Roll No ..... Reg No ..... Date ..... Sign .....

GOVERNMENT COLLEGE UNIVERSITY, FAISALABAD

M. Sc Physics Part 2nd 1st Annual 2015
Course Code PHY-D11/601 Course Title: Solid State Physics-II (opt)

Time Allowed: 03:00 Hours Maximum Marks: 100 Pass Marks 40%

OBJECTIVE PART Time Allowed: 30 Minutes Marks: 20

Note: This question No 1:. is compulsory and its all parts carry equal marks. Please Attempt the answers on same paper and return to the centre superintendent within the time allowed.

Q. No. 1 Tick the correct option (20 x 1)

1 magnetic susceptibility has the dimensions of

(a) Wb / m^2 (b) Wb / m (c) amp / m (d) dimension less

2 Magnetic induction B and the magnetic field intensity H are related by

(a) $B = \mu_0 H^2$ (b) $B = \mu_0 {}^2H$ (c) $B = \mu_0 \mu_r H$ (d) $B = \mu_0 + H$

3 Magnetic susceptibility χ equals

(a) dipole moment per unit volume (b) torque per unit area
(c) magnetization per unit magnetic field intensity (d) none of these

4 1 Bohrmagneton is defined as

(a) magnetic moment of an electron spin (b) magnetic moment of a nucleus

(c) magnetic moment of an electron orbital motion (d) Non of these

5 The units of magnetic permeability are

(a) henry / metre (b) weber metre (c) henry metre (d) henry / sec

6 The susceptibility of a diamagnetic material is about

(a) 10^5 (b) 10^7 (c) 10^{-7} (d) -10^{-3}

7 The ferromagnetic Curie temperature of iron is

(a) 631k (b) 922k (c) 1428k (d) 1043k

8 At Neel temperature
(a) Permeability is minimum (b) permeability is maximum
(c) Susceptibility is minimum (d) Susceptibility is minimum

9 Ferromagnetic materials or ferrites are obtained from

(a) Copper (b) zinc (c) aluminium (d) none of these

10 For copper the resultant spin in Bohrmagneton is

(a) 0 (b) 1 (c) 2 (d) 3

P-T-O

11 The relative permeability of iron is

(a) 7000 (b) 100 (c) 700 (d) 5000

12 The electrical conductivity σ is defined as

(a) $\sigma = 5ne^2 \tau / m$ (b) $\sigma = ne^2 \tau / 3m$ (c) $\sigma = 2ne^2 \tau / m$ (d) $\sigma = ne^2 \tau / m$

13 The electrical resistivity ρ is defined as

(a) $\rho = m / ne^2 \tau$ (b) $\rho = 3m / 2ne^2 \tau$ (c) $\rho = 4m / ne^2 \tau$ (d) $\rho = 2ne^2 \tau / m$

14 The mean free path L of a conduction electron is defined as

(a) $L = V_F \tau / 5$ (b) $L = 3V_F \tau$ (c) $L = 2V_F \tau$ (d) $L = V_F \tau$

15 The energy – wavevector relation for free electrons is defined as

(a) $\varepsilon = (\hbar^2 / 2m) k^2$ (b) $\varepsilon = (\hbar^2 / 3m) k^2$ (c) $\varepsilon = (2\hbar^2 / 2m) k^2$ (d) $\varepsilon = (3\hbar^2 / 2m) k^2$

16 If the mobility of electrons in a metal increases, the resistivity

(a) Decreases (b) increases (c) remain constant (d) 0

17 Ohm,s law relates to the electric fields E, Conductivity σ and current density J as

(a) $J = E / \sigma$ (b) $J = \sigma E^2$ (c) $J = \sigma / E$ (d) $J = \sigma E$

18 Order of resistivity of silver is

(a) nano ohm m (b) milli ohm m (c) ohm m (d) micro ohm m

19 If the Fermi energy of a metal is 1.4 ev, The Fermi temperature of the metal is approximately

(a) 1.6×10^3 K (b) 1.6×10^3 (c) 1.6×10^3 (d) 1.6×10^3

20 Net outflow of flux through a closed surface enclosing a charge is

(a) q (b) 1 / q (c) q / ε_0 (d) $q / 4\pi \varepsilon_0$

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GOVERNMENT COLLEGE UNIVERSITY, FAISALABAD

M. Sc Physics Part 2nd 1st Annual 2015

Course Code PHY-D11/601 Course Title: Solid State Physics-II (opt)

