



PUNJAB TECHNICAL UNIVERSITY JALANDHAR

Max. Marks: 90

Time: 90 Mins.

Entrance Test for Enrollment in Ph.D. Programme

Important Instructions

- Fill all the information in various columns, in capital letters, with blue/black ball point pen.
- Use of calculators is not allowed. Use Blue/Black ball point pen for attempting the questions.
- All questions are compulsory. No negative marking for wrong answers.
- To attempt a question, make a tick mark (✓) at the right option/answer.
- Each question has only one right answer.
- Questions attempted with two or more options/answers will not be evaluated.

Subject (Engg./Arch./Pharm./Mgmt./Sciences)	ENGINEERING
Discipline / Branch	ELECTRICAL
Name
Father's Name
Roll No.	Date : 10-07-2010
Signature of Candidate
Signature of Invigilator

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| <p>Q1 A potentiometer is basically</p> <p>(a) a deflection type instrument</p> <p>(b) a null type instrument</p> <p>(c) a deflection as well as null type instrument</p> <p>(d) a digital instrument</p> <p>Q2 Transfer function approach for analysis is applicable to</p> <p>(a) SISO - systems</p> <p>(b) MIMO - systems</p> <p>(c) SIMO - systems</p> <p>(d) MISO – systems</p> <p>Q3 Analysis of electrical network is the problem to</p> <p>(a) obtain output for given input and network</p> <p>(b) obtain network for given input and output</p> <p>(c) obtain input for given output and network</p> <p>(d) none of the above</p> <p>Q4 Mathematical expression for a unit step function is, $u(t) = 1, t \geq 0$ its Laplace transform is</p> <p>(a) $\frac{1}{s}$</p> <p>(b) $\frac{K}{s}$</p> <p>(c) $\frac{10}{s}$</p> <p>(d) none of the above</p> <p>Q5 State variables in an RLC-series network is defined in terms of current through an inductor (L) and voltage across capacitor (C) because</p> <p>(a) L and C are pure elements</p> <p>(b) resistance is energy dissipating element</p> <p>(c) L and C are energy storage elements</p> <p>(d) none of of above</p> | <p>Q6 Loop T.F. of a control system is given by</p> $G(s)H(s) = \frac{10}{s(s+1)(s+5)}$ <p>Its characteristic equation is</p> <p>(a) $s^3 + 6s^2 + 5s + 10 = 0$</p> <p>(b) $s^4 + 6s^3 + 5s^2 + 10s + 10 = 0$</p> <p>(c) $s^3 + 4s^2 + 5s + 10 = 0$</p> <p>(d) $s^3 + 6s^2 + 5s + 1 = 0$</p> <p>Q7 A second order system is described by its closed loop T.F., $G_0(s)$</p> $G_0(s) = \frac{4}{s^2 + 2s + 4}$ <p>Its damping factor and natural frequency of oscillation are given by</p> <p>(a) $\zeta = 0.2$ and $\omega_n = 2$ radian/sec</p> <p>(b) $\zeta = 0.5$ and $\omega_n = 4$ radian/sec</p> <p>(c) $\zeta = 0.5$ and $\omega_n = 2$ radian/sec</p> <p>(d) $\zeta = 0.5$ and $\omega_n = 1$ radian/sec</p> <p>Q8 An R-L series circuit is energized by a d.c. voltage of 6 volt. The current flowing in the circuit, if $R=3\Omega$ and $L=1$ H is</p> <p>(a) 1 A</p> <p>(b) 2 A</p> <p>(c) 0</p> <p>(d) none of the above</p> <p>Q9 If the input (x) – output (y) relationship of a system is described by the convolution integral of the form</p> $y(t) = \int_0^{\infty} \omega(t, \tau) x(\tau) d\tau$ <p>the system is</p> <p>(a) a linear system</p> <p>(b) a non-linear system</p> <p>(c) a quasi linear system</p> <p>(d) none of the above</p> |
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- Q10 A unity negative feedback control system is described by its closed loop T.F.
