxidation? What are oxidizing reagents? Name any four oxidizing reagents.

c) Discuss the mechanism of nitration of benzene.

***P.T.O.***

***Q3)*** Write short notes on <u>any two</u> of the following: **[8]**

a) Hydrogenation of oil.

b) Esterification process.

c) Friedel Craft alkylation.

***Q4)*** Describe the manufacture of chloral from ethyl alcohol. **[8]**

OR

Describe the manufacture of styrene from benzene with the help of a flow sheet.

**Total No. of Questions : 4]** **[Total No. of Pages : 2**

**P318**

# [4017] - 238

## S.Y. B.Sc. (Vocational)

## BIOTECHNOLOGY

## Voc - Biotech - 221 : Plant and Animal Tissue Culture

### (Paper - I) (Sem. - II) (2008 Pattern) (55712)

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***All questions carry equal marks.***

***Q1)*** Answer each of the following in 1-2 lines: **[10]**

a) State two applications of organ culture.

b) Define totipotency.

c) What is the use of 2,4 - D in plant tissue culture?

d) State advantages of meristem culture.

e) What is callogenesis?

f) Give role of serum in animal cell culture media.

g) State importance of cell lines.

h) What is an explant?

i) Give two applications of micropropagation.

j) What is surface sterilization?

***Q2***) Write short notes on <u>any two</u> of the following (8-10 lines): **[10]**

a) Hormones used in plant tissue culture.

b) Applications of animal cell lines.

c) Cell banks.

***P.T.O.***

***Q3)*** Attempt any two of the following (8-10 lines): **[10]**

a) Describe in brief the technique of micropropagation.

b) Describe any one method of protoplast isolation.

c) Describe the methods of organ culture.

***Q4)*** What is plant tissue culture? Describe the layout of a typical plant tissue culture laboratory. **[10]**

OR

What is organ transplant? Describe various methods of organ transplant.

**Total No. of Questions : 4]** **[Total No. of Pages : 2**

**P319**

# [4017] - 240

## S.Y. B.Sc. (Vocational)

## ELECTRONIC EQUIPMENT AND MAINTENANCE (EEM)

## VOC-EEM - 221: Audio, Video & Office Equipment - B

### (Paper - I) (Sem. - II) (2008 Pattern) (58112)

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat diagram wherever necessary.***

***Q1)*** Answer the following:

a) In which PC Peripheral equipment the CCD is used. **[1]**

b) State the use of sound card in case of PC. **[1]**

c) What is light pen? **[1]**

d) What type of lamp is used in a Scanner? **[1]**

e) State the use of Bar-code. **[2]**

f) State two advantages of EPABX system. **[2]**

g) State the important parameters of VDU monitor. **[2]**

h) Draw a neat diagram of over-head projector. **[2]**

***Q2***) Answer any two of the following:

a) Discuss the communication schemes used in FAX. **[4]**

b) Write a short note on Multimedia Projector. **[4]**

c) Distinguish between Impact and Non-impact printer. **[4]**

***Q3)*** Attempt any two of the following:

a) Explain with neat diagram the operating principle of Dot matrix printer. **[4]**

b) Explain the working of touch screen. State its applications. **[4]**

c) Discuss with neat diagram the working of LASER printer. **[4]**

***P.T.O.***

***Q4)*** Answer the following:

a) Explain with neat diagram the sequence of steps involved in Xerox Machine. **[6]**

b) State the different types of Scanners and explain the working principle of any one Scanner. **[6]**

OR

Answer the following:

a) Discuss the construction and working of an optomechanical mouse. State the advantages of an Optical Mouse over an optomechanical mouse. **[6]**

b) Write a short note on: **[6]**

i) Large Screen display.

ii) Rolling display.

**Total No. of Questions : 4]** **[Total No. of Pages : 2**

**P320**

# [4017] - 242

## S.Y. B.Sc. (Vocational)

## SEED TECHNOLOGY

## Vegetable Seed Production

### (Paper - III) (Sem. - II) (2008 Pattern) (58912)

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat and labeled diagrams wherever necessary.***

***Q1)*** Attempt the following: **[10 x 1 = 10]**

a) Define apomixis.

b) What is pollination?

c) Give two objectives of hybridization.

d) Enlist methods of population improvement.

e) Give different methods of classification for vegetable crops.

f) What is isolation distance for foundation seed production in Tomato?

g) Define roughing.

h) Which type of nursery bed is required for growing seedlings in Brinjal?

i) Define GMS.

j) Write any two objectives of vegetable seed production.