Time Allowed: 03:00 Hours Maximum Marks: 100 Pass Marks 40%

SUBJECTIVE PART Time 2: 30 Hours Marks: 80

Note: Attempt any four questions. All questions carry equal marks

Q.1

(a) Show that the Hall coefficient is independent of applied magnetic field and is inversely proportional to electronic charge. Mention the important applications of Hall effect. 10

(b) Evaluate the temperature at which there is 1 % probability that a state with an energy 0.5 ev above the Fermi energy will be occupied by an atom 10

Q.2

(a) Differentiate between paramagnetic, ferromagnetic and diamagnetic materials. (10)

(b) Describe the quantum theory of paramagnetic Susceptibility of a substance in an external magnetic field Bz under the following conditions.

(i) Bz is week and temperature is high.
(ii) Bz is very strong and temperature is very low. (5+5)

Q.3

(a) What is meant by Fermi level in metals? How does it vary with temperature in metals? (10)

(b) Show that the wavelength associated with an electron having energy equal to the Fermi energy is given by

$$2(\pi/3n)^{1/2}$$ (10)

Q. 4

(a) Distinguish between intrinsic and Extrinsic semiconductor in detail. (10)

(b) Derive an expression for the intrinsic carrier concentration in a semiconductor. What is the effect of large band gap on the intrinsic carrier concentration? (10)

Q.5

(a) Drive an expression for the specific heat of solids on the basis of Debye model. How does the Debye model differs from the Einstein model? Discuss the variation of Debye specific heat with temperature. (15)

(b) how a P-N junction formed. Discuss the reverse bias and forward bias of a P-N junction. (05)

Q.6 Write notes on the following.

(i) Brillouin Zones (10)
(ii) Band theory of solids (10)

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GOVERNMENT COLLEGE UNIVERSITY, FAISALABAD

M.Sc. Physics Part 2nd Annual2015

Course Code Phy-602/D12 Course title: Statistical Physics

OBJECTIVE PART Time allowed: 15 minutes Marks : 10

Note: This question No. 1 is compulsory and its all parts carry equal marks. Please attempt the answers on the same paper and return it to the center superintendent with in the time allowed.

i-	The difference between molar specific heats at constant pressure and at constant volume is always equal to about			
	a) Avogadro's number	b) Gas constant	c) 1.41	d) none of these
ii-	A system in contact with a large thermal reservoir is an example of			
	a) microcanonical ensemble	b) canonical ensemble	c) grand canonical ensemble	d) entropy
iii-	A gas initially occupies a volume V and is expanded to a total volume 2V. The change in entropy is			
	a) *ln* 2	b) R *ln* 2	c) nR *ln* 2	d) none of these
iv-	If out of W possible ways, all are equally probable, it is an example of			
	a) canonical ensemble	b) classical probability	c) microcanonical ensemble	d) statistical probability
v-	The experimental method of assigning equal probabilities to events by measuring relative frequency of occurrence is called			
	a) classical probability	b) entropy	c) statistical probability	d) none of these
vi-	The sum over all quantum states of a system is called			
	a) microcanonical ensemble	b) partition function	c) grand canonical ensemble	d) none of these
vii-	If the wave function of two non interacting identical particles does not change sign when the particles are interchanged, the particles are			
	a) Bosons	b) Fermions	c) photons	d) none of these
viii-	If the wavefunction of identical particles change sign when these are interchanged, the particles are			
	a) Bosons	b) photons	c) protons	d) none of these
ix-	Dilute solutions of the isotope 3He in a superfluid 4He is an example of			
	a) Boson gas	b) Fermi gas	c) Bose Einstein condensate	d) none of these
x-	A system in contact with a thermal as well as particle reservoir such that both the energy and number of particles can change, is an example of			
	a) canonical ensemble	b) entropy	c) grand canonical ensemble	d) microcanonical ensemble

Roll No.....