- $$G_0(s) = \frac{5}{s(s+3)+5}$$
- (a) $\frac{1}{s(s+3)}$
- (b) $\frac{5}{s(s+3)}$
- (c) $\frac{5}{s(s+3)+1}$
- (d) none of the above
- Q11 The slip of an asynchronous motor in India at full load is 3%. Frequency of its rotor emf is
- (a) 3 Hz
- (b) 2 Hz
- (c) 1.5 Hz
- (d) 1 Hz
- Q12 The air gap between the stator & rotor of a 3-phase induction motor is kept as small as possible because
- (a) no mutual flux is produced with exciting current large and leakage reactance is high
- (b) mutual flux is produced with min exciting current and leakage reactances are as small as possible
- (c) both exciting current and leakage reactances are more
- (d) none of the above
- Q13 At electric generating station, the power transformer used is
- (a) voltage step-up – transformer
- (b) voltage step-down transformer
- (c) 1 : 1 transformer
- (d) none of the above
- Q14 A two-winding transformer has full load copper-loss of 400 watts. Its value at half full-load will be
- (a) 400 W
- (b) 300 W
- (c) 200 W
- (d) 100 W
- Q15 A 6-pole, 3-phase, 50Hz induction motor is running at 900 rpm. Its approximate value of efficiency will be
- (a) 70%
- (b) 80%
- (c) 85%
- (d) 90%
- Q16 A transformer has maximum efficiency among electrical machinery because
- (a) there is no-losses in windings and core
- (b) there is no rotational & mechanical losses
- (c) output power is always equal to input power
- (d) none of the above
- Q17 Maximum value of electric generated voltage in India is
- (a) 6.6 KV
- (b) 11 KV
- (c) 22 KV
- (d) 33 KV
- Q18 Maximum value of electric transmission voltage presently used in India is
- (a) 33 KV
- (b) 66 KV
- (c) 132 KV
- (d) 400 KV
- Q19 Control actions normally employed in power systems to supply quality power to consumers are
- (a) the use of UPFC (Unified power flow controllers)
- (b) the use of PSS (Power system stabilizers)
- (c) the use of LFC (Load frequency controller) and EVC (Exciter voltage controller)
- (d) none of the above
- Q20 Load flow analysis in a power system is carried out
- (a) to obtain solutions for power system under steady state condition of operation
- (b) to obtain solutions for power system under transient condition of operation
- (c) to obtain solutions for power system under dynamic condition of operation
- (d) none of the above
- Q. 21 A synchronous generator has been designed for 6 pole in India. Its speed is
- (a) 1000 rpm
- (b) 750 rpm
- (c) 500 rpm
- (d) 1200 rpm
- Q22 Insulation resistance (R_{in}) is different from conductor resistance (R_c) because
- (a) R_{in} is proportional to length where as R_c is inversely proportional to length
- (b) R_{in} is inversely proportional to length where as R_c is directly proportional to length
- (c) both are directly proportional to length but with different variational constants
- (d) none of the above
- Q23 Power factor of an electrical installation can be improved by
- (a) connecting resistive loads
- (b) connecting heavy inductive loads
- (c) connecting capacitive loads
- (d) none of the above
- Q24 Transfer function of a typical system is described by $G(s)$
- $$G(s) = \frac{10}{s^2(s+1)(s+5)}$$
- The type and order of the above system is
- (a) type-1, order-4
- (b) type-2, order-4
- (c) type-4, order-4
- (d) none of the above