***Q2***) Attempt any two of the following: **[2 x 5 = 10]**

a) Define megasporogenesis. Explain in detail the process of megaspore formation with neat labeled diagram.

b) What is self incompatibility? Describe any one type of self incompatibility.

c) Describe procedure of hybridization technique in vegetable crops.

***P.T.O.***

***Q3)*** Write notes on (Any two): **[2 x 5 = 10]**

a) Pedigree selection.

b) Achievements of population improvement.

c) Modes of pollination.

***Q4)*** Give seed production procedure with reference to land requirement, isolation, nursery management, cultural practices, roughing, plant protection, harvesting, seed extraction, drying and storage in Tomato. **[10]**

OR

Give seed production procedure with reference to land requirement, isolation, nursery management, cultural practices, roughing, plant protection, harvesting, seed extraction, drying and storage in Bitter guard.

**Total No. of Questions : 4]** **[Total No. of Pages : 2**

**P321**

# [4017] - 243

## S.Y. B.Sc. (Vocational)

## INDUSTRIAL MICROBIOLOGY

## VOC-IND-MIC - 221: Microbial Fermentations and Downstream Processing

**(Theory) (Paper - I) (Sem. - II) (2008 Pattern) (58212)**

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***All questions carry equal marks.***
4) ***Draw neat labelled diagrams wherever necessary.***
5) ***Use of scientific calculators is allowed.***

***Q1)*** **Answer each sub - question in one or two lines; Fill in the blanks; State whether the statement is true or false.** **[10]**

a) State whether the statement is **TRUE or FALSE**.

Antibiotics are primary metabolites of cells.

b) Name the fermentation product whose overproduction is facilitated by modification of cell wall.

c) State the objective of the second step (after cell separation) used in the recovery of an extracellular product.

d) Name the solvents used for precipitation of proteins.

e) Define 'semisynthetic penicillins'.

f) Give one example of fermentation product produced by a two-step process.

g) Give one example each, of cation exchanger and anion exchanger.

h) Give the role of flocculating agents used for the treatment of fermentation broth.

i) Give one application of amylase.

j) Fill in the blank:

———————— is also known as Vitamin $B_{12}$.

***P.T.O.***

***Q2*) Answer *<u>any two</u>* of the following:** **[10]**

a) Illustrate the working of a plate-frame filter in downstream processing.

b) With the help of a suitable example, explain the principle of adsorption chromatography.

c) With the help of a suitable example, explain the use of evaporation as a method of recovery of a fermentation product.

***Q3)* Answer *<u>any two</u>* of the following:** **[10]**

a) Describe the different formulation steps involved in preparation of a fermentation product.

b) Explain the term 'whole broth processing'.

c) Draw a flow chart for microbial production of ethanol.

***Q4)* Answer *<u>any one</u>* of the following:** **[10]**

a) What are bioinoculants? Describe different bioinoculants and methods of their formulation.

b) With the help of a flow chart, describe the production of cheese.

**Total No. of Questions : 4]** **[Total No. of Pages : 1**

**P322**

# [4017] - 244

## S.Y. B.Sc. (Vocational)

## INDUSTRIAL CHEMISTRY

## Voc : 222 - Industrial Pollution

### (2008 Pattern) (Paper - II) (Sem. - II) (55622)

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat diagrams wherever necessary.***

***Q1)*** Answer the following: **[16]**

a) Convert 15 French into Clark.
b) Define batch discharge.
c) Name the chemical constituents in temporary hard water.
d) Define London Smog.
e) What is soil profile?
f) Define night soil.
g) State the principle of use of ultrasound to purify water.
h) Name the wastes in the effluents of dairy industry.

***Q2***) Attempt any two of the following: **[8]**

a) Compare COD and BOD tests.
b) Write a note on plumbo solvency.
c) Explain the nature of wastes in explosives industry.