GOVERNMENT COLLEGE UNIVERSITY, FAISALABAD

M. Sc Physics | Part 2nd | Annual 2015
Course Code: Phy-602/D12 | Course Title: Statistical Physics

Time Allowed: 03:00 Hours | Maximum Marks: 50 | Pass Marks: 40%

SUBJECTIVE PART | Time: 02:45 Hours | Marks: 40

Note: *Attempt any four questions. All questions carry equal marks.*

Q. 1 What is canonical ensemble. Discuss in detail and also find the expression of the entropy of a perfect gas keeping in view the ideas of canonical ensemble. Please note that no credit will be given if the idea of canonical ensemble is not utilized properly. 10

Q. 2 a) What are the different types of ensembles? 4+6
b) The volume of a perfect gas of N atoms is doubled.
Find the change in entropy if the energy of the system remains constant.

Q. 3 Find the expressions for most probable and average velocities of a gas using Maxwellian velocity distribution formulae. 10

Q. 4 Discuss the classical theory of specific heat of solids and also discuss the difference between monoatomic and diatomic gas in terms of specific heats at constant pressure and at constant volume. 5+5

Q. 5 a) Describe Boltzmann, Fermi and Bose-Einstein statistics and distinguish them from the point of view of in-distinguishability of particles. 6+4
b) Calculate the approximate values of Cv for hydrogen at 25K and 1000K.

Q. 6 Describe in detail the Bose-Einstein distribution. Calculate the density of states and discuss the variation in Bose-Einstein curves in different temperature regimes. 10

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GOVERNMENT COLLEGE UNIVERSITY, FAISALABAD

M.Sc Physics Part 2nd 1st Annual 2015
Course Code: Phy-604/D14 Course title: Computational Physics

OBJECTIVE PART Time Allowed: 15 Minutes Marks: 10

Note: This question No.1 is compulsory and its all parts carry equal marks. Please attempt the answers on same paper and return it to center superintendent within the time allowed.

Q. No. 1 Encircle the correct answers. (10x1) = 10

1. Which of the method is faster than Jacobi method for the solution of Linear Equations?

a) Gauss Seidel Method b) Gauss Jordan Method c) Euler Method d) Mont Carlo Method

2. Which of the equation gives the solution of Nonlinear equations f (x) = 0?

a) Cramer's Rule b) Secant Method c) Bisection Method d) (b) and (c)

3. Set of instructions grounded into programs that makes the computer to function in desired way is called

a) Hardware b) Structure c) Software d) (a) and (b)

4. If x=3, then after executing the statement "x=++x;" and "x=--x;" the value in x will be

a) 4 and 2 b) 6 and 2 c) 9 and 3 d) None of these

5. Write the name of Scientist which realize the power of calculus for solving a vast array of physical problems

a) Euler b) Gauss Jordan c) Newton d) All of these

6. A double type variable occupies space in memory of

a) 8 bytes b) 10 bytes c) 4 bytes d) 2 bytes

7. The symbol used for the NOT, and the OR logical operators are

a) ! and || b) ! and ℝ c) ! and# d) ! and#

8. A set statements of repeatedly for a fixed number of time is called

a) while loop b) for loop c) do-while loop d) if-else loop

9. Which of the software language is called high level language for numerical problems

a) Assembly language b) Maple c) Mathematica d) Fortran

10. A mathematical software package used for the solutions of Linear equations

a) Gaussian b) Mathematica c) Multi Physics d) None of these

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GOVERNMENT COLLEGE UNIVERSITY, FAISALABAD

M.Sc Physics | Part 2nd | 1st | Annual 2015
Course Code: Phy-604/D14 | Course title: Computational Physics
Time Allowed: 03:00 hrs | Maximum Marks: 50 | Pass Marks: 40%

SUBJECTIVE PART | Time: 02:45 Hours | Marks: 40

Note: Attempt any four questions. All questions carry equal marks

Q. 2 a) What are the basic Principles of Numerical Integration Methods and its types? Also, evaluate, $I = \int_1^3 (1+X)^{\frac{3}{2}} dx$, using Trapezoidal Rule, taking n=4, h=0.25sec and implement this method by using C++ program. 6

b) Write a C++ program, using arrays to determine the Current and Power values and maximum Current and power for 4

V (Voltage)	120	130	140	150	160
R(Resistance)	20.6	30.8	40.4	50.9	60.3

Q. 3 a) What is loop? Why we need loops in efficient programming? Write name of different loops used in computational physics. Explain your answer with the help of an example. 4

b) Write a program in C++ that takes number and its power, and print the number raised to the power. ($2^3 = 8$); and also write a program to calculate the sum of odd numbers from 1 to 10 on Computer screen. 6

