

PGCET-2023

Seat No. _____

SUB: ELECTRICAL ENGINEERING (EE)

Time: 1 Hour 30 minutes

Instructions:

1. Ensure that all pages are printed.
2. Use Black ball pen only
3. Change in option is not allowed
4. There is no negative marking
5. Use of non-programmable scientific calculator is allowed

1.	In thermal power plants, the pressure in the working fluid cycle is developed by			
	A	Condenser	B	Super heater
	C	Feed water pump	D	Turbine
2.	A triangular wave can be generated by			
	A	Integrating a square wave	B	Differentiating a square wave
	C	Integrating a sine wave	D	Differentiating a sine wave
3.	Tesla coils is a _____ transformer			
	A	Core less	B	Cascaded
	C	Low impedance	D	high frequency resonant
4.	To increase the transmission capability of a high voltage long line			
	A	The resistance can be increased	B	The resistance can be decreased
	C	The series reactance can be reduced	D	The shunt admittance can be reduced
5.	For Nyquist plot we use			
	A	Open loop function	B	Closed loop function
	C	Characteristic equation	D	None of the above
6.	The voltage of a bus can be controlled by controlling the			
	A	Phase angle	B	Reactive power of the bus
	C	Active power of the bus	D	Phase angle and reactive power
7.	In case of a split-phase motor, the phase shift between currents in the two windings is around			
	A	30°	B	70°
	C	90°	D	120°
8.	The transmission line distance protection relay having the property of being inherently directional is			
	A	Impedance relay	B	MHO relay
	C	OHM relay	D	Reactance relay

9.	During hunting of synchronous motor			
	A	Negative phase sequence currents are generated	B	Harmonics are developed in the armature circuit
	C	Damper bar develops torque	D	Field excitation increases
10.	Skewing is used in induction motors in order to reduce torque due to			
	A	Time harmonics	B	Slot harmonics
	C	Space harmonics	D	Reverse rotating fields
11.	A synchronous motor operating with normal excitation adjusts to increased load due to increase in			
	A	Back emf	B	Power factor
	C	Armature current	D	Non of the above
12.	Isolator used in transmission lines are capable of breaking			
	A	No current	B	Fault current
	C	Charging current	D	Load current
13.	The torque- speed characteristic of a Repulsion motor resembles with which of the following d.c. motor characteristic?			
	A	Series	B	Separately excited
	C	Shunt	D	Compound
14.	A synchronous generator connected to an infinite bus is overexcited. Considering only the reactive power from the point of the system the machine acts as			
	A	A capacitor	B	An inductor
	C	A resistor	D	None of these
15.	A D.C machine has maximum efficiency near			
	A	Half- full load	B	Full-load
	C	Twice the Full-load	D	No load
16.	In the formation of Routh-Hurwitz array for a polynomial, all the elements of a row have zero values. this premature termination of the array indicates the presence of			
	A	Only one root at origin	B	Only positive real root
	C	Only negative real root	D	Imaginary roots
17.	Creep error is associated with which one of the following meters			
	A	Moving iron meter	B	Energy meter
	C	Electrodynamo meter	D	Watt meter
18.	Which of the following instruments is most accurate			
	A	PMMC	B	Moving iron
	C	Thermocouple	D	Induction type

19.	The energy stored in the magnetic field of solenoid 30 cm long and 3 cm dia wound with 1000 turns of wire carrying current of 10 A is			
	A	0.015 J	B	0.5 J
	C	0.15 J	D	1.15 J
20.	A major advantage of active filter is that they can be realized without using			
	A	Op-amps	B	Resistors
	C	inductor	D	Capacitors
21.	The function of interpoles in a dc machine is to			
	A	Reduce field winding heating	B	Improve commutation
	C	Compensate for air gap variation	D	Reduce losses
22.	When the supply voltage to an induction motor is reduced by 10%, the maximum torque will decrease by approximately			
	A	5%	B	10%
	C	20%	D	40%
23.	The rms value of the resultant current in a wire which carries a dc current of 10A and a sinusoidal alternating current peak value 20A is			
	A	17.3 A	B	14.1 A
	C	22.4 A	D	30.0 A
24.	The P-N junction diode is a			
	A	Passive device	B	Vacuum tube
	C	Unilateral device	D	Bilateral device
25.	Swamping resistance is used to compensate error due to			
	A	Stray magnetic field	B	Temperature variation
	C	Large supply variations	D	None of the above
26.	Buchholz relay is used for protection in case of a			
	A	transformer	B	Synchronous generator
	C	Bus-bar	D	Induction motor
27.	By burden of the relay, we generally mean			
	A	Volt- ampere rating of relay	B	Current rating of the relay
	C	Voltage rating of the relay	D	Watt rating of relay
28.	Constant voltage source is			
	A	Active and bilateral	B	Passive and bilateral
	C	Active and unilateral	D	Passive and unilateral

