## (Set-"X")

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# (M.Phil/Ph.D/URS-EE-2018) Subject: ELECTRICAL ENGG.

Sr. No. 100021

Code

Time: 1¼ Hours	Max. Ma (in figure)	arks : 100	Total Questions: 100 (in words)
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answer-sheet of such a candidate will not be evaluated.

3. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.

4. Question Booklet along with answer key of all the A, B, C, D code will be got uploaded on the University website after the conduct of Entrance Examination. In case there is any discrepancy in the Question Booklet / Answer Key, the same may be brought to the notice of the Controller of Examination in writing / through E.Mail within 24 hours of uploading the same on the University Website. Thereafter, no complaint in any case, will be considered

5. The candidate MUST NOT do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question book-let itself. Answers MUST NOT be ticked in the Question book-let.

- 6. There will be no Negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.
- 7. Use only Black or Blue <u>BALL POINT PEN</u> of good quality in the OMR Answer-Sheet.
- 8. BEFORE ANSWERING THE QUESTIONS, THE CANDIDATES SHOULD ENSURE THAT THEY HAVE BEEN SUPPLIED CORRECT AND COMPLETE BOOK-LET. COMPLAINTS, IF ANY, REGARDING MISPRINTING ETC. WILL NOT BE ENTERTAINED 30 MINUTES AFTER STARTING OF THE EXAMINATION.

Question No.	G	uestions	NA.
	The system of linear equation (4d-1) x + y + z = 0 $-y + z = 0$	ons	
	(4d-1) z = 0 has a non-trivial solution, if	d equals	e AM
	(1) 1/2 (3) 3/4	(2) 1/4 (4) 1	
2.	Eigen vector(s) of the matrix $\begin{bmatrix} 0 & 0 & \alpha \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$ is (are)	dischausenen en regisergen.	
	(1) (0, 0, α) (3) (0, 0, 1)	<ul><li>(2) (α, 0, 0)</li><li>(4) (0, α, 0)</li></ul>	
3.	Consider the z-transform $x$ z-transform $x$ [n] is  (1) $5\delta [n+2]+3\delta [n]+4\delta$ (2) $5\delta [n-2]+3\delta [n]+4\delta$ (3) $5u [n+2]+3u [n]+4v$ (4) $5u [n-2]+3u [n]+4v$	$\begin{bmatrix} \mathbf{n+1} \end{bmatrix}$	

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Question No.	Questions	by John
4.	If $\delta(t)$ denotes a unit impulse then Laplace Transform of $\frac{d^2 \delta(t)}{dt^2}$ w  (1) $l$ (2) $s^2$ (3) $s$ (4) $s^{-2}$	ill be
5.	The state equation of LTI system is represented by $\dot{x} = \begin{bmatrix} 0 & 0 \\ -2 & -1 \end{bmatrix} x + \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix} u$ The Eigen values are	
	(1) $-1, +1$ (2) $0.5 \pm j \cdot 1.323$ (3) $-1, -1$ (4) None	
6.	Line integral can be transformed into a surface integral by using  (1) Divergence theorem (2) Gauss theorem  (3) Stokes theorem (4) None of these	
7.	Four fundamental equations of electromagnetics are known as  (1) Fleming's laws (2) Faraday's laws (3) Lorentz equations (4) Maxwell's equations	
8.	For a linear electromagnetic circuit, which of the following statement true?  (1) Field energy is equal to the co-energy  (2) Field energy is greater than the co-energy  (3) Field energy is lesser than the co-energy  (4) Co-energy is zero	nents

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Question No.	Which of the following statements holds for the divergence of electric and magnetic flux  (1) Both are zero  (2) These are zero for static densities but non-zero for time varying densities.  (3) It is zero for the electric flux density  (4) It is zero for the magnetic flux density	
9.		
10.	A parallel plate capacitor has an electrode area of 100 mm², with a spacing of 0.1 mm between the electrodes. The dielectric between the plates is air with a permittivity of $8.85 \times 10^{-12}$ F/m. The charge on the capacitor is 100V. The Stored energy in the capacitor is:  (1) 8.85pJ (2) 440pJ (3) 22.1nJ (4) 44.3nJ	
11.	Whenever the magnetic flux changes with respect to an electric conductor or a coil, an EMF is induced in the conductor is Faraday's  (1) First law  (2) Second law  (3) Third law  (4) Fourth law	
12.	<ul> <li>Inside a hollow conducting sphere</li> <li>(1) Electric field is zero.</li> <li>(2) Electric field is a non-zero constant.</li> <li>(3) Electric field changes with magnitude of the charge given to the conductor.</li> <li>(4) Electric field changes with distance from the center of the sphere.</li> </ul>	

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Question No.	Questions	
13.	A conductor of length L has current I passing through it, when it is placed parallel to strong magnetic field. The force experienced by the conductor will be  (1) BIL (2) BIL (3) BI <sup>2</sup> L (4) Zero	
14.	Cork Screw rule is used to find  (1) Direction of magnetic field (2) Direction of electric field  (3) Direction of current (4) Direction of emf	
15.	A point pole has a strength of $4\pi \times 10^{-4}$ weber. The force in Newtons on a point pole of $4\pi \times 1.5 \times 10^{-4}$ weber placed at a distance of 10 cm from it will be  (1) 20N (2) 15N  (3) 7.5N (4) 3.75N	
16.	In a sample it is observed that a carrier takes 100 µs to over a distance of 10 cm. If the applied external field is 10 <sup>4</sup> V/cm; find the mobolity  (1) 10 <sup>7</sup> cm <sup>2</sup> /Vs  (2) 10 <sup>-3</sup> cm <sup>2</sup> /Vs  (3) 10 cm <sup>2</sup> /Vs  (4) 10 <sup>7</sup> m <sup>2</sup> /Vs	
17.	The current gain of a bipolar transistor drops at high frequency because of  (1) Transistor internal capacitances  (2) High current effects in the base  (3) Parasitic inductive elements  (4) The Early effect	

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Questio No.	Questions
18.	A transistor has $\alpha = 0.98$ , then determine $\beta$ .
	(1) 50 (2) 49
	(3) 70 (4) None of the above
19.	The value of emitter capacitor CE in a multistage amplifier is about
	(1) 0.1μF (2) 100pF
7	(3) $0.01\mu F$ (4) $50\mu F$
20.	The conduction loss versus device current characteristic of a power
	MOSFET is best
	(1) A parabola (2) A straight line
	(3) A rectangular hyperbola (4) An exponentially decaying function
21.	The hexadecimal equivalent of the octal number 171.62 is
	(1) 3C1.C0 (2) 79.C8
	(3) 89.C7 (4) 97.8C
22.	Which of the following circuit can be used as parallel to series converter?
	(1) Digital Counter (2) Decoder
	(3) De-multiplexer (4) Multiplexer
23.	How many fillip-flops are required to construct a decade counter?
	(1) 10
	3) 4

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Question No.	Questions
24.	Which is not a type of ROM?  (1) Mask ROM  (2) PROM  (3) EEPROM  (4) XROM
25.	A stage in shift register consist of  (1) Latch (2) Flip flop  (3) Byte of storage (4) four bits of storage
26.	The closed loop transfer function of a system is $T(s) = \frac{(s+8)(s+6)}{s^5 + s^4 + 4s^3 - 4s^2 + 3s - 2}$ The number of poles in RHP and LHP are $(1)  4.1 \qquad (2)  1.4$ $(3)  3.2 \qquad (4)  2.3$
27.	For a second order system settling time $T_s = 7 \sec$ and peak time $T_p = 3 \sec$ The location of poles are $(1) -0.97 \pm j \ 0.69 \qquad (2) -0.69 \pm j \ 0.97$ $(3) -1.047 \pm j \ 0.571 \qquad (4) -0.571 \pm j \ 1.047$
28	$G(s) = \frac{50}{(1+0.1s)(1+2s)}$ The position, velocity and acceleration error constants are respectively
	(1) $0, 0, 250$ (2) $50, 0, 0$ (3) $0, 250, \infty$ (4) $\infty, 50, 0$

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Question No.	Questions	
29.	A unity feedback system has a forward path transfer function is $G(s) = \frac{10(1+4s)}{s^2(1+s)}$ If the system is subjected to an input $r(t) = 1 + t + \frac{t^2}{2}, \ t \succ 0$	
	the steady state error of the system will be $(1)  1 \qquad \qquad (2)  0.1$ $(3)  10 \qquad \qquad (4)  \infty$	The second of th
30.	For the Bode plot shown in figure, the transfer function is  dB  100 dB  40 dB/dec  -60 dB/dec	
	(1) $\frac{100 \text{ s}^2}{(1+0.1\text{s})^3}$	
	(2) $\frac{1000 \text{ s}^2}{(1+0.1\text{s})^6}$ (3) $\frac{15.6 \text{ s}^2}{(1+0.1\text{s})^6}$ (4) None	