Q.4 a) Compute, $I = \int_0^{0.6} Sin(x)dx$, using Simpson's 3/8th Rule, taking n=o6, write a Computer Program in C++ language to implement this method. 5

b) Write down the programming methodologies and roles of MATLAB and MATHIMATICA in Computational PHYSICS along with their uses in Physics applications? 5

Q.5 a) What is a user defined FUNCTION? Explain its significance for scientific programming in details with examples. How many types of FUNCTIONS are used in C++ programming? Give example of each. 4

b) Suppose A and B be 3x3 matrices. Write a program in C++ which reads in the entries of A and B. Prints out the entries of the following matrix: 3A x 4B. 6

Q. 6 a) Using Euler's Method, write a Program in C++ for a RC Series to study the Decay of Current. Find and print the values of time against Current. Given that: r (Resistance)=10Ω, c(Capacitance)=0.1F, q(initial current) =0C, v(Voltage)=2.0volt, t(initial time)= 0.5sec, h= 0.01sec, t_{max} (maximum time)= 2.5Sec. the formula is: i=(v-q/c)/r, q=q+ih and t=t+h. 8

b) Write down the types of Numerical Methods for writing Algorithms in C++ used in Physics? 2

Q. 7 a) Write a Program in C++ with function to calculate Y(X) = 7X2 – 15X + 5 and print the values for X and Y(X). Values of "X" should be from 1 to 10. Also calculate the sum of Even Y(X) and odd Y(X). 5

b) Evaluate $I = \int_1^2 \sqrt{x}dx$, using Simpson's 1/83rd Rule, n =o4, h=0.25, here $h = \frac{b-a}{n}$, write a Computer program in C++ language to implement this method. 5

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GOVERNMENT COLLEGE UNIVERSITY, FAISALABAD

M.Sc Physics Part 2nd 1st Annual 2015

Course Code: Phy-605/1015 Course title: Classical Electrodynamics

OBJECTIVE PART Time Allowed: 30 Minutes Marks: 20

Note: This question No.1 is compulsory and its all parts carry equal marks. Please attempt the answers on same paper and return it to center superintendent within the time allowed.

Q. No. 1 Encircle the correct answers. (20x1) = 20

1. The LARMOUR frequency (ν_c) for an electron will be.

a) 28GHz b) 20 BGHz c) 25 BGHz d) 20.20 BGHz

2. The formula for cyclotron angular frequency (ω_c) is of form

a) V / r b) m / Be c) eB / m d) (a) & (c)

3. The equation of motion of charged particle in uniform magnetic field with E=0 is of form

a) mV=V + V b) mV= eVxB+eE c) mV= eExV d) None of these

4. The velocity component in constant magnetic field with E=0 will be

a) $V=V_{\parallel}+V_{\perp}$ b) $V=V_{\parallel}+V_{\perp}+V_D$ c) $V=V_{\parallel}+V_D$ d) $V=V_{\perp}+V_D$

5. Meta stable states have life time of the order of

a) 10^{-8} Sec b) 10^{-6} Sec c) 10^{-3} Sec d) 10^{-10} Sec

6. Commonly used Gas laser is

a) Carbon Dioxide b) Helium-Neon c) Argon Ion d) All of above

7. He-Ne LASER discharge tube is filled with He and Ne with

a) 85% & 15% b) 65% & 35% c) 50% & 50% d) 75% & 35%

8. The differential form of Gauss's law in dielectric medium is

a) $DivE=\rho/\varepsilon_0$ b) $Div E=\rho$ c) $DivD=\rho$ d) (b) & (c)

9. The relation between Dielectric Constant and Electric Susceptibility is

a) $k=1+\chi/\varepsilon$ b) $k-\chi/\varepsilon=1$ c) $k=1-\chi/\varepsilon$ d) (a) & (b)

