Veer Narmad South Gujarat University, Surat

S. Y. B. Sc. (Physics Paper – V)
(For Industrial Chemistry Principal)

:From The Year 2006 – 07

1. Optical Instruments :

Entrance pupil and exit pupil, field of view, need for multiple -lens eye piece, Huygen's eyepiece, Ramsden eyepiece, Gaussian eyepiece, Kellner's eyepiece, comparison of Huygen's, Ramsden's and Kellner's eyepieces, compound microscope, ultra-microscope, telescope.
DPK: 6.1 to 6.11

2. Resolving Power of Optical Instruments :

"Geometrical" and "spectral" resolution, distinction between "magnification" and "resolution", Rayleigh Criterion for limit of resolution, resolving power of a diffraction grating, resolving power of a prism, some devices for high spectral resolution, resolving limit of a telescope, Michelson Stellar interferometer, resolution in a microscope, resolution with a coherent illumination, Abbe's theory, phase contrast microscope, determination of spectral resolving power, determination of resolving power of a telescope.
DPK: 15.1 to 15.13

3. X-ray spectrometers:

X-ray spectrum, instrumentation for X-ray spectrometry, X-ray diffractometer, X-ray absorption meter, X-ray fluorescence spectrometry, electron probe microanalyser.
RSK: 15.1 to 15.6

4. Radio Chemical Instruments:

Fundamentals of radio chemical methods, radiation detectors, pulse height analyzer, gamma spectrometry, radio isotope scanners for medical applications, the gamma camera.
RSK: 14.1 to 14.6

5. Nuclear Magnetic resonance Spectrometer:

Principle of NMR, constructional details of NMR spectrometer, sensitivity enhancement for analytical NMR spectroscopy.
RSK : 11.1 to 11.3

6. Mass Spectrometer:

Basic mass spectrometer, types of mass spectrometers, components of a mass spectrometer.
RSK: 10.1 to 10.3

7. Raman Spectrometer:

The Raman effect, Raman spectrometer.
RSK: 8.1 and 8.2

Text and Reference Books:

1. DPK : Optics and Atomic Physics. D. P. Khandelwal (Ed. 1989); Himalaya Publ. House.
2. RSK : Handbook of Analytical Instrumentation, R. S. Khandpur (Ed. 2000); Tata McGraw Hill.
3 A Text Book of Optics, Subramanayam, Brijlal and Avadhanulu (Ed. 2006); S.Chand & Co.

Veer Narmad South Gujarat University, Surat

S. Y. B. Sc. Physics Practical (for Paper – V)
(For Industrial Chemistry Principal)

:From The Year 2006 – 07

Group C:

1. To determine Cardinal points of a lens system by goniometer.
2. To estimate temperature of flame.
3. To determine temperature coefficient of resistance of a thermister using P.O. Box. (Least square fitting method)
4. Viscosity of liquid by log decrement.
5. Mutual inductance by Ballistic galvanometer.
6. Comparison of capacities by method of mixture.
7. Resolving power of telescope.
8. Resolving power of grating.
9. Wave length of monochromatic light by cylindrical obstacle.
10. Two stage R.C. Coupled Amplifier.
11. Use of CRO (D)
(i) Frequency (ii) Phase difference.
12. Study of V.T.V.M. & its Uses (D).

Veer Narmad South Gujarat University, Surat

S. Y. B. Sc. (Physics Paper – V)
(For Electronics Principal)

: From The Year 2006 – 07

1. **Thermometry** : Thermometry, types of thermometers, platinum resistance thermometer, Seebeck effect, thermoelectric thermometer, standardization and temperature scale, absolute zero and ice point, low temperature measurement, high temperature measurement.
   BS:1.2, 1.3, 1.15 to 1.17,1.19 to 1.22.

2. **Photometry :** - Sensitivity of the human eye, luminous intensity of a source, luminance and brightness, luminous efficiency of a source, illumination of a surface, typical photometers, brightness of images, viewing of stars through a telescope, the human eye.
   DPK: 25.1 to 25.9

3. **Resolving Power of Optical Instruments :**
   "Geometrical " and "Spectral " Resolution. Distinction between "Magnification" and "Resolution". Rayleigh Criterion for limit of resolution, resolving power of a diffraction grating, resolving power of a prism, some devices for high spectral resolution, resolving limit of a telescope. Michelson's stellar interferometer, resolution in a microscope, resolution with coherent illumination. Abbe's theory, phase contrast microscope, determination of spectral resolving power, determination of resolving power of a telescope.
   DPK : 15.1 to 15.13.

4. **Dielectrics and Related Properties:** Ferroelectricity, Piezoelectricity, effects of dielectrics, important requirements of good insulating materials, some important insulating materials.
   SOP :Chap. (11) VII, VIII, XVI, XVII, XVIII.

5. **Superconductivity :** Historical introduction, survey of superconductivity, mechanism of superconductors, effects of magnetic field, A.C. resistivity, critical currents, flux exclusion- The Meissner effect, the energy gap, type I and type II superconductors, London equations- Electrodynamics, a survey of B.C.S. theory, B.C.S. theory, quantum tunneling, Josephson's tunneling, new superconductors, potential applications of superconductivity.
   SOP:Chap.(8) I to VII,IX,XIII,XIV, XVII,XVIII, XIX, XX, XXII, XXIV.

6. **X-rays:** Introduction, spacing between three dimensional lattice planes, the powder crystal method, the Laue method and rotating crystal method.
   RM: 7.1, 7.3, 7.8, 7.9.

7. **Nuclear magnetic resonance spectrometer :** Principle of NMR, constructional details of NMR spectrometer, sensitivity enhancement for analytical NMR spectroscopy.
   RSK :11.1 to 11.3.

8. Mass spectrometers : Basic mass spectrometer, types of mass spectrometers, components of mass spectrometers.
RSK : 10.1 to 10.3.

: Text and Reference Books :

1. BS : Heat and Thermodynamics : By Brijlal and N. Subrahmanyam. S. Chand & Company(16th Ed.)
2. DPK: Optics and Atomic Physics : By D. P. Khandelwal Himalaya Publishing House (Ed. 1989)
3. SBA : A text book of Optics : by N. Subrahmanyam, Brijlal and M.N.Avadhanulu S.Chand & Co., Ltd, (Ed. 2006)
4. SOP : Solid State Physics : By S.O.Pillai , New Age International Pub. (4th Ed.)
5. RM : Modern Physics : By R. Murugeshan, K. Sivaprasath,S. Chand & Co. Ltd., (Ed. 2005)
6. RSK: Handbook of Analytical Instrumentation by R.S. Khandpur, Tata Mc-Graw Hill Pub.(Ed. 1989)

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S. Y. B. Sc. Physics Practical (for Paper – V)
(For Electronics Principal)

:From The Year 2006 – 07

Group – C

1. To estimate temperature of flame.
2. Cardinal points of a lens system by goniometer.
3. Hartmann's formula (Spectrometer)
4. Wavelength of monochromatic light by cylindrical obstacle.
5. Resolving power of telescope
6. Resolving power of grating.
7. Viscosity of liquid by log-decrement.
8. Mutual inductance by ballistic galvanometer.
9. Energy band gap of a semi conductor using diode.
10. Measurement of thermo- emf and it's dependance on temperature interval in a thermocouple..
11. To study crystal structure of a material by X – ray diffraction method (D)
12. Geiger Muller Counter (D)