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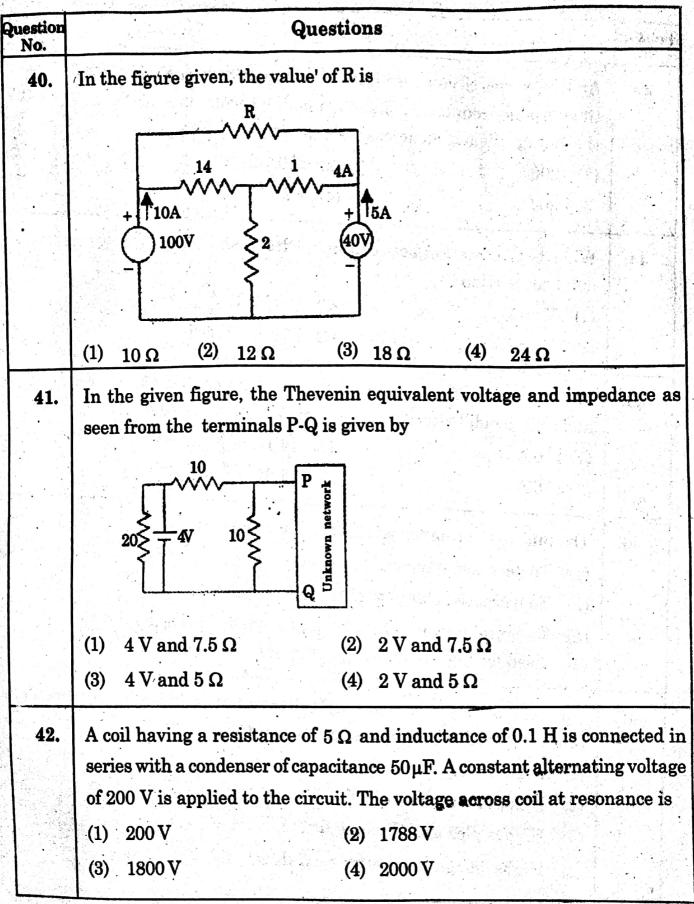
	Questions and phase
Question No. 31.	Questions  Consider the gain-phase plot shown in fig. The gain margin and phase margin are  dB  2 dB-  ( ) = 2/
	$-2 \text{ dB}$ $-2 \text{ dB}$ $-270^{\circ} -180^{\circ} -140^{\circ} -90^{\circ}$ Fig
	(1) -2 dB, 40° (2) 2 dB, 40° (3) 2 dB, 140° (4) -2 dB, 140°
32.	The root locus of a unity feed function is given by  (1) $k/s (s + 1) (s + 2)$ (2) $k (s + 1)/s (s + 2)$ (3) $k (s + 2)/s (s + 1)$ (4) $ks/(s + 1) (s + 2)$
33.	The transfer function $\frac{1+0.5s}{1+s}$ represents  (1) Lag network  (2) Lead network  (3) Lag-lead Network  (4) Proportional controller
34.	If the stability error for a step input and speed of the response be the criteria for design, the suitable controller will be  (1) P Controller  (2) PI Controller  (3) PD Controller  (4) PID Controller

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Question No.	Questions
35.	The open loop transfer function of a feedback system is $G(s) H(s) = \frac{K(s+1)}{(1-s)}.$ The received also of this system is
	The nyquist plot of this system is $(1)  \overline{\omega} = 0  \overline{\omega} = \infty \text{ (2)}  \overline{\omega} = 0  \overline{\omega} = \overline{\omega} = 0$
	(3) $\omega = 0$ $\omega = \infty$ (4) $\omega = 0$ $\omega = \infty$
36.	The equation for 25 cycles electric current sine wave having rms value of 30 amps, will be  (1) $42.4 \sin 50 \pi t$ (2) $30 \sin 50 \pi t$
	(1) $42.4 \sin 50 \pi t$ (2) $30 \sin 25 \pi t$ (3) $30 \sin 25 \pi t$ (4) $42.4 \sin 25 \pi t$
<b>37</b> .	The equation of an emf is given by $e=I_m\left[\sqrt{\left(R^2+4\omega^2L^2\right)}\right]\sin 2\omega t$ . The amplitude of the wave will be
	(1) $I_m \left[ \left( R^2 + 4\omega^2 L^2 \right)^{\frac{1}{2}} \right]$ (2) $\sqrt{2} I_m \left[ \left( R^2 + 4\omega^2 L^2 \right)^{\frac{1}{2}} \right]$
	(3) $\left[I_{m}\left(R^{2}+4\omega^{2}L^{2}\right)\right]^{\frac{1}{2}}$ (4) $2I_{m}\left[\left(R^{2}+4\omega^{2}L^{2}\right)^{\frac{1}{2}}\right]$

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}uestion No.			
43.	An RLC series circuit resonates at a frequency w, the ratio of w, L/R = 10 the variable frequency voltage applied to the circuit is 20 sin $(\omega t + \pi/3)$ the voltage measured across the capacitance		
	(1) $200 / \sqrt{2}$ (2) $220 / \sqrt{2}$ (3) $20 / \sqrt{2}$ (4) $1/2$		
44.	What is the relation between line voltage and phase voltage in case delta connection?		
	(1) $V_L = V_p$ . (2) $V_t = 1/\sqrt{3} V_p$ . (3) $V_L = \sqrt{3} V_p$ . (4) None of these		
45.	The rms value of the current is a wire which carries a dc current of 10 and a sinusoidal alternating current of peak value 20 A is  (1) 10 A (2) 14.14 A  (3) 15 A (4) 17.32 A		
46.	The purpose of compensation for a thermocouple is  (1) To decrease temperature sensitivity  (2) To increase volatge output  (3) To cancel unwanted voltage output of a thermocouple  (4) Used for high-temperature circuits		
47.	Semiconductor strain gages typical have much higher gage factors the those of metallic strain gages primarily due to  (1) Higher temperature sensitivity		
	(2) Higher Poisson's ratio (3) Higher piezoresistive coefficient (4) Higher magnetostrictive coefficient		

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Question Questions No. For the op-amp shown in the figure, the bias currents are  $I_{b1} = 450$  nA and 48.  $I_{b2} = 350$  nA. The values of the input bias current ( $I_b$ ) and the input offset current (I) are (1)  $I_b = 800 \text{ nA}, I_f = 50 \text{ nA}$  (2)  $I_b = 800 \text{ nA}, I_f = 100 \text{ nA}$ (3)  $I_b = 400 \text{ nA}, I_f = 50 \text{ nA}$  (4)  $I_b = 400 \text{ nA}, I_f = 100 \text{ nA}$ A Hall Effect sensor 49. (1) exists only in theory is a non-contacting magnetic sensor **(2)** can operate only a few times before failure (3) produces very large voltages For turbulent flow, the velocity at the center is \_\_\_\_\_ times the mean 50. velocity. (2) 2.2 (1) 1.2 (4) 3.333 (3)2 A psychrometric chart is used to determine 51. (2) Sound velocity in glasses (1) pH (4) Relative humidity (3) CO<sub>2</sub> concentration

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Question	Questions are similar
No. 52.	Questions  The dynamic characteristics of capacitive transducer are similar those of.  (1) low pass filter (2) high pass filter (3) notch filter (4) band stop filter
53.	The effect of error damping is to  (1) provide larger settling time  (2) delay the response  (3) reduce steady state error  (4) any of the above
54.	The bridge method commonly used for finding mutual inductance is  (1) Heaviside Campbell bridge  (2) Schering bridge  (3) De Sauty's bridge  (4) Wien bridge
55.	The bridge circuit shown in the figure below is used for the measurement of an unknown element $Z_x$ . The bridge circuit is best suited when $Z_x$ is a $V_s$ $\sim$ $C_1$ $C_1$ $C_2$ $C_3$ $C_4$ $C_4$ $C_4$ $C_5$
	(1) Lossy capacitor (2) Low Q inductor
	(3) High resistance (4) Low resistance

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Question No.	Questions					
56.	A 500 kVA, three phase transformer has iron losses of 300 W and full load copper losses of 600 W. The percentage load at which the transformer is expected to have maximum efficiency is  (1) 50.0%  (2) 70.7%  (3) 141.4%  (4) 200.0%					
57.	A single phase transformer has a maximum efficiency of 90% at full load and unity power factor. Efficiency at half load at the same power factor is  (1) 86.7%  (2) 88.26%  (3) 88.9%  (4) 87.8%					
58.	Which of the following motor definitely has a permanent magnet rotor  (1) DC commutator motor (2) Brushless DC motor  (3) Stepper motor (4) Reluctance motor					
59.	The type of single phase induction motor having the highest power factor at full load is  (1) Shaded pole type  (2) Split phase type  (3) Capacitor start type  (4) Capacitor run type					
60.	The direction of rotation of a three phase induction motor is clockwing when it is supplied with three phase sinusoidal voltage having phasequence A-B-C, for counter clockwise rotation of the motor, the phasequence of the power supply should be  (1) B-C-A  (2) C-A-B  (3) A-C-B  (4) None of above					

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## Code-A

<i>uestion</i>	Questions tonce's of both the stator
No. 61.	A rotating electrical machine having its self-inductance's of both the stator  A rotating electrical machine having its self-inductance's of both the stator and the rotor windings independent of the rotor position will definitely not develop  (1) Starting Torque (2) Synchronizing torque (3) Hysteresis Torque (4) Reluctance torque
62.	If peak value of phase mmf is $F_{max}$ , then peak value of the rotating field caused by three phase is  (1) $(3/2) F_{max}$ (2) $F_{max}$ (3) $3 F_{max}$ (4) $(1/2) F_{max}$
63.	A 50 Hz, 4 pole turbo generator rated at 20 MVA, 13.2 KV has inertial constant H = 3 kW sec / KVA. The kinetic energy stored in the rotor is  (1) 80 MJ  (2) 60 MJ  (3) 20 MJ  (4) 10 MJ
64.	An alternator is supplying a load of 300 kW of a p.f. of 0.6 lagging. If the power factor is raised to unity. How many more kilowatts can alternate supply for the same KVA loading  (1) 100 kW  (2) 200 kW  (3) 300 kW  (4) 500 kW
65.	A 300 kVA, single phase transformer is designed to have resistance 1.5% and max. efficiency occurs at load of 173.2 kVA. When supplying the full load at 0.8 p.f. lagging at normal voltage, the efficiency will be