***Q3)*** Attempt any two of the following: **[8]**

a) Explain the process of lagooning used for sludge disposal.
b) Write a note on Nitrogen cycle.
c) Explain any two types of chlorinations.

***Q4)*** Explain the types of sewages and their compositions. **[8]**

OR

Name the sources of oxides of nitrogen in air and explain their hazardous effects on human health.

**Total No. of Questions : 4]** **[Total No. of Pages : 2**

**P323**

# [4017] - 245

## S.Y. B.Sc. (Vocational)

## BIOTECHNOLOGY

## Voc - Biotech : 222 - Immunology

### (Paper - II) (Sem. - II) (2008 Pattern) (55222)

**Time : 2 Hours]** **[Max. Marks : 40**

**Instructions to the candidates:**

1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) All questions carry equal marks.

**Q1)** Answer each of the following in 1-2 lines: **[10]**

a) Define: Acquired immunity.

b) What is opsonization?

c) Give any one example of recombinant vaccines.

d) Explain the role of NK cells in immunity.

e) Write important features of antigens.

f) Which type of antibody can pass through placenta?

g) What is avidity?

h) Give the role of $T_H$ cells in cell mediated immunity.

i) Name the technique used for monoclonal antibody production.

j) Give any one example of primary lymphoid organ.

**Q2)** Write short notes on <u>any two</u> of the following (8-10 lines): **[10]**

a) Type III Hypersensitivity reaction.

b) Antibody structure.

c) Radial immuno assay technique.

**P.T.O.**

**Q3)** Attempt any two of the following (8-10 lines): **[10]**

a) Explain the clonal selection theory.

b) Give the role of neutrophiles in phagocytosis.

c) Explain with suitable example: Recombinant vaccines.

**Q4)** Explain the process of enzyme linked immuno sorbant assay. **[10]**

OR

Explain the structure and functions of MHC II molecule.

**Total No. of Questions : 4]** **[Total No. of Pages : 2**

**P324**

# [4017] - 247

## S.Y. B.Sc. (Vocational)

### ELECTRONIC EQUIPMENT AND MAINTENANCE (EEM)

### VOC-EEM - 222: Maintenance and Repair of Audio, Video, Office and Communication Equipment

### (Paper - II) (Sem. - II) (2008 Pattern) (58122)

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of log tables and calculators is allowed.***

***Q1)*** a) Answer all of the following:

i) AM receiver is dead. No out put. No noise. What is the likely fault? **[1]**

ii) State the bondwidths of typical AM & FM stations. **[1]**

iii) What makes TV picture 'Roll up and down'? **[1]**

iv) What is meant by ghost image? **[1]**

b) Answer all of the following:

i) Why is de-emphasis required in FM receiver and not in AM receiver? **[2]**

ii) Why can audio signal be directly transmitted? **[2]**

iii) State the wavelength of photodiodes used in ACD and DVD players. **[2]**

iv) State the possible reasons for not booting a PC. **[2]**

***Q2***) Attempt any two of the following:

a) Explain any four faults in AM receiver. Also give their remedies. **[4]**

b) What is the meaning of MP3? What is its advantage? What is the procedure for down loading songs in MP3 format? **[4]**

c) Explain trouble shooting in AM receiver. **[4]**

***P.T.O.***

***Q3)*** Attempt any two of the following:

a) Explain the user controlls in color TV receiver. **[4]**

b) Explain in brief the trouble shooting procedure for tuner section of TV receiver. **[4]**

c) Explain different faults in inkjet printer. Compare its performance with dot matrix printer. **[4]**

***Q4)*** Answer the following:

a) Explain the steps in fault diagnosis of a tape recorder. **[6]**

b) Explain following faults in TV receiver. **[6]**

i) Vertical rolling.

ii) Reduced height.

iii) Insufficient width.