29.	Feedback control systems are			
	A	Band pass filters	B	Lowpass filters
	C	High pass filters	D	None of the above
30.	The resistance of a reverse biased ideal diode is			
	A	Zero	B	Infinity
	C	Low	D	Negative
31.	A gas turbine works on			
	A	Carnot cycle	B	Brayton cycle
	C	Dual cycle	D	Rankine cycle
32.	The inductive reactance of a transformer depends on			
	A	Electromotive force	B	Magnetomotive force
	C	Magnetic flux	D	Leakage flux
33.	Latching current of an SCR is			
	A	Below 10%	B	10-20 %
	C	20-25 %	D	25-30 %
34.	Demand factor on a power system is			
	A	Greater than unity	B	Always less than unity
	C	Normally greater than unity	D	Always unity
35.	A transformer can have zero regulation at			
	A	Zero pf.	B	Unity pf.
	C	Lagging pf.	D	Leading pf.
36.	Induction wattmeter can be used to measure			
	A	ac power	B	dc power
	C	ac or dc power	D	None of these
37.	In which transformer, the tertiary winding is used?			
	A	Star-delta	B	Delta-delta
	C	Star-star	D	Delta-star
38.	Transistor is a			
	A	Current controlled current device	B	Current controlled voltage device
	C	Voltage controlled current device	D	Voltage controlled voltage device
39.	In two wattmeter method of power measurement, one of the wattmeters will show negative reading when the load power factor angle is strictly			
	A	Greater than 60°	B	Less than 60°
	C	Greater than 30°	D	Less than 30°

40.	The magnetic shielding of the operating parts in an electrical instrument is achieved by using			
	A	Glass cover	B	Iron case
	C	Brass case	D	Anti magnetic material
41.	For both lap and wave windings, there are as many commutator bars as the number of			
	A	Armature conductors	B	Winding elements
	C	Poles	D	Slots
42.	The speed-time curve for urban services has no			
	A	Coasting period	B	Braking period
	C	Free running period	D	Accesration period.
43.	The common collector amplifier has the highest			
	A	Voltage gain	B	Current gain
	C	Power gain	D	Output impedance
44.	The magnetizing current in a transformer is rich in			
	A	3 rd harmonics	B	5 th harmonics
	C	7 th harmonics	D	13 th harmonics
45.	The resistance of a reverse biased ideal diode is			
	A	Zero	B	Low
	C	Negative	D	Infinity
46.	An increase in number of poles of an induction motor results in			
	A	Decrease in maximum pf	B	Increase in maximum pf.
	C	No change in maximum pf	D	Cannot be predicted
47.	Critical voltage limit of a transmission line is increased by			
	A	Increasing the radius of conductor	B	Increasing the spacing between conductors
	C	Reducing the spacing between conductors	D	Reducing the radius of the conductors
48.	The electric braking system commonly employed in rilling mills, elevators and printing presses is			
	A	Regenerative	B	Rheostatic
	C	Dynamic	D	Plugging
49.	Diversity factor in a power system is			
	A	Always less than unity	B	Normally less than unity
	C	Always more than unity	D	Normally more than unity