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Question No.	Questions		
66.	For constant load current at which power factor the efficiency of a transformer will be maximum?  (1) Zero power factor  (2) Unity power factor		
	(3) Leading power factor (4) Lagging power factor		
67.	The all-day efficiency is the term related to		
	(1) Power transformer		
	(2) Distribution transformer		
	(3) Current transformer		
	(4) Voltage transformer		
68.	Satisfactory commutation of DC machine requires		
	(1) Smooth, concentric commutator properly undercut		
	(2) Brushes should smoothly run in the holders		
	(3) Brushes should be of proper grade and size		
	(4) All of the above		
69.	In a $3 - \Phi$ induction motor running at full load which of these parameters is stationary with respect to the stator mmf wave?		
4	(1) Stator winding		
	(2) Rotor winding		
	(3) Both rotor and stator winding		
	(4) Rotor mmf wave		

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Question No.	to the control of the		
70.	The damper windings also called the squirrel cage winging's damper grids  (1) consists of short-circuited copper bars embedded in the field pole faces  (2) are provided in a synchronous motor to make itself starting  (3) are provided on the stator for improving power factor  (4) both (1) and (2)		
71.	EHV transmission has which of the following advantages?  (1) Reduction in noise  (2) Increase in transmission efficiency  (3) Improves voltage regulation  (4) All of these		
72.	Absence of skin effect lower line cost, less corona effect are the features of which of the transmission system?  (1) EHV-AC system  (2) HVDC system  (3) Both (1) and (2)  (4) UHV-AC system		
73.	Inside the station of the broad gauge line what is the clearance between track and lowest conductor for operating voltages from 650 V-3 kV?  (1) 10 m  (2) 7.2 m  (3) 8.6 m  (4) 7.6 m		

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Question No.	Questions				
74.	The area under load curve represents				
Si gara (	(1) System voltage (2) Current				
	(3) Average demand (4) Maximum demand				
75.	A power station supplies the peak load of 50 MW, 40 MW and 70 MW to				
	three localities. The annual load factor is 0.50 p.u. and the diversity factor				
	of the load at the station is 1.55 the maximum demand on the station and average load respectively will be				
	(1) 51.61 MW (2) 57.5 MW				
	(3) 53 MW (4) 52 MW				
76.	Which of the followng circuit breakers produce least arc energy?				
	(1) Air blast (2) Air break				
	(3) Minimum oil (4) Plain oil				
77.	A 100 Km long transmission line is loaded at 110 kV. If the loss of line is				
	5 MW and the load is 150 VA the resistance of the line is				
	(1) 4.65 ohms/phase (2) 2.26 ohms/phase				
o	(3) 8.06 ohms/phase (4) 6.06 ohms/phase				
78.	A three phase, 33 kV oil circuit breaker is rated 1200 A, 2000 MVA, 3 s.				
1	The symmetrical breaking current is				
(	(1) 1200 A (2) 3600 A				
	(3) 35 kA (4) 104.8 kA				

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Question No.	Questions
79.	A 3 core cable gives on test a capacitance of 3.7 microfarad between two cores. Find the line charging current of the cable when it is connected to 11 kV, 50 Hz system?  (1) 14.76 A  (2) 1.476 A  (3) 14.7 mA  (4) 1 A
80.	The most suitable circuit breaker for short line fault without switching resistor is  (1) Oil circuit breaker (2) Air blast circuit breaker  (3) SF <sub>6</sub> breaker (4) None of these
81.	Mho relay is used for the protection of  (1) medium length lines (2) long transmission lines  (3) short length lines (4) no length criterion
82.	An overhead line conductor has an inductance per unit length of L henry.  If the entire medium around the conductor is filled with a dielectric material of permittivity $\epsilon$ , then the inductance will  (1) L/ $\epsilon$ (2) L/0.5 $\epsilon$ (3) L (4) unchanged
83.	When a line-to-ground fault occurs, the current in the phase is 100 A. The zero sequence current in the case will be
	(1) 33.3 A (2) 0 A (3) 66.6 A (4) 99.9 A

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Question No.	Questions		
84.	Air blast circuit breaker is most suitably used in  (1) Up to 132 KV line  (2) Up to 260 KV line  (3) Up to 400 KV line  (4) any voltage		
85.	To reduce the adverse effect of corona discharge which conductor is specially used?  (1) ACSR (2) Bundle conductor  (3) Aluminium conductor (4) Copper conductor		
86.	A single phase one pulse controlled circuit has a resistance R and counter emf E load 400 sin (314t) as the source voltage. For a load counter emf of 200 V, the range of firing angle control is  (1) 30° to 150°  (2) 30° to 180°  (3) 60° to 120°  (4) 60° to 180°		
87.	Let of a thyristor $V_{c1}$ , $V_{c2}$ , $V_{c3}$ are forward break over voltage for gate current $I_{g1}$ , $I_{g2}$ , $I_{g3}$ respectively. Then $(1)  V_{c1} > V_{c2} > V_{c3} \text{ when } I_{g1} > I_{g2} > I_{g3}$ $(2)  V_{c1} > V_{c2} > V_{c3} \text{ when } I_{g1} < I_{g2} < I_{g3}$ $(3)  V_{c1} = V_{c2} = V_{c3} \text{ any value of } I_{g}$ $(4)  V_{c1} > V_{c2} > V_{c3} \text{ when } I_{g1} \geq I_{g2} \geq I_{g3}$		

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88.	Triacs cannot be used in AC voltage regulator for a  (1) Resistive load  (2) Inductive load  (3) Back emf load  (4) Resistive Inductive
89.	(3) Back emi load Latching current for an SCR inserted between a dc voltage source 200 V and load is 100 mA. Compute the minimum rate of width pul required to turn ON the SCR in case load consists of $R = 20~\Omega$ in serious required to turn ON the SCR in case load consists of $R = 20~\Omega$ in serious consists.
	with $L = 0.2 H$
	(2) 300 μs
	(3) 150 μs
90.	Delay time is defined by the interval when  (1) gate current increases from 90% to 100% of its final value  (2) anode current reaches 10% from forward leakage current  (3) anode voltage drops from 100% to 90% of its actual value  (4) all of these
91.	Typical range of thyristor turn OFF time is
	(1) 3-10 µs
	(2) 3-50 μs
	(3) 3 – 100 μs
	(4) 3-500 μs

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Question No.	Questions					
92.	String efficiency depends upon					
	(1) voltage rating of whole string					
	(2) no. of SCR in the string					
	(3) voltage rating of one SCR					
	(4) all of these					
93.	A thyristor string is made of a no. of SCR connected in series and parallel.					
	The string have volume and current of 11 KV and 4 KA. The voltage and					
	current rating of available SCRs are 1800 V and 1000 A. For a string					
	efficiency of 90% let the number of SCRs in series and parallel are a and b					
	respectively. Then the value of a and b will be					
	(1) 5, 7 (2) 4, 6					
	(3) 7, 5 (4) 6, 4					
94.	A 200 A thyristor is to be operated in parallel with a 300 A thyristor. The					
	ON state voltage drops are 1.5 V and 1.2 Volts. What is the value of					
	resistance R to be connected in series with each thyristor, so that current					
	through the combination is 500 A and each of them is fully loaded?					
	(1) $0.03 \times 10^{-2} \Omega$					
grang against a proper of the second	(2) $0.3 \times 10^{-3} \Omega$					
	(3) $3.0 \times 10^{-3} \Omega$					
	(4) $0.3 \times 10^{-2} \Omega$					

PHD-EE-2018 (Electrical Engineering) Code-A (23)

No.	Questions						
95.							
	T 120 V 3 0.2 H						
	I <sub>L</sub> =2 mA						
i ja ia	(1) 3 μs (2) 3.1 μs						
	(3) 3.2 μs (4) 3.3 μs						
	figure. Calculate the value of R in ohm is						
	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$						
	$\begin{array}{c c} & I_{\mathbf{g}} & R & I_{\mathbf{g}} \\ \hline & V_{\mathbf{g}} & 20 \Omega & T 8V \end{array}$						
	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$						
97.	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$						
97.	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$						

PHD-EE-2018 (Electrical Engineering) Code-A (24)

Question No.	Questions				
98.	The average source current in amperes in steady state is				
•	(1)	3/2	(2)	5/3	
	(3)	5/2	(4)	15/4	
99.	The	erms value of lo	ad phase voltag	e is	
	(1)	105.1 V	(2)	141.4 V	
	(3)	212.2 V	(4)	282.8 V	
100.	Int	he DC bus volta	ge V <sub>d</sub> = 300 V, th	e power consumed	by three phase load
45	is				
	(1)	1.5 kW	(2)	2.0 kW	
	(3)	2.5 kW	(4)	3.0 kW	
			· · · · · · · · · · · · · · · · · · ·		

PHD-EE-2018 (Electrical Engineering) Code-A
(25)

#### (Set-"X")

(DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU ARE ASKED TO DO SO)

#### (M.Phil/Ph.D/URS-EE-2018)

Code



Subject : ELECTRICAL ENGG. sr. No. 100018

Time: 11/4 Hours	Max. Ma	arks : 100	Total (	Questions: 100
Roll No.	(in figure)		111	(in words)
Name :		Father's Name	:	
Mother's Name :		Date of Exami	nation:	
(Signature of the candid	date)	(	Signature o	f the Invigilator)
CANDIDATES MU INSTRUCTIONS BEF	ST READ TORE STARTI	HE FOLLOWING THE QUES	WING INI	FORMATION/ ER.

- 1. All questions are compulsory.
- 2. The candidates must return the Question book-let as well as OMR answer-sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / mis-behaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
- 3. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
- 4. Question Booklet along with answer key of all the A, B, C, D code will be got uploaded on the University website after the conduct of Entrance Examination. In case there is any discrepancy in the Question Booklet / Answer Key, the same may be brought to the notice of the Controller of Examination in writing / through E.Mail within 24 hours of uploading the same on the University Website. Thereafter, no complaint in any case, will be considered
- 5. The candidate MUST NOT do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question book-let itself. Answers MUST NOT be ticked in the Question book-let.
- 6. There will be no Negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.
- 7. Use only Black or Blue BALL POINT PEN of good quality in the OMR Answer-Sheet.
- 8. BEFORE ANSWERING THE QUESTIONS, THE CANDIDATES SHOULD ENSURE THAT THEY HAVE BEEN SUPPLIED CORRECT AND COMPLETE BOOK-LET. COMPLAINTS, IF ANY, REGARDING MISPRINTING ETC. WILL NOT BE ENTERTAINED 30 MINUTES AFTER STARTING OF THE EXAMINATION.



