



বিদ্যাসাগর বিশ্ববিদ্যালয়

**VIDYASAGAR UNIVERSITY**

**M.Sc. Examinations 2020**

**Semester IV**

**Subject: PHYSICS**

**Paper: PHS 404 (Special Paper)**

(Theory)

**Full Marks: 40**

**Time: 2 hrs.**

*Candidates are required to give their answers in their own words as far as practicable.*

**PHS404 A (Solid State Physics-II )**

**Answer Any One of the Following:**

1. Explain quantum theory of Paramagnetism and hence find the Magnetization?
2. Clearly explain the origin of Pauli's Spin Paramagnetism?
3. Discuss Weiss Theory and find an expression of Saturation Magnetization?
4. Explain the origin of Ferromagnetic Domain.
5. What is the origin of Bloch Wall? What is the total energy per unit area of the wall?
6. Show the structure of Antiferromagnetic solid? How the structure can be determined? What is Neel Temperature?
7. Show the structure of Ferrite? Find the saturation magnetic moment of Ferrous Ferrite?
8. What is spin wave? Deduce Bloch  $T^{3/2}$  law?
9. Explain the Principle of NMR and hence find the expression of Resonance condition for Isotope  $\text{Na}^{23}$ .
10. Show that Superconducting state is more ordered state than normal state? Explain Superconducting to normal transition in presence of applied magnetic field.
11. Explain in details AC Josephson Effect.
12. Prove that total Magnetic flux that passes through a superconducting ring is quantized.

**PHS – 404 B**

**Unit: 404B.1 Applied Analog Electronics**



Answer any One of the following questions

1. How EHT is generated in a TV receiver?
2. Mention the requirements to make the colour TV system fully compatible with B/W TV system.
3. Define (i) Luminance, (ii) Saturation and (iii) Hue.
4. What do you mean by interlaced scanning and why this is incorporated in TV system?
5. Explain the difference between even field and odd field in case of TV system.
6. What is vestigial side band modulation and why this is used for picture signal modulation in TV?
7. Explain the design and operation of Yagi-Uda antenna for receiving television signal.
8. Why shadow mask is required in a colour picture tube?
9. Explain the process of Pre-emphasis and De-emphasis?
10. What are the advantages of Trinitron picture tube over other colour picture tubes?
11. What do you mean by colour difference signals and why it is necessary to transmit these signals instead of transmitting the individual colour signals?
12. Why negative modulation is used in television system?

**Unit: 404B.2 Digital Electronics**

**Answer Any One of the Following:**

1. Explain the procedure of 'frequency shift keying' modulation technique.
2. Compare the PCM and DPCM technique.
3. Mark the different aspect of improvement in 8086 microprocessor compare to 8085.
4. What are the role of BIU and EU in 8086 microprocessor?
5. How one can add the ten numbers stored in memory location 4000 onwards in an 8085 microprocessor using simple mnemonics.
6. Describe the method of generating 20 bit physical address of instruction in 8086 microprocessor with proper numerical example.
7. What is quantization error in PCM? How can you reduce the error? Explain with example.
8. Describe the process of 'Delta Modulation'.
9. Explain the idea of 'quadrature phase shift keying' in digital modulation.
10. Describe the process of getting the highest number from an array of ten numbers stored in memory location 5000 onwards in an 8085 microprocessor using simple mnemonics.
11. Discuss the merits and demerits of FSK over ASK.
12. Explain the TDM-PCM technique with 24 sound signals and find out the bit rate in the transmission line for an ideal system where sync bit is one for every frame.