(b) Explain the function of op-amp as an integrator and differentiator. Find the expression for output voltage in each case.

9. (a) Draw the circuit diagram of a Wien's bridge oscillator using an op-amp and explain how oscillations are generated. Derive an expression for frequency.

Or

(b) (i) Which is the fastest ADC and why?

(ii) Explain the operation of dual-slope ADC with a neat sketch.

10. (a) Draw the circuit of Astable multivibrator using 555 timer and explain its operation.

Or

(b) (i) Discuss the various ways for fabricating pnp transistor.

(ii) Compare the performance of pnp and npn transistor.

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12PPH04

(For the candidates admitted from 2012–2013 onwards)

M.Sc. DEGREE EXAMINATION, NOVEMBER 2017.

Second Semester

Physics

ELECTRONICS

Time : Three hours Maximum : 75 marks

PART A — (5 × 5 = 25 marks)

Answer ALL questions.

1. (a) Describe the action of PN junction diode under forward bias and reverse bias.

Or

(b) Explain the Volt-ampere characteristics of a photodiode.

2. (a) With the help of neat sketches and characteristics curves, explain the operation of the junction FET.

Or

(b) Explain the following terms are much used in the study of SCR

(i) Break down voltage

(ii) Peak inverse voltage

(iii) Holding current and

(iv) Forward current rating

3. (a) An inverting amplifier has $R_1 = 20\,K\Omega$ and $R_f = 100\,K\Omega$. Find the output voltage, the input resistance and the input current for an input voltage 1V.

Or

(b) List six characteristics of an ideal of op-amp.

4. (a) Draw a sample and hold circuit. Explain its operation and indicate its uses.

Or

(b) Discuss the basic DAC techniques.

5. (a) Describe the diffusion process in the fabrication of monolithic ICs.

Or

(b) Discuss the operating principle of charge coupled device. Mention few applications of it.

PART B — (5 × 10 = 50 marks)

Answer ALL questions.

6. (a) (i) Draw the V-I characteristics of tunnel diode and explain its operation.

(ii) List out the applications of tunnel diode and mention its advantages and disadvantages.

Or

(b) Describe with the help of a relevant diagram, explain the principle and working of Gunn diode.

7. (a) With the help of suitable diagrams, explain the working of different types of MOSFET.

Or

(b) (i) Draw the equivalent circuit of UJT and explain its operation with the help of emitter characteristics.

(ii) Mention some of the applications of UJT.

8. (a) Explain how first-order and second-order low pass filters can be constructed using an op-amp.

Or