Question No.	Questions
1.	In the given figure, the Thevenin equivalent voltage and impedance as seen from the terminals P-Q is given by $ \begin{array}{c c}  & P & \\ \hline  & 20 \\ \hline  & 4V & 10 \end{array} $
	(1) $4 \text{ V and } 7.5 \Omega$ (2) $2 \text{ V and } 7.5 \Omega$ (3) $4 \text{ V and } 5 \Omega$ (4) $2 \text{ V and } 5 \Omega$
2.	A coil having a resistance of $5\Omega$ and inductance of 0.1 H is connected in series with a condenser of capacitance $50\mu\text{F}$ . A constant alternating voltage of 200 V is applied to the circuit. The voltage across coil at resonance is (1) $200\text{V}$ (2) $1788\text{V}$ (3) $1800\text{V}$ (4) $2000\text{V}$
3.	An RLC series circuit resonates at a frequency $w_r$ the ratio of $w_r$ L/R = 10 the variable frequency voltage applied to the circuit is 20 sin $(\omega t + \pi/3)$ the voltage measured across the capacitance  (1) $200/\sqrt{2}$ (2) $220/\sqrt{2}$ (3) $20/\sqrt{2}$ (4) $1/2$
4.	What is the relation between line voltage and phase voltage in case of delta connection? $ (1)  V_L = V_p. \qquad \qquad (2)  V_t = 1/\sqrt{3} \; V_p. $ $ (3)  V_L = \sqrt{3} \; V_p. \qquad \qquad (4)  \text{None of these} $

PHD-EE-2018 (Electrical Engineering) Code-B
(1)

uestion No.	Questions
5.	The rms value of the current is a wire which carries a dc current of 10 A and a sinusoidal alternating current of peak value 20 A is  (1) 10 A (2) 14.14 A  (3) 15 A (4) 17.32 A
6.	The purpose of compensation for a thermocouple is  (1) To decrease temperature sensitivity  (2) To increase volatge output  (3) To cancel unwanted voltage output of a thermocouple  (4) Used for high-temperature circuits
7.	Semiconductor strain gages typical have much higher gage factors than those of metallic strain gages primarily due to  (1) Higher temperature sensitivity  (2) Higher Poisson's ratio  (3) Higher piezoresistive coefficient  (4) Higher magnetostrictive coefficient
8.	For the op-amp shown in the figure, the bias currents are $I_{b1} = 450$ nA and $I_{b2} = 350$ nA. The values of the input bias current ( $I_b$ ) and the input offse current ( $I_f$ ) are  (1) $I_b = 800$ nA, $I_f = 50$ nA  (2) $I_b = 800$ nA, $I_f = 100$ nA  (3) $I_b = 400$ nA, $I_f = 50$ nA  (4) $I_b = 400$ nA, $I_b = 100$ nA

PHD-EE-2018 (Electrical Engineering) Code-B
(2)

Question No.	Questions			
9.	A Hall Effect sensor  (1) exists only in theory  (2) is a non-contacting magnetic sensor  (3) can operate only a few times before failure  (4) produces very large voltages			
10.	For turbulent flow, the velocity at the center is times the mean velocity.  (1) 1.2 (2) 2.2  (3) 2 (4) 3.333			
11.	EHV transmission has which of the following advantages?  (1) Reduction in noise  (2) Increase in transmission efficiency  (3) Improves voltage regulation  (4) All of these			
12.	Absence of skin effect lower line cost, less corona effect are the features of which of the transmission system?  (1) EHV – AC system  (2) HVDC system  (3) Both (1) and (2)  (4) UHV – AC system			

PHD-EE-2018 (Electrical Engineering) Code-B
(3)

uestion No.	Questions
13.	Inside the station of the broad gauge line what is the clearance between track and lowest conductor for operating voltages from 650 V-3 kV?  (1) 10 m  (2) 7.2 m  (3) 8.6 m  (4) 7.6 m
14.	The area under load curve represents  (1) System voltage (2) Current  (3) Average demand (4) Maximum demand
15.	A power station supplies the peak load of 50 MW, 40 MW and 70 MW to three localities. The annual load factor is 0.50 p.u. and the diversity factor of the load at the station is 1.55 the maximum demand on the station and average load respectively will be  (1) 51.61 MW (2) 57.5 MW (3) 53 MW (4) 52 MW
16.	Which of the following circuit breakers produce least arc energy?  (1) Air blast (2) Air break  (3) Minimum oil (4) Plain oil
17	A 100 Km long transmission line is loaded at 110 kV. If the loss of line is 5 MW and the load is 150 VA the resistance of the line is  (1) 4.65 ohms/phase  (2) 2.26 ohms/phase  (3) 8.06 ohms/phase  (4) 6.06 ohms/phase

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(4)

Question No.	Questions				
18.	A three phase, 33 kV oil circuit breaker is rated 1200 A, 2000 MVA, 3 s.  The symmetrical breaking current is  (1) 1200 A (2) 3600 A  (3) 35 kA (4) 104.8 kA				
19.	A 3 core cable gives on test a capacitance of 3.7 microfarad between two cores. Find the line charging current of the cable when it is connected to 11 kV, 50 Hz system?  (1) 14.76 A  (2) 1.476 A  (3) 14.7 mA  (4) 1 A				
20.	The most suitable circuit breaker for short line fault without switching resistor is  (1) Oil circuit breaker (2) Air blast circuit breaker  (3) SF <sub>6</sub> breaker (4) None of these				
21.	Typical range of thyristor turn OFF time is  (1) $3-10~\mu s$ (2) $3-50~\mu s$ (3) $3-100~\mu s$ (4) $3-500~\mu s$				
22.	String efficiency depends upon  (1) voltage rating of whole string  (2) no. of SCR in the string  (3) voltage rating of one SCR  (4) all of these				

PHD-EE-2018 (Electrical Engineering) Code-B (5)

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uestion No.	Questions			
23.	A thyristor string is made of a no. of SCR connected in series and parallel. The string have volume and current of 11 KV and 4 KA. The voltage and current rating of available SCRs are 1800 V and 1000 A. For a string efficiency of 90% let the number of SCRs in series and parallel are a and b respectively. Then the value of a and b will be  (1) 5,7  (2) 4,6  (3) 7,5  (4) 6,4			
24.	A 200 A thyristor is to be operated in parallel with a 300 A thyristor. The ON state voltage drops are 1.5 V and 1.2 Volts. What is the value of resistance R to be connected in series with each thyristor, so that current through the combination is 500 A and each of them is fully loaded?  (1) $0.03 \times 10^{-2} \Omega$ (2) $0.3 \times 10^{-3} \Omega$ (3) $3.0 \times 10^{-3} \Omega$			
25.	If a latching current for the circuit shown in figure is 2 mA. Obtain the value of minimum width of the property turn ON the SCR? $ \frac{T}{L=2 \text{ mA}} $ 0.2 H			

PHD-EE-2018 (Electrical Engineering) Code-B
(6)



Question No.		Questions
26.	A thyristor will be	triggered when $V_g = 1.5$ volt and $I_g = 100$ mA in the
		ate the value of R in ohm is
and the same of	A	
	↓ Ig	R $I_s$
	1 of I	<b>~~~</b>
	$K \mid V_g \stackrel{?}{{\stackrel{>}{\underset{\sim}}{\sim}}} 20 $	
		- Laupe Lu de la
	(1) 65	(2) 3.714
	(3) 37.14	(4) 60 man to the (a) to have been a second
27.	The peak to peak so	urce current ripple in amperes is
	(1) 0.96	(2) 0.144
	(3) 0.192	(4) 0.288
28.	The average source c	current in amperes in steady state is
. (	1) 3/2	(2) 5/3
15-11 (6	3) 5/2	(4) 15/4
29. T	he rms value of load	phase voltage is
(1	) 105.1 V	(2) 141.4 V
(3	) 212.2 V	· (4) 282.8 V

Question	Questions
No. 30.	In the DC bus voltage $V_d = 300 V$ , the power consumed by three phase load
	is (1) 1.5 kW (3) 2.5 kW (4) 3.0 kW
31.	The system of linear equations $ (4d-1) x + y + z = 0 $ $ -y + z = 0 $ $ (4d-1) z = 0 $ has a non-trivial solution, if d equals
	(1) 1/2 (2) 1/4
	(3) 3/4 (4) 1
32.	Eigen vector(s) of the matrix $\begin{bmatrix} 0 & 0 & \alpha \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$ is (are)
	(1) $(0, 0, \alpha)$ (2) $(\alpha, 0, 0)$
	(3) $(0, 0, 1)$ (4) $(0, \alpha, 0)$
33.	Consider the z-transform X (z) = $5z^2 + 4z^{-1} + 3$ ; $0 <  z  < \infty$ . The inverse z-transform x [n] is  (1) $5\delta [n+2] + 3\delta [n] + 4\delta [n-1]$ (2) $5\delta [n-2] + 3\delta [n] + 4\delta [n+1]$ (3) $5u [n+2] + 3u [n] + 4u [n-1]$ (4) $5u [n-2] + 3u [n] + 4u [n+1]$

PHD-EE-2018 (Electrical Engineering) Code-B
(8)