10. The formula for drift velocity of charged particle in Electric and Magnetic fields will be

a) $V_D= B^2/ExB$ b) $V_D= ExB/B^2$ c) $V_D= -ExB/B^2$ d) $V_D= -B^2/ExB$

11. The value of total charge density inside the volume of the dielectric is

a) $\rho_p+\rho$ b) $\rho_p-\rho$ c) $\rho-\rho_p$ d) none of above

12. Which equation shows that a source of emf exist for a loop

a) DivE = 0 b) CurlE = 0 c) DivE ≠ 0 d) CurlE ≠ 0

13. The relation between current density vector and a average drift velocity of electrons is

a) j=nev b) j=-nev c) j=ev d) j=-ev

14. In a cable capacitor, voltage gradient is Maximum at the surface of the

a) Sheath b) Conductor c) Insulator d) Earth

P.T.O

15. The expression for couple on a dipole placed in an external Electric field

a) $\tau = PxE$ b) $\tau = -PxE$ c) $\tau = P.E.$ d) $\tau = -P.E$

16. The maximum Electric field which a dielectric can withstand without breakdown is called its

a) Strength b) Intensity c) Power d) Field vector

17. Which equation shows the coulomb gauge?

a) Div $B \neq 0$ b) Div$A = 0$ c) Div $B = 0$ d) Div $A \neq 0$

18. Which of the equation gives the equation of continuity?

a) Div$J = dp/dt$ b) Curl $J = -dp/dt$ c) Div$J = -dp/dt$ d) None

19. When the scalar and vector potential satisfy the Lorentz condition, then that gauge is called

a) Coulomb Gauge b) Lorentz Gauge c) Faraday Gauge d) None

20. The ratio of the average energy of reflected wave to the average energy of incident wave is called

a) Refracted co-efficient b) Reflected co-efficient c) Transmitted co-efficient d) None

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GOVERNMENT COLLEGE UNIVERSITY, FAISALABAD

M. Sc Physics | Part 2nd | 1st Annual 2015
Course Code: Phy-605/D15 | Course title: Classical Electrodynamics
Time Allowed: 03:00 | Maximum Marks: 100 | Pass Marks: 40%

SUBJECTIVE PART | Time: 02:45 Hours | Marks: 80

Note: Attempt any four questions. All questions carry equal marks

Q. 2 a) Drive Gausses law in Dielectric and also determine the integral form of Gauss's law by clearly indicating the term Displacement Vector (**D**). 08

b) Establish the boundary condition for the Electric field Intensity Vector (**E**) and displacement vector (**D**) for the TWO media. 06

c) Two Spherical conducting shells of radii r1 and r2 are arranged concentrically (r1<r2). The inner shell is charged to a potential U1 and outer one to a potential U2. Find the POTENTIAL at a point between the shells and at a point outside the shells. 06

Q. 3 a) Define and explain the difference between VOLT & STAT-VOLT and establish a relationship between them. 04

b) What is Biot-Savart's law? Drive a GENERAL expression for them and its vector form? Using Biot-Savart's law, find the MAGNETIC FIELD due to an infinite long straight conductor CARRYING CURRENT. 12

c) What is CHARGE DENSITY in a region of Space where ELECTROSTATIC POTENTIAL is given by: U = a-b (x2-y2)-c log(x2-y2)? 04

Q.4 a) Show that the energy transferred by a plane **E M** wave is exactly equal to that given by **POYNTING vector**. 10

b) Derive wave equation for scalar potentials by using **MAXWELL** equations. Also reduce the wave equations to **LORENTZ**'s and **COULOMB** gauge. 10

Q.5 a) Derive plane wave equation for conducting medium for electric field. What is skin depth and give its physical significance. 10

b) Electric Field **E** of an **ELECTROMAGNETIC** wave in free space is given by the expression: $\mathbf{E_x=E_z=0;\ E_y= ASin(\omega t-\omega z/c)}$, using **MAXWELL'S** equations for free space conditions, determine expression for the components of **MAGNETIC** vector **H**. 05

c) Show that for **WAVE** equations for a **CONDUCTING** medium: $\nabla^2\mathbf{E}=\mu\epsilon\ddot{\mathbf{E}}+\mu g\dot{\mathbf{E}}$ and $\nabla^2\mathbf{H}=\mu\epsilon\mathbf{H}+\mu g\mathbf{H}$ 05

Q. 6 a) What is **ALFVON WAVE**? Drive the equation which governs the propagation of **ALFVON** wave in the **PLASMA**. 12

b) Show that the ratio of two **LARMOUR** radii is being same to the square root of their masses. 08

Q. 7 a) Briefly discuss the construction, working and principle of solid state **LASER.** 12

b) Write down essential PARTS and APPLICATIONS of **LASER** 08

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GOVERNMENT COLLEGE WOMEN UNIVERSITY, FAISALABAD

2015

M. Sc Physics Part 2nd 1st Annual

Course Code: Phy-606/D16 Course Title: Nuclear Physics

OBJECTIVE PART Time Allowed: 30 Minutes Marks 20

Note: This question No. 1 is compulsory and its all parts carry equal marks. Please attempt the answers on same paper and return it to center superintendent within the time allowed.