- Q25 Terminal characteristics (V-I ch) of an ideal diode is
 (a) linear
 (b) non-linear
 (c) quasi-nonlinear
 (d) none of the above
- Q26 A voltmeter having resistance of 2000Ω when connected to a.c. circuit, power consumption is 2mW. If this voltmeter is replaced by another voltmeter of 4000Ω resistance, the power consumption will be
 (a) 4 mW
 (b) 1 mW
 (c) 2 mW
 (d) none of the above
- Q27 A synchronous motor for leading p.f. can be operated at
 (a) under exciting the motor
 (b) over exciting the motor
 (c) not exciting at all
 (d) none of the above
- Q28 If a generator of 250 MVA rating has inertia constant of 6 MJ/MVA, its inertia constant on 100 MVA base will be
 (a) 15 MJ/MVA
 (b) 10.5 MJ/MVA
 (c) 6 MJ/MVA
 (d) 2.4 MJ/MVA
- Q29 A resistive transducer (potentiometer) has 1000 turns on its winding. Its resolution is
 (a) 1%
 (b) 0.1%
 (c) 0.01%
 (d) None of above
- Q. 30 Operational amplifiers use
 (a) Linear ICs
 (b) digital ICs
 (c) both linear and digital ICs
 (d) None of above
- Q. 31 The microprocessor in a PLC
 (a) receives and analyses data
 (b) processes data
 (c) sends data to the output devices
 (d) does all of the above
- Q. 32 In a 3-phase half-wave rectifier, each diode conducts for a duration of
 (a) 120°
 (b) 60°
 (c) 45°
 (d) 30°
- Q33 The international standard of length is defined in term of
 (a) length of earth's meridian passing through Paris
 (b) distance between two lines engraved on platinum –iridium bar
 (c) wave length in vacuum of radiation of Krypton-86 atom in its two specified transitions
 (d) none of the above
- Q34 The most stable primary atomic standard is
 (a) Hydrogen maser standard
 (b) Cesium beam standard
 (c) Quartz standard
 (d) Rubidium vapour standard
- Q35 The 'gauge factor' of a strain gauge is defined as
 (a) $\frac{\Delta L / L}{\Delta R / R}$
 (b) $\frac{\Delta R / R}{\Delta L / L}$
 (c) $\frac{\Delta R / R}{\Delta D / D}$
 (d) none of the above
- Q36 The maximum demand of a consumer is 2K watt and his daily energy consumption is 24 units. His load factor is
 (a) 25%
 (b) 40%
 (c) 50%
 (d) none of the above
- Q37 For low head and high discharge, the hydraulic turbine is advised to be of
 (a) Pelton wheel
 (b) Kaplan turbine
 (c) Francis turbine
 (d) none of the above
- Q38 Specify the number of times the following loop is executed:
 Loop: MVI B, 64 H
 DCR B
 JNZ Loop
 (a) 64
 (b) zero
 (c) 100
 (d) infinite
- Q39 What is the equivalent hexadecimal of binary 101010?
 (a) A2
 (b) A8
 (c) 52
 (d) 2A
- Q40 If the memory chip size is 2048x8 bits, how many chips are required to make up 16 K-byte memory?
 (a) 4
 (b) 2
 (c) 16
 (d) 8
- Q41 How many flags are there in the Intel 8085A microprocessor?
 (a) 8
 (b) 9
 (c) 6
 (d) 5