Question No.	Questions
34.	If $\delta(t)$ denotes a unit impulse then Laplace Transform of $\frac{d^2\delta(t)}{dt^2}$ will be  (1) $l$ (2) $s^2$ (3) $s$ (4) $s^{-2}$
35.	The state equation of LTI system is represented by $\dot{\mathbf{x}} = \begin{bmatrix} 0 & 0 \\ -2 & -1 \end{bmatrix} \mathbf{x} + \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix} \mathbf{u}$
	The Eigen values are (1) $-1, +1$ (2) $0.5 \pm j 1.323$
	(3) -1,-1 (4) None
36.	Line integral can be transformed into a surface integral by using  (1) Divergence theorem (2) Gauss theorem  (3) Stokes theorem (4) None of these
37.	Four fundamental equations of electromagnetics are known as  (1) Fleming's laws (2) Faraday's laws (3) Lorentz equations (4) Maxwell's equations
38.	For a linear electromagnetic circuit, which of the following statements is true?  (1) Field energy is equal to the co-energy  (2) Field energy is greater than the co-energy  (3) Field energy is lesser than the co-energy  (4) Co-energy is zero

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(9)

Question No.	Questions	
39.	Which of the following statements holds for the divergence of electric and magnetic flux  (1) Both are zero  (2) These are zero for static densities but non-zero for time varying densities.  (3) It is zero for the electric flux density  (4) It is zero for the magnetic flux density	
40.	A parallel plate capacitor has an electrode area of 100 mm <sup>2</sup> , with a spacing of 0.1 mm between the electrodes. The dielectric between the plates is air with a permittivity of 8.85 × 10 <sup>-12</sup> F/m. The charge on the capacitor is 100V. The Stored energy in the capacitor is:  (1) 8.85pJ (2) 440pJ (3) 22.1nJ (4) 44.3nJ	
41.	A psychrometric chart is used to determine  (1) pH  (2) Sound velocity in glasses  (3) CO <sub>2</sub> concentration  (4) Relative humidity	
42.	The dynamic characteristics of capacitive transducer are similar to those of  (1) low pass filter  (2) high pass filter  (3) notch filter  (4) band stop filter	

PHD-EE-2018 (Electrical Engineering) Code-B
(10)

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Question No.	Questions
43.	The effect of error damping is to  (1) provide larger settling time  (2) delay the response  (3) reduce steady state error  (4) any of the above
44.	The bridge method commonly used for finding mutual inductance is  (1) Heaviside Campbell bridge  (2) Schering bridge  (3) De Sauty's bridge  (4) Wien bridge
45.	The bridge circuit shown in the figure below is used for the measurement of an unknown element $Z_x$ . The bridge circuit is best suited when $Z_x$ is a $V_s$ $\sim$ $C_1$ $C_1$ $C_2$ $C_3$ $C_4$ $C_4$ $C_4$ $C_4$ $C_4$ $C_4$ $C_5$ $C_4$ $C_5$
	(1) Lossy capacitor (2) Low Q inductor (3) High resistance (4) Low resistance

PHD-EE-2018 (Electrical Engineering) Code-B
(11)

Question No.	Questions
46.	A 500 kVA, three phase transformer has iron losses of 300 W and full load copper losses of 600 W. The percentage load at which the transformer is expected to have maximum efficiency is  (1) 50.0%  (2) 70.7%  (3) 141.4%  (4) 200.0%
47.	A single phase transformer has a maximum efficiency of 90% at full load and unity power factor. Efficiency at half load at the same power factor is  (1) 86.7% (2) 88.26% (3) 88.9% (4) 87.8%
48.	Which of the following motor definitely has a permanent magnet rotor  (1) DC commutator motor (2) Brushless DC motor  (3) Stepper motor (4) Reluctance motor
49.	The type of single phase induction motor having the highest power factor at full load is  (1) Shaded pole type  (2) Split phase type  (3) Capacitor start type  (4) Capacitor run type

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(12)

Question No.	Questions
50.	The direction of rotation of a three phase induction motor is clockwise when it is supplied with three phase sinusoidal voltage having phase sequence A-B-C, for counter clockwise rotation of the motor, the phase sequence of the power supply should be  (1) B-C-A  (2) C-A-B  (3) A-C-B  (4) None of above
51.	A rotating electrical machine having its self-inductance's of both the stator and the rotor windings independent of the rotor position will definitely not develop  (1) Starting Torque (2) Synchronizing torque (3) Hysteresis Torque (4) Reluctance torque
52.	If peak value of phase mmf is $F_{max}$ , then peak value of the rotating field caused by three phase is  (1) $(3/2) F_{max}$ .  (2) $F_{max}$ .  (3) $3 F_{max}$ .  (4) $(1/2) F_{max}$ .
53.	A 50 Hz, 4 pole turbo generator rated at 20 MVA, 13.2 KV has inertial constant H = 3 kW sec / KVA. The kinetic energy stored in the rotor is  (1) 80 MJ  (2) 60 MJ  (3) 20 MJ  (4) 10 MJ

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(13)

Question No.	Questions
54.	An alternator is supplying a load of 300 kW of a p.f. of 0.6 lagging. If the power factor is raised to unity. How many more kilowatts can alternator supply for the same KVA loading  (1) 100 kW  (2) 200 kW  (3) 300 kW  (4) 500 kW
55.	A 300 kVA, single phase transformer is designed to have resistance of 1.5 % and max. efficiency occurs at load of 173.2 kVA. When supplying the full load at 0.8 p.f. lagging at normal voltage, the efficiency will be  (1) 12.6%  (2) 97.6%  (3) 35.5%  (4) 29.6%
56.	For constant load current at which power factor the efficiency of a transformer will be maximum?  (1) Zero power factor  (2) Unity power factor  (3) Leading power factor  (4) Lagging power factor
57.	The all-day efficiency is the term related to  (1) Power transformer (2) Distribution transformer  (3) Current transformer (4) Voltage transformer
58.	Satisfactory commutation of DC machine requires  (1) Smooth, concentric commutator properly undercut  (2) Brushes should smoothly run in the holders  (3) Brushes should be of proper grade and size  (4) All of the above

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(14)

## Code-B

Question No.	Questions
59.	In a $3$ - $\Phi$ induction motor running at full load which of these parameters is stationary with respect to the stator mmf wave ?
Action ages (c.	(1) Stator winding
	(2) Rotor winding
	(3) Both rotor and stator winding
	(4) Rotor mmf wave
60.	The damper windings also called the squirrel cage winging's damper grids  (1) consists of short-circuited copper bars embedded in the field pole
	faces
	(2) are provided in a synchronous motor to make itself starting
	(3) are provided on the stator for improving power factor
	(4) both (1) and (2)
61.	The hexadecimal equivalent of the octal number 171.62 is
	(1) 3C1.C0 (2) 79.C8
	(3) 89.C7 (4) 97.8C
62.	Which of the following circuit can be used as parallel to series converter?
	(1) Digital Counter (2) Decoder
	(3) De-multiplexer (4) Multiplexer
63.	How many fillip-flops are required to construct a decade counter?
	(1) 10 (2) 3
	(3) 4

PHD-EE-2018 (Electrical Engineering) Code-B (15)

Question No.	Questions
64.	Which is not a type of ROM?  (1) Mask ROM (2) PROM (3) EEPROM (4) XROM
65.	A stage in shift register consist of  (1) Latch (2) Flip flop  (3) Byte of storage (4) four bits of storage
66.	The closed loop transfer function of a system is $T(s) = \frac{(s+8)(s+6)}{s^5 + s^4 + 4s^3 - 4s^2 + 3s - 2}$ The number of poles in RHP and LHP are $(1)  4,1 \qquad (2)  1,4$ $(3)  3,2 \qquad (4)  2,3$
67.	For a second order system settling time $T_s = 7 \sec$ and peak time $T_p = 3 \sec$ The location of poles are $(1) -0.97 \pm j \ 0.69 \qquad (2) -0.69 \pm j \ 0.97$ $(3) -1.047 \pm j \ 0.571 \qquad (4) -0.571 \pm j \ 1.047$
68.	The open loop transfer function of a unity feedback system is $G(s) = \frac{50}{(1+0.1s)(1+2s)}$ The position, velocity and acceleration error constants are respectively (1) 0, 0, 250 (2) 50, 0, 0 (3) 0,250, $\infty$ (4) $\infty$ , 50, 0

PHD-EE-2018 (Electrical Engineering) Code-B
(16)

Question No.	Questions
69.	A unity feedback system has a forward path transfer function is $G(s) = \frac{10(1+4s)}{s^2(1+s)}$ If the system is subjected to an input $r(t) = 1 + t + \frac{t^2}{2}, \ t > 0$
	the steady state error of the system will be
	(1) 1 (2) 0.1 (3) 10 (4) ∞
70.	For the Bode plot shown in figure, the transfer function is $\frac{dB}{100 \ dB}$ $\frac{dB}{40 \ dB/dec}$ $\frac{-60 \ dB/dec}{\omega = 10}$
	(1) $\frac{100 \text{ s}^2}{(1+0.1\text{s})^3}$
	(2) $\frac{1000 \text{ s}^2}{(1+0.1\text{s})^6}$
	(3) $\frac{15.6 \text{ s}^2}{(1+0.1\text{s})^6}$
	(1+0.1s) <sup>3</sup> (4) None

PHD-EE-2018 (Electrical Engineering) Code-B (17)

Question No.	Questions
71.	Whenever the magnetic flux changes with respect to an electric conductor or a coil, an EMF is induced in the conductor is Faraday's  (1) First law (2) Second law (3) Third law (4) Fourth law
72.	<ul> <li>Inside a hollow conducting sphere</li> <li>(1) Electric field is zero.</li> <li>(2) Electric field is a non-zero constant.</li> <li>(3) Electric field changes with magnitude of the charge given to the conductor.</li> <li>(4) Electric field changes with distance from the center of the sphere.</li> </ul>
73.	A conductor of length L has current I passing through it, when it is placed parallel to strong magnetic field. The force experienced by the conductor will be  (1) BIL (2) BIL (3) BI <sup>2</sup> L (4) Zero
74.	Cork Screw rule is used to find  (1) Direction of magnetic field (2) Direction of electric field  (3) Direction of current (4) Direction of emf
75.	A point pole has a strength of $4\pi \times 10^{-4}$ weber. The force in Newtons on a point pole of $4\pi \times 1.5 \times 10^{-4}$ weber placed at a distance of 10 cm from it will be  (1) 20N (2) 15N (3) 7.5N (4) 3.75N