Q. no. 1: Write short answers of the following questions. (10×2)

I. Define Q-value and threshold energy of a nuclear reaction.
II. Define magnetic dipole moment of a nucleus.
III. Explain graphically the term resonance in a nuclear reaction.
IV. Write down four main differences between liquid drop model and shell model.
V. What is average life of a radioactive element?
VI. Complete the following disintegration reaction.

$$^{1}_{1}H + ^{6}_{3}Li \rightarrow ^{4}_{2}He + ?$$

$$^{2}_{1}H + ^{8}_{16}O \rightarrow ? + \alpha - particle$$

VII. What type of X-Rays are emitted during β decay when daughter nucleus is formed in excited state.
VIII. Find out the range of a nuclear force initiated by a particle of energy 140 MeV.
IX. Write limitations of compound nucleus theory.
X. Define displacement laws of radioactivity.

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GOVERNMENT COLLEGE WOMEN UNIVERSITY, FAISALABAD

M. Sc Physics | Part 2nd | 1st Annual 2015

Course Code: Phy-606/ D16 | Course Title: Nuclear Physics

Time Allowed: 03:00 Hours | Maximum Marks: 100 | Pass Marks: 40%

SUBJECTIVE PART

Time: 02:30 Hours | Marks 80

Note: Attempt FOUR questions. All questions carry equal marks.

Q No. 1: a) What are different properties of nuclear forces. Describe Yukawa theory of nuclear forces in detail.

b) Explain the working of proportional counter with the help of circuit.

Q No. 2 : a) How fission theory based on liquid drop model (LDM)? Calculate the total energy of nucleus. Also discuss the space for spontaneous fission reaction.

b) What are future perspectives of nuclear energy.

Q No. 3: a) Explain compound nucleus theory and give two examples of (P,α) reaction based upon this theory.

b) From compound nucleus theory derive an expression for the energy of an excited state of a nucleus.

Q No. 4: a) Explain the liquid drop model for nuclear structure. How nuclear fission is explained on this model?

b) On the basis of liquid drop model derive an empirical formula for binding energy per nucleon of a nucleus.

Q No. 5: a) Derive an expression for α-disintegration energy.

b) Derive a relation for mean life of a nucleus that decays by α & β emission with decay constants λ_α and λ_β respectively.

QNO.6 (a) What is beta decay? Give its different kinds, also discuss Fermi theory of beta decay.

(b) What kind of spectrum is observed for beta decay? Explain. Do beta particles pre - exist in nucleus ?

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GOVERNMENT COLLEGE UNIVERSITY, FAISALABAD

M. Sc Physics | Part 2nd | 1st Annual 2015

Course Code: Phy-D53 | Course Title: Advanced Electronics-I (Theory)

OBJECTIVE PART | Time Allowed: 30 Minutes | Marks: 20

Note: This question No.1 is compulsory and its all parts carry equal marks. Please attempt the answers on same paper and return it to center superintendent with in the time allowed.

Q. No.1 (20x1)

1.The output of an XOR gate with 5 inputs is high only when the input combination is
(a) 10100 (b) 10111 (c) 00100 (d) 00000

2. The expression for the sum output of a full adder is
(a) $\sum$ = XOR of A, B, and C_{in} (b) $\sum = AB + (A + B)C_{in}$
(c) $\sum = (A + B)C_{in}$ (d) $\sum = AB + (AB)C_{in}$

3. A BCD-to-7 segment decoder has 0110 on its inputs. The active outputs are
(a) a, b, c, d, e, f, g (b) a, c, d, e, f, g
(c) a, b, c, d, e, f (d) None of above

4. Which of the following category of adders is most suitable to operate at high frequencies?
(a) Look ahead carry adders (b) Ripple carry adders
(c) any type of adders connected in cascading manner (d) All above

5. Which statement about Gray code is not correct?
(a) Gray code is a weighted code system.
(b) The MSB in Gray code and corresponding binary number is always same.
(c) Gray code exhibits only a single bit change from one code to the next in sequence.
(d) Gray code is not an arithmetic code.