OR

Answer the following:

a) Explain the alignment and tracking adjustment of superheterodyne receiver. **[4]**

b) Explain how to check TV antenna. **[4]**

c) Explain the functions of user and service controls of B/W TV receiver. **[4]**

**Total No. of Questions : 4]** **[Total No. of Pages : 2**

**P325**

# [4017] - 249

## S.Y. B.Sc. (Vocational)

## SEED TECHNOLOGY

## Seed Quality Control

### (Paper - IV) (Sem. - II) (2008 Pattern) (58922)

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat and labelled diagrams wherever necessary.***

***Q1)*** Attempt the following: **[10 x 1 = 10]**

a) Give any one concept of seed quality.

b) What is a certified seed?

c) Enlist any two seed certification agencies.

d) Give any two objectives of field inspection.

e) What qualification is required for a field inspector?

f) What is control legislation?

g) Give any two duties of seed inspector.

h) Who is responsible for establishment of central seed committee?

i) What is the maximum period of a member on central seed committee?

j) Sketch any two walking patterns in field inspection.

***Q2***) Attempt <u>any two</u> of the following: **[2 x 5 = 10]**

a) Comment on seed certification standards.

b) Discuss the organization of Seed certification agencies.

c) Describe the powers of seed inspector.

***P.T.O.***

***Q3)*** Write notes on (any two): **[2 x 5 = 10]**

a) Seed legislation in India.

b) State seed testing laboratory.

c) Specific crop standards.

***Q4)*** Describe any two agencies and statutory bodies established in India. **[10]**

OR

Explain in detail the method of field inspection with suitable example.

**Total No. of Questions : 4]** **[Total No. of Pages : 2**

**P326**

# [4017] - 250

## S.Y. B.Sc. (Vocational)

## INDUSTRIAL MICROBIOLOGY

## VOC-IND-MIC - 222: Quality Assurance in Industrial Products

### (Theory Paper - II) (Sem. - II) (2008 Pattern) (58222)

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***All questions carry equal marks.***
4) ***Draw neat labelled diagrams wherever necessary.***
5) ***Use of scientific calculators is allowed.***

***Q1)*** **Answer each sub - question in one or two lines; Fill in the blanks; State whether the statement is true or false.** **[10]**

a) Define "Quality Control".

b) State the difference between "Sterile" and 'Commercially sterile'.

c) State the difference between "Toxicity" and 'Undue toxicity'.

d) State whether the following statement is **TRUE / FALSE**.
All pyrogenic bacteria are Gram negative.

e) State whether the following statement is **TRUE / FALSE**.
Gel diffusion microbiological assays are more sensitive than turbidimetric microbiological assays for testing antibiotics.

f) BIS stands for:
   i) Bureau of International Standards.
   ii) Bureau of Indian Standards.
   iii) Biological Inclusive Samples.
   iv) Biological Indian Standards.

g) State whether the following statement is **TRUE / FALSE**.
The term 'IP' means 'Industrial Pharmacopoeia'.

h) Define the term "Assay".

***P.T.O.***

i) Fill in the blank:

——————— (Male / Female / Either male or female)

rabbits are used in the test for detection of pyrogens.

j) The blue colour in a positive LAL test develops due to

i) The reagent C in the test.

ii) The lysis of the crab cell and the color of the cell debris.

iii) The lysis of the crab blood cell and the color of the crab blood.

iv) The reaction between reagent C and the crab cell.

***Q2*) Answer *<u>any two</u>* of the following:** **[10]**

a) Explain why the test used for detecting both mutagenicity can also be adapted for testing carcinogenity of a product.

b) Explain the limitations of turbidimetric assays as compared with gel diffusions assays used for estimating the potency of vitamins microbiologically.

c) Describe the test for 'undue toxicity'.

***Q3)* Answer *<u>any two</u>* of the following:** **[10]**

a) All quality assurance tests need to be standardized. Explain with a suitable example.

b) State the name and the role of the dye used in the medium used for checking the presence of anaerobic bacteria in a sterilized product. Also explain the principles of the procedure.

c) Explain the role of FDA in Quality Assurance of pharmaceutical products.

***Q4)* Answer *<u>any one</u>* of the following:** **[10]**

a) A Vitamin $B_{12}$ is to be tested for potency using the turbidimetric assay. Draw and explain the protocol for the procedure you would perform.

b) Describe the test for checking for presence of pyrogen in a liquid vial. Explain the principle of the test, and how the test is standardized.

