



KUVEMPU UNIVERSITY
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TOPICS FOR INTERNAL ASSESSMENT ASSIGNMENTS - 2010-11

B.Sc. Final Year (PCM & CBZ)

Important Notes:

- 1) Students are advised to read the separate enclosed instructions regarding submission of Internal Assessment Assignments.
- 2) Students to submit Internal Assignments of all the Optional Papers (PCM or CBZ) in accordance with the combination opted by the.
- 3) Out of 15 Internal Assignment marks per Paper (30 Marks for Mathematics Papers) 05 marks will be awarded for regularity (attendance) to Counseling/ Contact Programme classes pertaining to the paper. Therefore, the topics given below are only for 10 marks each paper (Mathematics papers, 25 marks).

Topics in Optional Papers

PHYSICS

**Paper- III: Spectroscopy, Wave Mechanics, Statistical Mechanics,
Relativity and Astrophysics**

Topic
Number

Answer ALL topics

1. a) Why 4 level laser system is better than 3 level laser system? 04 Marks
b) Why the population inversion is not possible in 2 level system?
2. An electron moves in a straight line with a constant speed of $V = 1.10 \times 10^6$ m/s. which has been measured to a precision of 0.10 percent. What is the maximum precision with which its position could be simultaneously measured? 03 Marks
3. Calculate the two possible orientation of spin vector S with respect to magnetic field direction. 03 Marks

Paper- IV: Nuclear Physics, Solid State Physics and Electronics

Topic
Number

Answer ALL topics

1. Mention the similarities and differences between the Free Electron Theory and Quantum Theory. 03 Marks
2. For what elements should stable isobars exist for a) $A=97$ and b) $A=80$? 03 Marks
3. Obtain an expression for the Hall co-efficient of an intrinsic semiconductor sample. 04 Marks

MATHEMATICS

Paper- III

**Topic
Number**

Answer ALL topics

**Maximum
25 Marks**

1. Prove that the ring $(\mathbb{Z}_n, +_n, *_n)$ is an integral domain and hence a field if and only if n is a prime integer.
2. Find the linear transformation $T : \mathbb{R}^2 \rightarrow \mathbb{R}^3$ such that $T(1,1)=(0,1,2)$ $T(-1,1)=(2,1,0)$.
3. Prove that "Any linearly independent set of a finite dimensional vector space V is a part of some basis of V " & If $\alpha_1, \alpha_2, \alpha_3$ are linearly independent in $V_n(\mathbb{Q})$, then prove that $\alpha_1 + \alpha_2, \alpha_2 + \alpha_3, \alpha_3 + \alpha_1$ are also linearly independent.
4. If $\alpha = (1, -5, 2, 3)$ & $\beta = (0, 1, -2, 1)$, then find $(\alpha, \beta), |\alpha|, |\beta|$ and angle between α & β .
5. Verify Euler's theorem for the functions
 - a) $U = x^3 \log\left(\frac{y}{x}\right)$
 - b) $U = 3x^2yz + 4xy^2z + 5y^4$

Paper- IV

**Topic
Number**

Answer ALL topics

**Maximum
25 Marks**

1. Show that $\int_0^1 \frac{x}{\sqrt{1-x^5}} dx = \frac{1}{5} \beta\left(\frac{2}{5}, \frac{1}{5}\right)$
2. Evaluate $\iint_D \frac{x^2 y^2}{x^2 + y^2} dx dy$ where D is the annular region between the circles $x^2 + y^2 = 4$ & $x^2 + y^2 = 1$.
3. Show that $(1+x)^2 y'' + 3xy' + y = 1 + 3x^2$ is exact and hence solve.
4. Verify the condition of integrability & hence solve the differential equations
 - a) $(yz + z^2)dx - (xz)dy + (xy)dz = 0$
 - b) $z^2 dx + (z^2 - 2yz)dy + (2y^2 - yz - xz)dz = 0$
5. Find the Fourier series for $f(x) = 1 + x + x^2$ in $(-\pi, \pi)$.

Paper- V

**Topic
Number**

Answer ALL topics

**Maximum
25 Marks**

1. Evaluate $\int_c \frac{\sin \pi z^2 + \cos \pi z^2}{(z-1)(z-2)} dz$ where c is the circle with $|z| = 3$.
2. Find inverse Laplace Transform of the following by using Convolution theorem
 - a) $\frac{s}{(s^2 + a^2)^2}$, b) $\frac{1}{(s^2 + a^2)^2}$
3. Find $L[F(t)]$, $F(t) = e^{-t}$, $0 < t < 2$, $F(T+2) = F(t)$
4. Solve $x^3 - 2x - 5 = 0$ for the real root lying between 2 & 3 by Regula-Falsi method.
5. Find the solution of $\frac{dy}{dx} = 1 + xy$ subject to the condition $y = 0$ when $x = 0$, upon third approximation and obtain y when $x = 0.2$ using Picards method of successive approximations.

CHEMISTRY

Paper- III

Answer ALL topics

1. Discuss the extraction of nickel from sulphide ore. **03 Marks**
2. Explain the determination of solubility of a sparingly soluble salt by EMF measurements. **03 Marks**
3. Discuss the structure of nicotine. **04 Marks**

Paper- IV

Answer ALL topics

1. Explain the factors influencing the stability of complex compounds **03 Marks**
2. Discuss the method of determination of crystal structure of sodium chloride by Bragg's method. **03 Marks**
3. Give the synthesis of the following
 - i) Malachite green **04 Marks**
 - ii) Chloroquine.

BOTANY

Paper- III

**Topic
Number**

Answer ALL topics. Draw diagrams wherever necessary.

- | | | |
|----|--|-----------------|
| 1. | Explain different types of Racemose inflorescence. | 05 Marks |
| 2. | Differentiate between Solanaceae & Asteraceae. | 05 Marks |

Paper- IV

**Topic
Number**

Answer ALL topics. Draw diagrams wherever necessary.

- | | | |
|----|---|-----------------|
| 1. | What is plant Breeding? Explain its objectives. | 05 Marks |
| 2. | What are the merits and demerits of tissue culture? | 05 Marks |

ZOOLOGY

Paper- III

**Topic
Number**

Answer ALL topics. Draw diagrams wherever necessary.

- | | | |
|---|---|-----------------|
| 1 | Give an account on evolution of Horse. | 05 Marks |
| 2 | Explain the process of Spermatogenesis and Oogenesis. | 05 Marks |

Paper- IV

**Topic
Number**

Answer ALL topics. Draw diagrams wherever necessary.

- | | | |
|---|------------------------------------|-----------------|
| 1 | Write an essay on Birds migration. | 05 Marks |
| 2 | Explain the concept of ecosystem. | 05 Marks |