6. If BI/RBO terminal of BCD to 7-segment decoder is connected to ground, then
(a) all output LEDs will turn on.
(b) all output LEDs will turn off.
(c) all output LEDs will turn on, if the input code is 0000.
(d) all output LEDs will turn off, if the input code is 0000.

7. The term CS in case of 74HC154 binary to decimal decoder means that
(a) Code select (b) Code subscriber
(c) Chip select (d) Code sum

8. An n-bit Gray-to-Binary code convertor always need
(a) n XOR gates (b) (n+1) XOR gates
(c) (n-1) XOR gates (d) (2n-1) XOR gates

9. How many selection lines are needed for 16-to-1 line multiplexer?
(a) 2 (b) 3 (c) 4 (d) 5

10. The Edge triggering is the specialty of
(a) SR- Latch (b) SR- Flip Flop (c) JK Flip Flop (d) Both b & c

11. A BCD counter is an example of
(a) full modulus counter (b) decade counter
(c) truncated modulus counter (d) both b & c

12. Three counters are connected in cascading manner; the modulus of each individual counter is 5, 6 and 10. The overall modulus will be
(a) 21 (b) 100 (c) 300 (d) 1100

13.E-MOSFETs are generally used for switching applications because of their
(a) threshold characteristic (b) high input resistance
(c) linearity (d) high gain

14. The overflow condition may occur while adding two signed numbers when
(a) positive number is greater than negative number.
(b) negative number is greater than positive number.
(c) both (a) & (b)
(d) none of above

15. In a certain digital waveform, the time period is 200 ms and pulse width is 150 ms, then the duty cycle will be
(a) 25 % (b) 50% (c) 75% (d) 100 %

16. A 1 MB memory is equivalent to
(a) 1000 bytes (b) 1024 kilo-bytes (c) 4096 bits (d) none of these

17. The storage cell in a SRAM is
(a) a flip flop (b) a capacitor (c) a fuse (d) pits & flats

18. A Read Only Memory (ROM) is
(a) non-volatile memory (b) volatile memory
(c) random access memory (d) both (a) & (c)

19. The fuse technology used to store data in a memory called
(a) RAM (b) EE PROM
(c) PROM (d) FPM DRAM

20.A 20-bit address bus supports
(a) 100000 memory addresses (b) 1,048,576 memory addresses
(c) 2,097,152 memory addresses (d) 20,000 memory addresses

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GOVERNMENT COLLEGE UNIVERSITY FAISALABAD

M.Sc. Physics Part 2nd 1st Annual 2015

Course Code: Phy-D53 Course Title: Advanced Electronics-1 (Theory)

Time Allowed: 03:00 Hours Max Marks: 100 Pass Marks: 40 %

Objective Part Time Allowed: 02:30 Minutes Marks: 80

Note: Attempt any four questions. All questions carry equal marks.

Q2	A	Write down the characteristics of an ideal operational amplifier and design a inverting amplifier using operational amplifier.	10
	B	Discuss and derive mathematical relation for effect of negative feedback on the input and output impedance of inverting operational amplifier.	10
Q3	A	Design a BCD to 7-segemnt decoder and discuss the function of LT, RBI and BI/RBO terminals.	10
	B	What are adders and how full adders can be used for the addition of 4-bit binary numbers.	10
Q4	A	Design a up/down3-bit binary counter.	10
	B	Differentiate the terms RAM and ROM. Also write their applications	10
Q5	A	Describe the working of laser diode and explain how laser diode differs from a conventional LED.	10
	B	What is UJT and how it can be used to generate sweep voltages. (sweep circuit)	10
Q6	A	Write a comparative note on AM and FM modulation.	10
	B	Briefly describe the various methods of microwave production.	10
Q7	A	Describe in detail the flash analog to digital convertor.	10
	B	Draw the internal circuit diagram of J-K flip flop and discuss the role of PRE and CLR inputs.	10