

(G4 4r A-35-Eng)

SEAT No. \_\_\_\_\_

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**Sardar Patel University****F. Y. B. Sc. 2<sup>nd</sup> Semester Examination (CBCS)****Subject title: Electronics, nuclear and Modern Physics****Subject Code: US02CPHY02****Time: 2 Hours - 2 to 4 PM****1<sup>st</sup> April, 2017, Saturday****Total Marks : 70****Q.1 Multiple Choice Question : (Each of One Marks)****(10)**

1. In output dc voltage pulsation removed by  
(a) Transformer (b) Rectifier (c) Filter (d) Regulator
2. In half wave rectifier dc voltage is -----  
(a)  $\frac{V_m}{\pi}$  (b)  $\frac{2V_m}{\pi}$  (c)  $\frac{V_m}{2\pi}$  (d) None of these
3. What is the value of ripple factor in bridge rectifier?  
(a) 0.482 (b) 1.21 (c) 1.84 (d) 0.84
4. The Peak Inverse Voltage rating in Power diode likely to be  
(a) 50mv to 1000v (b) 50v to 1000v (c) 50mv to 1000mv (d) None of these
5. For CB transistor current ratio of  $I_c$  to  $I_E$  is  
(a) =1 (b) <1 (c) =0 (d) >1
6. In PNP transistor base is  
(a) metal (b) N type semiconductor (c) insulator (d) None of these
7. In Nuclear Physics unit of magnetic moment is  
(a) Fermi (b) nuclear magneton (c) Weber (d) Tesla
8. The radius of atomic nuclei is proportional to 1/3 power of its  
(a) Atomic mass (b) Atomic number (c) no. of electron (d) none of these
9. (One) 1 fm (Fermi) =----- meter  
(a)  $10^{-8}$  (b)  $10^{-12}$  (c)  $10^{-15}$  (d)  $10^{-10}$
10. The De-Broglie wave length ( $\lambda$ ) of a particle with momentum p is given by  
(a)  $\lambda = \frac{p}{2\pi}$  (b)  $\lambda = \frac{h}{2\pi}$  (c)  $\lambda = \frac{h}{p}$  (d)  $\lambda = \frac{p}{h}$
11. According to Somerfield atomic model electron revolves around the nucleus in --- orbit  
(a) Rectangle (b) elliptical (c) circular (d) none of these
12. For lower wave length Plank's radiation law becomes ----- law  
(a) Lummer (b) Compton (c) Rayleigh Jeans (d) Wein's

**Q.2 Answer any TEN in short (Each of two marks)****(20)**

1. Draw circuit for V-I characteristics in reverse bias condition for PN-Junction diode.
2. What is the Peak Inverse Voltage? Explain.
3. What is the filter circuit? Why is it required?
4. Draw the symbol of Light Emitting Diode and explain in short.
5. For a transistor having  $\alpha_{dc} = 0.98$  determine the  $I_c$  if  $I_E = 5$  mA.
6. Define  $\alpha_{dc}$  and  $\beta_{dc}$  of a transistor and derive relation between them.
7. Explain nuclear magnetic resonance(NMR).
8.  ${}^5_5B^{12}$  nuclei is unstable. Why?

(P.T.O.)

9. Using  $\frac{dN}{dt} = -N\lambda$ , derive  $N = N_0 e^{-\lambda t}$

10. State limitations of Bohr atom model.

11. State Heisenberg uncertainty principle.

12. Derive Wein's law from Plank's .

Q.3(a) Draw centre tap Full Wave rectifier circuit diagram and explain its working. (6)

(b) Discuss performance of Full Wave rectifier. (4)

OR

(a) Draw circuit diagram of shunt capacitor filter with full wave rectifier and explain (6)

(b) Explain construction and filtering action of a LC filter. (4)

Q.4(a) Draw Zener diode voltage regulator circuit and explain it. (6)

(b) What is transistor? Explain its construction(structure). (4)

OR

(a) Draw circuit diagram of common emitter(CE) PNP transistor and output characteristics curve and explain it. (6)

(b) Explain determination of DC load line for CE transistor circuit. (4)

Q.5(a) Define : (i) Binding energy (ii) Binding energy per nucleon. Draw the graph of binding energy per nucleon versus mass number(A) and discuss its importance (6)

(b) Write notes on radio metric dating. (4)

OR

(a) For liquid drop model of nucleus obtain the formula for binding energy of nucleus. (6)

(b) Explain in detail stability of light nuclei (4)

Q.6 Explain compton effect, derive expression for change in wave length of photon in it. Define compton shift also. (10)

OR

Draw heat radiation curve of a black body and discuss its features. State Plank's law and show it is successful to explain the heat radiation curve of black body completely (10)