50.	The dc motor that draws almost same power at different loads is			
	A	Cumulative compound	B	Differential compound
	C	Shunt	D	Series
51.	The insulation level of a 400KV, EHV overhead transmission line is decided on the basis of			
	A	Lightning over voltage	B	Switching over voltage
	C	Corona inception voltage	D	Radio and TV interference
52.	A series R-L-C circuit will have unity power factor if operated at a frequency of			
	A	$1/LC$	B	$1/\omega\sqrt{LC}$
	C	$1/\omega^2LC$	D	$1/2\pi\sqrt{LC}$
53.	Power transformer is generally designed to give maximum efficiency at			
	A	Full load	B	Half load
	C	No load	D	None of above
54.	A d.c generator beyond critical resistance will generate			
	A	Maximum power	B	Maximum voltage
	C	Maximum current	D	No voltage
55.	The flux in transformer core			
	A	Increase with load	B	Decrease with load
	C	Remains constant irrespective of load	D	None of the load
56.	In a microprocessor, the address of the next instruction to be executed is stored in			
	A	Stack pointer	B	Address latch
	C	Program counter	D	General purpose resister
57.	The cascade intermediate stages should be			
	A	CB	B	CE
	C	CC	D	CE and CB
58.	Without a dc source, a clipper acts like it a			
	A	Clamper	B	Chopper
	C	Rectifier	D	Demodulator
59.	The best method of bias is			
	A	Base resistor method	B	Potential divider method
	C	Collector to base bias	D	Base bias with collector and emitter feedbacks

60.	In an R-C coupled amplifier the voltage gain			
	A	Constant over range of frequency	B	Always increasing with frequency
	C	Always decreasing with frequency	D	None of these
61.	A power transformer is a constant _____ device.			
	A	Current	B	Voltage
	C	Main flux	D	Power
62.	The current flowing through armature conductors of dc motor is			
	A	pulsating	B	ac
	C	dc	D	None of these
63.	In an induction motor if the air gap is increased			
	A	Speed will reduce	B	Breakdown torque will reduce
	C	Efficiency will improve	D	Power factor will be lowered
64.	Graphite is used in Nuclear power plant as a			
	A	Fuel	B	Coolant
	C	Moderator	D	Electrode
65.	The advantage of neutral earthing is			
	A	Safety of personnel	B	Reduction of earth fault current
	C	Elimination of arcing ground	D	None of the above
66.	Thermo-couple is based on			
	A	Joule's	B	Thomson
	C	Seebeck effect	D	None of these
67.	Open-circuit test in a transformer is performed with			
	A	Rated transformer voltage	B	Rated transformer current
	C	Direct current	D	High frequency supply
68.	After completion of the execution micro processor returns to			
	A	An execute state	B	A fetch state
	C	An interrupt state	D	An Halt state
69.	The no-load current in a transformer lags the applied voltage by			
	A	90°	B	0°
	C	75°	D	About 115°
70.	When an alternator connected to an infinite busbar is shutdown, the busbar voltage will			
	A	Increase	B	Decrease
	C	Remain unchanged	D	Unpredictable

71.	A motor used for punching machine is usually subjected to			
	A	Full load continuously	B	Part of full load continuously
	C	No-load	D	Intermittent load
72.	The most inappropriate among the disadvantages of Gauss-Seidel method of load flow solution is			
	A	Slow conversion	B	Unreliable conversion
	C	A good initial guess is essential for convergence	D	Choice of slack bus affects convergence
73.	Which semiconductor device acts like a diode and two transistors?			
	A	SCR	B	UJT
	C	Triac	D	Diac
74.	Under voltage relays are mostly used for			
	A	Transformer protection	B	Busbar protection
	C	Feeder protection	D	Motor protection
75.	N-Type semi-conductor the doping material is			
	A	A trivalent material	B	A pentavalent material
	C	A tetravalent material	D	germanium
76.	The temperature coefficient of an intrinsic semiconductor is			
	A	Zero	B	Positive
	C	Negative	D	Like that of metals
77.	Reactance relay is normally preferred for protection against			
	A	Earth faults	B	Phase faults
	C	Open-circuit faults	D	None of these
78.	A negative sequence relay is commonly use to protect			
	A	An alternator	B	A transformer
	C	A transmission line	D	Abus bar
79.	The speed of a universal motor can be controlled by			
	A	Introducing a variable resistance series with the motor	B	Tapping the speed at various points
	C	Centrifugal mechanism	D	All of the above
80.	Higher synchronous reactance is preferred in the present-day alternator because one can have			
	A	Reduced sub-transient current	B	Reduce harmonic current
	C	Reduce transient currents	D	Higher voltage regulation with load