PHD-EE-2018 (Electrical Engineering) Code-B
(18)

Questio No.	Questions
76.	In a sample it is observed that a carrier takes 100 µs to over a distance of 10 cm. If the applied external field is 10 <sup>4</sup> V/cm; find the mobolity  (1) 10 <sup>7</sup> cm <sup>2</sup> /Vs  (2) 10 <sup>-3</sup> cm <sup>2</sup> /Vs  (3) 10 cm <sup>2</sup> /Vs  (4) 10 <sup>7</sup> m <sup>2</sup> /Vs
77.	The current gain of a bipolar transistor drops at high frequency because of  (1) Transistor internal capacitances  (2) High current effects in the base  (3) Parasitic inductive elements  (4) The Early effect
78.	A transistor has $\alpha = 0.98$ , then determine $\beta$ .  (1) 50 (2) 49  (3) 70 (4) None of the above
79.	The value of emitter capacitor CE in a multistage amplifier is about (1) $0.1\mu F$ (2) $100pF$ (3) $0.01\mu F$ (4) $50\mu F$
80.	The conduction loss versus device current characteristic of a power MOSFET is best  (1) A parabola (2) A straight line  (3) A rectangular hyperbola (4) An exponentially decaying function

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(19)

Question No.	Questions
81.	Mho relay is used for the protection of  (1) medium length lines (2) long transmission lines  (3) short length lines (4) no length criterion
82.	An overhead line conductor has an inductance per unit length of L henry. If the entire medium around the conductor is filled with a dielectric material of permittivity $\epsilon$ , then the inductance will  (1) $L/\epsilon$ (2) $L/0.5\epsilon$ (3) L (4) unchanged
83.	When a line-to-ground fault occurs, the current in the phase is 100 A. The zero sequence current in the case will be  (1) 33.3 A (2) 0 A  (3) 66.6 A (4) 99.9 A
84.	Air blast circuit breaker is most suitably used in  (1) Up to 132 KV line  (2) Up to 260 KV line  (3) Up to 400 KV line  (4) any voltage
85.	To reduce the adverse effect of corona discharge which conductor is specially used?  (1) ACSR (2) Bundle conductor  (3) Aluminium conductor (4) Copper conductor

PHD-EE-2018 (Electrical Engineering) Code-B
(20)

Question No.	Questions		
86.	A single phase one pulse controlled circuit has a resistance R and counteremf E load 400 sin (314t) as the source voltage. For a load counter emf 200 V, the range of firing angle control is  (1) 30° to 150°  (2) 30° to 180°  (3) 60° to 120°  (4) 60° to 180°		
87.	Let of a thyristor $V_{c1}$ , $V_{c2}$ , $V_{c3}$ are forward break over voltage for gate current $I_{g1}$ , $I_{g2}$ , $I_{g3}$ respectively. Then $(1)  V_{c1} > V_{c2} > V_{c3} \text{ when } I_{g1} > I_{g2} > I_{g3}$ $(2)  V_{c1} > V_{c2} > V_{c3} \text{ when } I_{g1} < I_{g2} < I_{g3}$ $(3)  V_{c1} = V_{c2} = V_{c3} \text{ any value of } I_{g}$ $(4)  V_{c1} > V_{c2} > V_{c3} \text{ when } I_{g1} \ge I_{g2} \ge I_{g3}$		
88.	Triacs cannot be used in AC voltage regulator for a  (1) Resistive load  (2) Inductive load  (3) Back emf load  (4) Resistive Inductive		
89.	Latching current for an SCR inserted between a dc voltage source of 200 V and load is 100 mA. Compute the minimum rate of width pulse required to turn ON the SCR in case load consists of $R=20~\Omega$ in series with $L=0.2~H$		

(2) 300 µs

(4) 100 µs

PHD-EE-2018 (Electrical Engineering) Code-B
(21)

200 μs

150 µs

(1)

(3)

Question No.	Questions	
90.	1 -vhon	
91.	Consider the gain-phase plot shown in fig. The gain margin and phase margin are $\frac{dB}{2 \ dB} = \frac{dB}{\omega = 100} = \frac{2}{100}$ $\frac{dB}{-270^{\circ}} = \frac{180^{\circ}}{-140^{\circ}} = \frac{2}{90^{\circ}}$ Fig	
	(1) -2 dB, 40° (2) 2 dB, 40° (3) 2 dB, 140° (4) -2 dB, 140°	
4.1	The root locus of a unity feed function is given by  (1) $k/s (s + 1) (s + 2)$ (2) $k (s + 1)/s (s + 2)$ (3) $k (s + 2)/s (s + 1)$ (4) $k s/(s + 1) (s + 2)$	

PHD-EE-2018 (Electrical Engineering) Code-B (22)

Question No.	Questions	
93.	The transfer function $\frac{1+0.5s}{1+s}$ represents  (1) Lag network  (2) Lead network  (3) Lag-lead Network  (4) Proportional controller	
94.	If the stability error for a step input and speed of the response be the criteria for design, the suitable controller will be  (1) P Controller  (2) PI Controller  (3) PD Controller  (4) PID Controller	
95.	The open loop transfer function of a feedback system is $G(s) H(s) = \frac{K(s+1)}{(1-s)}.$ The nyquist plot of this system is $(1) \qquad \qquad$	

PHD-EE-2018 (Electrical Engineering) Code-B (23)

Question		Questions
No. 96.	30 amps, will be (1) $42.4 \sin 50 \pi t$	g electric current sine wave having rms value of (2) $30 \sin 50 \pi t$ (4) $42.4 \sin 25 \pi t$
97.	(3) 30 sin 25πt  The equation of an emf is	is given by $e = I_m \left[ \sqrt{(R^2 + 4\omega^2 L^2)} \right] \sin 2\omega t$ . The
	amplitude of the wave will $I_{m} \left[ \left( R^{2} + 4\omega^{2}L^{2} \right)^{\frac{1}{2}} \right]$	. be
	(2) $\sqrt{2I_{m}} \left[ \left( R^{2} + 4\omega^{2}L^{2} \right)^{\frac{1}{2}} \right]$ (3) $\left[ I_{m} \left( R^{2} + 4\omega^{2}L^{2} \right) \right]^{\frac{1}{2}}$	
	(4) $2I_{m}\left[\left(R^{2}+4\omega^{2}L^{2}\right)^{\frac{1}{2}}\right]$	
98.	In the figure, the potential of the figure, the figure, the figure of the figure, the figure of	difference between points P and Q is
(1	) 6	(2) -6
(3	) 10	(4) 12

PHD-EE-2018 (Electrical Engineering) Code-B
(24)

PHD-EE-2018 (Electrical Engineering) Code-B (25)

## (Set-"X")

(DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU ARE ASKED TO DO SO)

## Code C

EXAMINATION.

## (M.Phil/Ph.D/URS-EE-2018)

Subject : ELECTRICAL ENGG.

Sr. No.100023

Time: 11/4 Hours	Max. Marks: 100	
Roll No	(in figure)	(in words)
Name:	Father's Nan	ne:
Mother's Name:	Date of Exam	nination:
(Signature of the candid	ate)	(Signature of the Invigilator)
CANDIDATES MUSINSTRUCTIONS BEFORM  1. All questions are concerned answer-sheet to the failing which a case against him / her, in answer-sheet of such 3. Keeping in view the Sheet is provided to the candidate.	TREAD THE FOLLO ORE STARTING THE QUE opulsory.  Lust return the Question Invigilator concerned before of use of unfair-means / mis addition to lodging of an FI a candidate will not be evaluated transparency of the examination to the candidate so that a copy	book-let as well as OMR leaving the Examination Hall, s-behaviour will be registered R with the police. Further the uated. A carbonless OMR of OMR Sheet may be kept by
uploaded on the Univ In case there is any same may be brough through E.Mail within Thereafter, no compl	discrepancy in the Question to the notice of the Controll 124 hours of uploading the salaint in any case, will be constant in the condition i	n Booklet / Answer Key, the ler of Examination in writing / lime on the University Website. idered
Answer-Sheet. Rough Answers MUST NOT	be ticked in the Question be	ook-let.
one full mark. Cutti	ng, erasing, over witten	and more than one answer orrect answer. d quality in the OMR Answer-
Sheet. BEFORE ANSWERI ENSURE THAT THE	NG THE QUESTIONS, TH Y HAVE BEEN SUPPLIED (	IE CANDIDATES SHOULD CORRECT AND COMPLETE CAMERDINTING ETC. WILL
ENSTIRETHATTHE	Y HAVE BEEN SUPPLIED ( INTS, IF ANY, REGARDING INED 30 MINUTES AF	O MICODINTING:ETC. WILL

Question No.	Questi	ons	
1.	The hexadecimal equivalent of the octal number 171.62 is		
	(1) 3C1.C0 (2)	79.C8	
	(3) 89.C7 (4)	97.8C	
2.	Which of the following circuit can	be used as parallel to series converter	
	(1) Digital Counter (2)	Decoder	
	(3) De-multiplexer (4)	Multiplexer	
3.	How many fillip-flops are require	d to construct a decade counter?	
8.4	(1) 10 (2)	7 3	
	(3) 4	) 2	
4.	Which is not a type of ROM?		
	(1) Mask ROM (2)	) PROM	
	(3) EEPROM (4)	) XROM	
5.	A stage in shift register consist of	accentino contrativo S. 1 . 4	
	(1) Latch (2)	요	
	(3) Byte of storage (4	) four bits of storage	
6.	The closed loop transfer function	of a system is	
	$T(s) = \frac{(s+8)(s+6)}{s^5 + s^4 + 4s^3 - 4s^2 + 3s - 2}$		
	The number of poles in RHP and		
	(1) 4,1	) 1,4	
	(3) 3,2	) 2,3	