- Q42 Which of the following can be used as a timer / counter?
 (a) 8257
 (b) 8255
 (c) 8259
 (d) 8254
- Q43 EGG is abbreviated as
 (a) Electroretinogram
 (b) Electrogastrograph
 (c) Electrocardiogram
 (d) Electrogastrogram
- Q44 The device used to measure heart sounds is
 (a) Plethysmograph
 (b) Sphygmomanometer
 (c) Stethoscope
 (d) none of the above
- Q45 Steel rails are welded by
 (a) argon arc welding
 (b) thermit welding
 (c) gas welding
 (d) resistance welding
- Q46 In arc welding the temperature of the arc is of the order of
 (a) 150°
 (b) 1540°C
 (c) 3500°C
 (d) 10,000°C
- Q47 If natural uranium is used as the fuel, the moderator to be used is
 (a) ordinary water
 (b) heavy water
 (c) ordinary & heavy water
 (d) graphite
- Q48 A lamp gives 1500 C.P in all directions below the horizontal. The total radiation sent vertically downward is
 (a) 750 π
 (b) 1500 π
 (c) 750 / π
 (d) 1500 / π
- Q49 The fissile material is
 (a) U₂₃₂
 (b) thorium
 (c) Plutonium
 (d) Monazite
- Q50 For speed control of motors using choppers it is desirable to employ
 (a) frequency modulation method
 (b) pulse width modulation method
 (c) phase control method
 (d) any of the above
- Q51 A D.C. generator has 6-poles. A brush shift of 6° actual means a brush shift of
 (a) 6° electrical
 (b) 18° electrical
 (c) 36° electrical
 (d) 2° electrical
- Q52 A 220 V dc generator run at full speed without any excitation. The open circuit voltage will be
 (a) 0
 (b) about 2 V
 (c) about 50 V
 (d) 220 V
- Q53 A series d.c. generator can self-excite
 (a) only if load current is zero
 (b) only if load current is not zero
 (c) irrespective of the value of load current
 (d) none of the above
- Q54 The torque developed by a d.c. motor is proportional to
 (a) flux
 (b) armature current
 (c) flux and armature current
 (d) none of the above
- Q55 When the armature of dc series motor is small, the torque is proportional to
 (a) $\sqrt{I_a}$
 (b) I_a
 (c) $(I_a)^2$
 (d) $(I_a)^{\frac{3}{2}}$
- Q56 The resistance of shunt field of a d.c. machine is about
 (a) 100 Ω
 (b) 10 Ω
 (c) 2 Ω
 (d) 0.1 Ω
- Q57 It is desired to control the speed of a d.c. shunt motor less than rated speed. The proper method of speed control is
 (a) Field control
 (b) armature resistance control
 (c) shunted field control
 (d) shunted armature control
- Q58 The regulation of a two winding transformer is 5% at full load and u.p.f. At full load, 0.8 p.f. lagging the regulation would be
 (a) 5%
 (b) less than 5%
 (c) more than 5%
 (d) none of the above
- Q59 An auto transformer results in copper saving of material if
 (a) turn ratio is high
 (b) turn ratio is low
 (c) rating of transformer is high
 (d) rating of transformer is low
- Q60 Turbo alternators use
 (a) hydrogen cooling
 (b) air cooling
 (c) nitrogen cooling
 (d) any of above

- Q61 The function of amortisseur winding in a synchronous motor is
- to prevent hunting
 - to provide starting torque
 - to improve p.f
 - to prevent hunting & provide starting torque
- Q62 V-curves of synchronous motor show the relation between
- armature current and terminal voltage
 - arm current and load
 - arm current and field current
 - all the above
- Q63 A 50 Hz 3-phase induction motor has a full speed of 1440 rpm. The number of poles of the motor are
- 4
 - 6
 - 12
 - 8
- Q64 The p.f. of an induction motor at full load is about
- 0.8 lagging
 - 1
 - 0.8 leading
 - 0.2 lagging
- Q65 In a capacitor start motor, the capacitor is connected
- in series with both the windings
 - in series with auxiliary winding
 - in series with main winding
 - in parallel with auxiliary winding
- Q66 A fully controlled converter can be adopted as
- rectifier only
 - both rectifier and inverter
 - inverter only
 - none of the above
- Q67 A chopper converts
- a constant d.c. voltage into a variable d.c. voltage
 - a variable d.c. voltage into a constant dc voltage
 - a constant a.c. voltage into a variable a.c. voltage
 - a variable ac voltage into a constant d.c. voltage.
- Q68 if a power supply has a no load voltage of 9V and a full load voltage of 8V, the regulation is
- 10.2%
 - 12.5%
 - 1.25%
 - 125%
- Q69 Which of the following ICs is a voltage regulator?
- IC 723
 - IC 3028
 - IC 3065
 - IC 741
- Q70 The unit of measurement for slew rate of an op-amp. is
- V/ μ s
 - nA
 - dB
 - dimensionless
- Q71 Which of the following may constitute the objectives of research?
- to gain familiarity or new insights into a phenomenon
 - to test a hypothesis of a casual relationship between variables
 - to portray accurately the characteristics of a situation or a group
 - all of the above
- Q72 Which of the following is not a measure of central tendency?
- Mean
 - Median
 - Variance
 - Mode
- Q73 The shape of sampling distribution is more like a normal distribution even if the sampling is not from normal population provided the sample size 'n' exceeds:
- 20
 - 30
 - 50
 - 100
- Q74 The central limit theorem states that the distribution of means of random samples taken from a population having mean, μ and finite variance, σ^2 approaches the normal distribution with mean μ and variance $\left(\frac{\sigma^2}{n}\right)$ as n tends to
- 0
 - ∞
 - 1
 - 100
- Q75 Which of the following assumptions made for using the t-test is not correct
- sample is a random sample
 - observation are independent
 - population from which the sample is drawn is normal-distributed
 - none of the above
- Q76 The weight of 10-students in Kg is 38, 40, 45, 53, 47, 43, 55, 48, 52, 49. The variance of the given sample data is
- 47
 - 52.22
 - 31.11
 - 28
- Q77 A dice is thrown 132 times. The expected frequency of any one number coming upward is
- 1/6
 - 792
 - 22
 - none of the above