81.	If $P(A) = 0.07$ then, what is the probability of “Not A”?			
	A	0.3	B	0.03
	C	0.33	D	0.93
82.	A card is drawn from the pack of 52 cards. Find the probability of getting an Ace.			
	A	1/13	B	1/26
	C	1/52	D	1/53
83.	If ‘p’ is the probability of success, ‘q’ is the probability of failure and ‘n’ is the number of trials in a Binomial distribution then, what is the standard deviation?			
	A	\sqrt{np}	B	\sqrt{npq}
	C	(npq)	D	$(npq)^2$
84.	To solve the equation $f(x) = 0$ using Bisection method, we set a search interval $[a, b]$ such that _____.			
	A	$f(a) \cdot f(b) < 0$	B	$f(a) \cdot f(b) > 0$
	C	$f(a) \cdot f(b) = 0$	D	None of the above
85.	At least one Eigen value of a Singular matrix _____.			
	A	-1	B	0
	C	1	D	None of the above
86.	The argument of a complex number $\frac{1+i}{1-i}$ is, _____			
	A	$-\pi$	B	$-\frac{\pi}{2}$
	C	$\frac{\pi}{2}$	D	π
87.	The values of x for which function $f(x) = \frac{x^2 - 3x + 4}{x^2 - 3x - 4}$ does not exists.			
	A	4, -1	B	-4, 1
	C	4, 1	D	-4, -1

88.	The solution of $x \frac{dy}{dx} + y = x^4$ with condition $y(1) = \frac{6}{5}$ is _____			
	A	$y = \frac{4x^4}{5} + \frac{4}{5x}$	B	$y = \frac{x^4}{5} + \frac{1}{x}$
	C	$y = \frac{x^4}{5} + 1$	D	$y = \frac{x^5}{5} + 1$
89.	Which one of the following is true for the relationship between three vectors $i + j + 2k$, $2i + j + k$ and $i + 2j + k$?			
	A	The vectors are mutually perpendicular.	B	The vectors are linearly dependent.
	C	The vectors are parallel.	D	The vectors are linearly independent.
90.	Evaluate the integral $\int_1^3 \frac{1}{x} dx$ is using trapezoidal rule with step size 1. The value of the integral is _____.			
	A	1	B	1.08
	C	1.16	D	1.24
91.	Laplace Transform of the function $e^{2t} \sin 3t$ is _____.			
	A	$\frac{3}{s^2 + 4s + 13}$	B	$\frac{3}{s^2 + 4s - 5}$
	C	$\frac{3}{s^2 - 4s - 5}$	D	$\frac{3}{s^2 - 4s + 13}$
92.	The inverse Laplace transform of $\log\left(\frac{s+b}{s+a}\right)$ is _____			
	A	$\frac{e^{-at} - e^{-bt}}{t}$	B	$\frac{e^{-at} + e^{-bt}}{t}$
	C	$\frac{e^{at} - e^{bt}}{t}$	D	$\frac{e^{at} + e^{bt}}{t}$
93.	The solution of the differential equation $x^2 D^2 y + x Dy = 0$ is _____.			
	A	$y = c_1 + c_2 \log x$	B	$y = c_1 + c_2 e^x$
	C	$y = c_1 + c_2 \log z$	D	None of these
94.	The function $f(x) = 2x^3 + 3x^2 - 12x + 7$ is decreasing in _____.			
	A	$[1, 3]$	B	$R - [-2, 1]$
	C	$[0, 2]$	D	$[-2, 1]$
95.	The improper integral $\int_0^\infty \frac{dx}{x^2 + 4}$			
	A	Diverges to ∞	B	Diverges to $-\infty$
	C	Converges to $\frac{\pi}{4}$	D	Converges to $\frac{1}{4}$
96.	If errors of 3% in E and -2% in R are made, then the percentage error in $P = \frac{E^2}{R}$ is _____.			
	A	0%	B	4%
	C	6%	D	8%

97.	Which of the following statements are true in general? Statement 1: Singular matrix is always a square matrix. Statement 2: Every square matrix is symmetric matrix. Statement 3: Every square matrix satisfies its own characteristic equation.		
	A	Only statement 1	B Statement 1 and 2
	C	Statement 1 and 3	D All of above
98.	Poisson distribution is applied for _____		
	A	Continuous random variable	B Discrete random variable
	C	Uncertain random variable	D None of these
99.	Which of the following method is used to find solution of Ordinary Differential Equation?		
	A	Bisection Method	B Newton Raphson method
	C	Euler's method	D Successive approximation method
100.	Function of two variables $f(x, y)$ has Maxima at point (a, b) if _____		
	A	$rt - s^2 < 0$ and $r < 0$	B $rt - s^2 > 0$ and $r < 0$
	C	$rt - s^2 > 0$ and $r > 0$	D None of these