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Question No.	Questions
7.	For a second order system settling time $T_s = 7 \sec$ and peak time $T_p = 3 \sec$ .  The location of poles are $(1) -0.97 \pm j \ 0.69$ $(2) -0.69 \pm j \ 0.97$ $(3) -1.047 \pm j \ 0.571$
to a contract of	(4) $-0.571 \pm j \cdot 1.047$
8.	The open loop transfer function of a unity feedback system is $G(s) = \frac{50}{(1+0.1s)(1+2s)}$ The position, velocity and acceleration error constants are respectively $(1)  0, 0, 250 \qquad (2)  50, 0, 0$ $(3)  0,250, \infty \qquad (4)  \infty, 50, 0$
9.	A unity feedback system has a forward path transfer function is
	$G(s) = \frac{10(1+4s)}{s^2(1+s)}$ If the system is subjected to an input $r(t) = 1 + t + \frac{t^2}{s}, \ t > 0$
	$\mathbf{r}(t) = 1 + t + \frac{1}{2}, t > 0$
	the steady state error of the system will be
.,	(1) 1 (2) 0.1 (3) 10 (4) ∞

PHD-EE-2018 (Electrical Engineering) Code-C (2)

Question No.	6	Questions
10.	For the Bode plot shown in	figure, the transfer function is
	100 dB	-60 dB/dec
		40 dB/dec
		ω = 10 (o
	(1) $\frac{100 \text{ s}^2}{(1+0.1\text{s})^3}$	energy breads
	(2) $\frac{1000 \text{ s}^2}{(1+0.1\text{s})^6}$ (3) $\frac{15.6 \text{ s}^2}{(1+0.1\text{s})^6}$	undrast or records durant space in the figure of the figur
	(4) None	
11.	A psychrometric chart is us	ed to determine
	(1) pH	(2) Sound velocity in glasses
	(3) CO <sub>2</sub> concentration	(4) Relative humidity
12.	The dynamic characterist	ics of capacitive transducer are similar to
	(1) low pass filter	(2) high pass filter
	(3) notch filter	(4) band stop filter

PHD-EE-2018 (Electrical Engineering) Code-C (3)



Question No.	Questions	
13.	The effect of error damping is to  (1) provide larger settling time  (2) delay the response  (3) reduce steady state error  (4) any of the above	
14.	The bridge method commonly used for finding mutual inductance is  (1) Heaviside Campbell bridge  (2) Schering bridge  (3) De Sauty's bridge  (4) Wien bridge	
15.	the figure below is used for the measurer	

PHD-EE-2018 (Electrical Engineering) Code-C
(4)

Question No.				
16.	A 500 kVA, three phase transformer has iron losses of 300 W and load copper losses of 600 W. The percentage load at which the transformer has iron losses of 300 W and load copper losses of 600 W. The percentage load at which the transformer has iron losses of 300 W and load copper losses of 600 W. The percentage load at which the transformer has iron losses of 300 W and load copper losses of 600 W. The percentage load at which the transformer has iron losses of 300 W and load copper losses of 600 W. The percentage load at which the transformer has iron losses of 300 W and load copper losses of 600 W. The percentage load at which the transformer has iron losses of 300 W and load copper losses of 600 W. The percentage load at which the transformer has iron losses of 300 W and load copper losses of 600 W. The percentage load at which the transformer has iron losses of 300 W and load copper losses of 600 W. The percentage load at which the transformer has iron losses of 300 W and load copper losses of 600 W. The percentage load at which the transformer has increased at the second copper losses of 600 W. The percentage load at which the transformer has increased at the following loss of 600 W. The percentage load at which the transformer has increased at the following loss of 600 W. The percentage load at which the transformer has increased at the following loss of 600 W. The percentage load at which the transformer has increased at the following loss of 600 W. The percentage load at which the transformer has increased at the following loss of 600 W. The percentage load at which the transformer has a following loss of 600 W. The percentage load at which the transformer has a following loss of 600 W. The percentage load at which the transformer has a following load at which the transformer has a following load at which the following load at which the transformer has a following load at which the following l			
17.	A single phase transformer has a maximum efficiency of 90% at ful load and unity power factor. Efficiency at half load at the same power factor is  (1) 86.7%  (2) 88.26%  (3) 88.9%  (4) 87.8%			
18.	Which of the following motor definitely has a permanent magnet rotor  (1) DC commutator motor (2) Brushless DC motor  (3) Stepper motor (4) Reluctance motor			
19.	The type of single phase induction motor having the highest power factor at full load is  (1) Shaded pole type  (2) Split phase type  (3) Capacitor start type  (4) Capacitor run type			
20.	The direction of rotation of a three phase induction motor is clockwise when it is supplied with three phase sinusoidal voltage having phase sequence A-B-C, for counter clockwise rotation of the motor, the phase sequence of the power supply should be  (1) B-C-A  (2) C-A-B			
4	(3) A-C-B (4) None of above			

PHD-EE-2018 (Electrical Engineering) Code-C (5)

Question No.	Questions			
21.	Mho relay is used for the protection of  (1) medium length lines (2) long transmission lines  (3) short length lines (4) no length criterion			
22.	An overhead line conductor has an inductance per unit length of L henry  If the entire medium around the conductor is filled with a dielectric materia  of permittivity \varepsilon, then the inductance will  (1) L/\varepsilon (2) L/0.5\varepsilon  (3) L (4) unchanged			of permittivity $\epsilon$ , then the inductance will  (1) $L/\epsilon$ (2) $L/0.5\epsilon$
23.	When a line-to-ground fault occurs, the current in the phase is 100 A. The zero sequence current in the case will be  (1) 33.3 A (2) 0 A  (3) 66.6 A (4) 99.9 A			
24.	Air blast circuit breaker is most suitably used in  (1) Up to 132 KV line  (2) Up to 260 KV line  (3) Up to 400 KV line  (4) any voltage			
25.	To reduce the adverse effect of corona discharge which conductor is specially used?  (1) ACSR (2) Bundle conductor  (3) Aluminium conductor (4) Copper conductor			

PHD-EE-2018 (Electrical Engineering) Code-C
(6)



Question No.	Questions
26.	A single phase one pulse controlled circuit has a resistance R and counter emf E load 400 sin (314t) as the source voltage. For a load counter emf of 200 V, the range of firing angle control is  (1) 30° to 150°  (2) 30° to 180°  (3) 60° to 120°  (4) 60° to 180°
27.	Let of a thyristor $V_{c1}$ , $V_{c2}$ , $V_{c3}$ are forward break over voltage for gate current $I_{g1}$ , $I_{g2}$ , $I_{g3}$ respectively. Then $(1)  V_{c1} > V_{c2} > V_{c3} \text{ when } I_{g1} > I_{g2} > I_{g3}$ $(2)  V_{c1} > V_{c2} > V_{c3} \text{ when } I_{g1} < I_{g2} < I_{g3}$ $(3)  V_{c1} = V_{c2} = V_{c3} \text{ any value of } I_{g}$ $(4)  V_{c1} > V_{c2} > V_{c3} \text{ when } I_{g1} \geq I_{g2} \geq I_{g3}$
28.	Triacs cannot be used in AC voltage regulator for a  (1) Resistive load  (2) Inductive load  (3) Back emf load  (4) Resistive Inductive
29.	Latching current for an SCR inserted between a dc voltage source of 200 V and load is 100 mA. Compute the minimum rate of width pulse required to turn ON the SCR in case load consists of $R=20~\Omega$ in series with $L=0.2H$ (1) 200 $\mu$ s (2) 300 $\mu$ s (3) 150 $\mu$ s (4) 100 $\mu$ s

PHD-EE-2018 (Electrical Engineering) Code-C (7)

Question No.	Questions
30.	Delay time is defined by the interval when  (1) gate current increases from 90% to 100% of its final value  (2) anode current reaches 10% from forward leakage current
	<ul><li>(3) anode voltage drops from 100% to 90% of its actual value</li><li>(4) all of these</li></ul>
31.	EHV transmission has which of the following advantages?  (1) Reduction in noise  (2) Increase in transmission efficiency  (3) Improves voltage regulation  (4) All of these
32.	Absence of skin effect lower line cost, less corona effect are the features of which of the transmission system?  (1) EHV-AC system  (2) HVDC system
	(3) Both (1) and (2) (4) UHV – AC system
33.	Inside the station of the broad gauge line what is the clearance between track and lowest conductor for operating voltages from 650 V-3 kV?  (1) 10 m  (2) 7.2 m  (3) 8.6 m  (4) 7.6 m

PHD-EE-2018 (Electrical Engineering) Code-C
(8)

Question No.	on Questions			
34.	The area under load curve represents  (1) System voltage (2) Current  (3) Average demand (4) Maximum demand			
35.	A power station supplies the peak load of 50 MW, 40 MW and 70 MW to three localities. The annual load factor is 0.50 p.u. and the diversity factor of the load at the station is 1.55 the maximum demand on the station and average load respectively will be  (1) 51.61 MW  (2) 57.5 MW  (3) 53 MW  (4) 52 MW			
36.	Which of the followng circuit breakers produce least arc energy?  (1) Air blast (2) Air break (3) Minimum oil (4) Plain oil			
37.	A 100 Km long transmission line is loaded at 110 kV. If the loss of line 5 MW and the load is 150 VA the resistance of the line is  (1) 4.65 ohms/phase  (2) 2.26 ohms/phase  (3) 8.06 ohms/phase  (4) 6.06 ohms/phase			
38.	A three phase, 33 kV oil circuit breaker is rated 1200 A, 2000 MVA, 3 s  The symmetrical breaking current is  (1) 1200 A (2) 3600 A  (3) 35 kA (4) 104.8 kA			