- Q78 Eight coins were tossed 256-times. The expected value of getting 2-heads in a single throw in 256 throws of eight coins is
- (a) 8
(b) 28
(c) 56
(d) 1
- Q79 Relationship between standard error of mean of a given sample size $\bar{\sigma}_x$, standard deviation of the population σ_p and the size of the sample, n is given by
- (a) $\bar{\sigma}_x = \frac{\sigma_p}{n}$
(b) $\bar{\sigma}_x = \frac{\sigma_p}{(n-1)}$
(c) $\bar{\sigma}_x = \frac{\sigma_p}{\sqrt{n-1}}$
(d) $\bar{\sigma}_x = \frac{\sigma_p}{\sqrt{n}}$
- Q80 If the standard deviation of a random sample of size 64 taken from a population of size 2400 is 0.8, the standard error of mean for a given population is
- (a) 0.097
(b) 0.050
(c) 0.010
(d) 0.435
- Q81 The Harmonic mean of numbers 4, 6 & 12 is
- (a) 96
(b) 7.33
(c) 6
(d) none of the above
- Q82 The Geometric mean of numbers 4, 6 and 9 is
- (a) 6
(b) 14.7
(c) 6.3
(d) 72
- Q83 Skewness is
- (a) measure of relationship
(b) measure of central tendency
(c) measure of dispersion
(d) measure of asymmetry
- Q84 If α and β denote type I & type II errors, the power of the test is given by
- (a) $(\alpha + \beta)$
(b) $1 - (\alpha + \beta)$
(c) $(1 - \alpha)$
(d) $(1 - \beta)$
- Q85 Chi – square test is used to
- (a) test goodness of fit
(b) test significance of association between two attributes
(c) test the homogeneity of population variance
(d) all of the above
- Q86 Which of the following is a formal experimental design
- (a) randomized block design
(b) Latin square design
(c) completely randomized design
(d) all of the above
- Q87 Selection of appropriate method for data collection depends on
- (a) precision needed
(b) availability of time
(c) scope of inquiry
(d) all of the above
- Q88 Yate's correction is applicable to
- (a) t-test
(b) f-test
(c) Chi-square test
(d) none of the above
- Q89 Research activities relying on experience or observation alone is
- (a) conceptual research
(b) empirical research
(c) applied research
(d) analytical research
- Q90 A tentative assumption made in order to draw out and test its logical or empirical consequences is a
- (a) Law
(b) postulation
(c) hypothesis
(d) none of the above