**Total No. of Questions : 4]** **[Total No. of Pages : 2**

**P400**

# [4017]-239
## S.Y. B.Sc. (Sem. - II)
## PHOTOGRAPHY AND AUDIO-VISUAL PRODUCTION
## Colour Photography
## (58012) (2008 Pattern) (Vocational)

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Draw neat and labeled diagrams wherever necessary.***
3) ***Figures to the right indicate full marks.***

***Q1)*** Answer in short : **[16]**

a) Explain the use of colour correction filter in colour photography.

b) How are the cones important for the human vision?

c) How does a daylight film react to tungsten light source?

d) A light source has a colour temperature of 8000 K what is its colour temperature in mired?

e) What does a colour positive film mean?

f) What is the use of the top coat in a colour film?

g) A filter is designated as CC 20 Y. Which colours it will transmit and absorb?

h) Explain what you mean by the colour temperature of a light source.

***Q2)*** Attempt any two of the following : **[8]**

a) Discuss how light is important in colour photography.

b) What are additive and subtractive colours? Discuss their use in photography.

c) What do you mean by a Mired shift? What is positive and negative Mired shift? How are these corrected?

***Q3)*** Write short notes on any two of the following : **[8]**

a) Use of filters in a colour enlarger.

b) Colour vision.

c) Removal of excess colour from a colour print.

***P.T.O.***

***Q4)*** Attempt any one of the following : **[8]**

a) Draw a diagram and explain the cross section of a colour film.

b) Draw a labeled diagram and describe the construction of a colour enlarger.

**Total No. of Questions : 4]** **[Total No. of Pages : 2**

**P401**

# [4017]-246
## S.Y. B.Sc. (Vocational)
## PHOTOGRAPHY AND AUDIO-VISUAL PRODUCTION
## Principles and Applications of Analog and Digital Communications
## (Paper - IV) (Sem. - II) (2008 Pattern) (58022)

***Time : 2 Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Draw neat and labeled diagrams wherever necessary.***
3) ***Figures to the right indicate full marks.***

***Q1)*** Solve the following questions : **[4 × 1 = 4]**

A) Attempt following multiple-choice questions :

a) ..... Wave is used when transmitting and receiving antenna are close to each other.

i) Tropospheric.
ii) Surface.
iii) Ionospheric.
iv) Electric.

b) RF current is converted into electromagnetic waves and Electromagnetic wave is converted into RF current using .....

i) Antenna.
ii) Transmitter.
iii) Receiver.
iv) Amplifier.

c) ..... cable can be used in frequency range up to about 1MHz for transmission of signals.

i) Coaxial.
ii) Open wire.
iii) Strip.
iv) Optical fibre.

***P.T.O.***

B) Solve following Numericals : **[2 × 2 = 4]**

a) A loss free transmission line has distributed inductance of 2.5 mH/Km and capacitance of 1.0μF/Km. Calculate the characteristic impedance ($Z_0$) of the line.

b) Consider the analog signal $x(t) = 3\cos 80\pi t + 10\sin 300\pi t - \cos 100\pi t$, Find maximum frequency present in $x(t)$ and Niquist rate for this signal.

C) Comment on the following statements : **[2 × 2 = 4]**

a) Comment on necessity of synchronization of commutator switch for TDM.

b) FDM is used in analog communication.

***Q2)*** Attempt the following (any two) : **[2 × 4 = 8]**

a) Draw the AM waveforms for modulation index of 0, 0.5 and 1.

b) Why DSB is preferred than SSB Transmission.

c) Explain TDM with the help of block diagram.

***Q3)*** Attempt the following (any two) : **[2 × 4 = 8]**

a) Compare analog pulse modulation with digital modulation.

b) Compare power requirements for DSB, SSB and VSB.

c) What is sampling? Explain it with the help block diagram.

***Q4)*** Attempt the following : **[2 × 6 = 12]**

a) The output voltage of transmitter is given by $400\ (1 + 0.5\sin 3140t)\ \sin 6.28 \times 10^6\ t$. This voltage is fed to a load of $600\Omega$. Determine Carrier frequency, Modulating frequency, Carrier power and Mean power output.

OR

Draw basic block diagram and explain a digital communication system.

b) Explain coaxial cable with the help of diagram and also give advantages and disadvantages of these.

☒☒☒☒