PHD-EE-2018 (Electrical Engineering) Code-C (9)

Question	Questions  Co 7 microfarad between			
No. 39.	A 3 core cable gives on test a capacitance of 3.7 microfarad between two cores. Find the line charging current of the cable when it is connected to 11 kV, 50 Hz system?  (1) 14.76 A  (2) 1.476 A  (3) 14.7 mA  (4) 1 A			
40.	The most suitable circuit breaker for short line fault without switching resistor is  (1) Oil circuit breaker  (2) Air blast circuit breaker			
	(3) SF <sub>6</sub> breaker  (4) None of these			
41.	The system of linear equations $ (4d-1) \ x + y + z = 0 $ $ -y + z = 0 $ $ (4d-1) \ z = 0 $ has a non-trivial solution, if d equals			
	(1) 1/2 (2) 1/4 (3) 3/4 (4) 1			

PHD-EE-2018 (Electrical Engineering) Code-C (10)

Question No.	Questions
42.	Eigen vector(s) of the matrix
	[0 0 α]
	0 0 0
taring production	[0 0 0]
	is (are)
	(1) $(0,0,\alpha)$ (2) $(\alpha,0,0)$
	(3) (0, 0, 1) (4) (0, α, 0)
43.	Consider the z-transform X (z) = $5z^2 + 4z^{-1} + 3$ ; $0 <  z  < \infty$ . The inverse
	z-transform x [n] is
	(1) $5\delta [n+2] + 3\delta [n] + 4\delta [n-1]$
	(2) $5\delta [n-2] + 3\delta [n] + 4\delta [n+1]$
	(3) $5u[n+2]+3u[n]+4u[n-1]$
	(4) $5u[n-2]+3u[n]+4u[n+1]$
44.	If $\delta(t)$ denotes a unit impulse then Laplace Transform of $\frac{d^2\delta(t)}{dt^2}$ will be
And a second	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
as un	(3) $s$ (4) $s^{-2}$
45.	The state equation of LTI system is represented by
	r o ol ro 11
	$\dot{\mathbf{x}} = \begin{bmatrix} 0 & 0 \\ -2 & -1 \end{bmatrix} \mathbf{x} + \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix} \mathbf{u}$
	The Eigen values are
	(1) $-1, +1$ (2) $0.5 \pm j \cdot 1.323$
	(3) -1,-1 (4) None

PHD-EE-2018 (Electrical Engineering) Code-C (11)

Question	Questions			
No. 46.	Line integral can be transformed into a surface integral by using  (1) Divergence theorem (2) Gauss theorem  (3) Stokes theorem (4) None of these			
47.	Four fundamental equations of electromagnetics are known as  (1) Fleming's laws (2) Faraday's laws (3) Lorentz equations (4) Maxwell's equations			
48.	For a linear electromagnetic circuit, which of the following statements is true?			
	<ol> <li>Field energy is equal to the co-energy</li> <li>Field energy is greater than the co-energy</li> <li>Field energy is lesser than the co-energy</li> <li>Co-energy is zero</li> </ol>			
49.	Which of the following statements holds for the divergence of electric and magnetic flux  (1) Both are zero  (2) These are zero for static densities but non-zero for time varying densities.  (3) It is zero for the electric flux density  (4) It is zero for the magnetic flux density			

PHD-EE-2018 (Electrical Engineering) Code-C (12)



Question No.	lo.			
50.				
51.	Consider the gain-phase plot shown in fig. The gain margin and phase margin are $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$			
52.	(3) $2 dB$ , $140^{\circ}$ (4) $-2 dB$ , $140^{\circ}$ The root locus of a unity feed function is given by  (1) $k/s$ (s + 1) (s + 2)			
	(2) k (s + 1)/s (s + 2) (3) k (s + 2)/s (s + 1) (4) ks/(s + 1) (s + 2)			

PHD-EE-2018 (Electrical Engineering) Code-C (13)

Question No.	Questions
53.	The transfer function \(\frac{1+0.5s}{1+s}\) represents  (1) Lag network  (2) Lead network  (3) Lag-lead Network  (4) Proportional controller  If the stability error for a step input and speed of the response be the stability error for a step input and speed of the response be the stability error for a step input and speed of the response be the stability error for a step input and speed of the response be the stability error for a step input and speed of the response be the stability error for a step input and speed of the response be the stability error for a step input and speed of the response be the stability error for a step input and speed of the response be the stability error for a step input and speed of the response be the stability error for a step input and speed of the response be the stability error for a step input and speed of the response be the stability error for a step input and speed of the response be the stability error for a step input and speed of the response be the stability error for a step input and speed of the response be the stability error for a step input and speed of the response be the stability error for a step input and speed of the response be the stability error for a step input and speed of the response be the stability error for a step input and speed of the response be the stability error for a step input and speed of the response be the stability error for a step input and speed of the response be the stability error for a step input and speed of the response be the stability error for a step input and speed of the response be the stability error for a step input and speed of the response be the stability error for a step input and speed of the response be the stability error for a step input and speed of the response be the stability error for a step input and speed of the response be the stability error for a step input and speed of the response be the stability error for a step input and speed of the response be the stability error for a step input and speed of th
54.	criteria for design, the suitable controller  (1) P Controller  (2) PI Controller  (3) PD Controller  (4) PID Controller
	The open loop transfer function of a feedback system is $G(s) H(s) = \frac{K(s+1)}{(1-s)}.$ The nyquist plot of this system is $(1)  \bigoplus_{\omega=0}^{lm} \mathbb{R}^{e} \qquad (2)  \bigoplus_{\omega=0}^{lm} \mathbb{R}^{e}$
56. T	he equation for 25 cycles electric current sine wave having rms value of the same $\frac{1}{2}$
(1)	(2) 00 sm 00 % t

Question No.	Questions			
57.	The equation of an emf is given by $e = I_m \left[ \sqrt{\left(R^2 + 4\omega^2 L^2\right)} \right]$ si amplitude of the wave will be	n 2ωt. The		
	(1) $I_m \left[ \left( R^2 + 4\omega^2 L^2 \right)^{\frac{1}{2}} \right]$ (2) $\sqrt{2} I_m \left[ \left( R^2 + 4\omega^2 L^2 \right)^{\frac{1}{2}} \right]$			
	(3) $\left[I_{m}\left(R^{2}+4\omega^{2}L^{2}\right)\right]^{\frac{1}{2}}$ (4) $2I_{m}\left[\left(R^{2}+4\omega^{2}L^{2}\right)^{\frac{1}{2}}\right]$			
58.	In the figure, the potential difference between points P and Q is $ \begin{array}{ccccccccccccccccccccccccccccccccccc$			
59.	In the network shown, what is the electric current I is the shown  I 4  10A  10A			
	(1) 0 A. (2) 1/3 A. (3) 5/6 A. (4) 4 A.	im.		

Question No.	Questions
60.	In the figure given, the value' of R is $ \begin{array}{c c} R \\ \hline 14 & 1 & 4A \\ + & 10A & + & 15A \\ \hline 100V & \geq 2 & 40V \\ - & & - & - \end{array} $
	(1) $10 \Omega$ (2) $12 \Omega$ (3) $18 \Omega$ (4) $24 \Omega$
61.	Whenever the magnetic flux changes with respect to an electric conductor or a coil, an EMF is induced in the conductor is Faraday's  (1) First law (2) Second law (3) Third law (4) Fourth law
62.	<ul> <li>Inside a hollow conducting sphere</li> <li>(1) Electric field is zero.</li> <li>(2) Electric field is a non-zero constant.</li> <li>(3) Electric field changes with magnitude of the charge given to the conductor.</li> <li>(4) Electric field changes with distance from the center of the sphere.</li> </ul>
63.	A conductor of length L has current I passing through it, when it is placed parallel to strong magnetic field. The force experienced by the conductor will be  (1) BIL  (2) BIL  (3) BI <sup>2</sup> L  (4) Zero

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Question No.	Questions
64.	Cork Screw rule is used to find  (1) Direction of magnetic field (2) Direction of electric field  (3) Direction of current (4) Direction of emf
<b>65.</b>	A point pole has a strength of $4\pi \times 10^{-4}$ weber. The force in Newtons on a point pole of $4\pi \times 1.5 \times 10^{-4}$ weber placed at a distance of 10 cm from it will be  (1) 20N (2) 15N  (3) 7.5N (4) 3.75N
66.	In a sample it is observed that a carrier takes 100 µs to over a distance of 10 cm. If the applied external field is 10 <sup>4</sup> V/cm; find the mobolity  (1) 10 <sup>7</sup> cm <sup>2</sup> /Vs  (2) 10 <sup>-3</sup> cm <sup>2</sup> /Vs  (3) 10 cm <sup>2</sup> /Vs  (4) 10 <sup>7</sup> m <sup>2</sup> /Vs
67.	The current gain of a bipolar transistor drops at high frequency because of  (1) Transistor internal capacitances  (2) High current effects in the base  (3) Parasitic inductive elements  (4) The Early effect
68.	A transistor has $\alpha = 0.98$ , then determine $\beta$ .  (1) 50 (2) 49 (3) 70 (4) None of the above

PHD-EE-2018 (Electrical Engineering) Code-C (17)

Maball

Question No.	Questions amplifier is about			
69.	The value of emitter capacitor CE in a multistage amplifier is about (1) $0.1\mu F$ (2) $100pF$ (3) $0.01\mu F$ (4) $50\mu F$			
70.	The conduction loss versus device current characteristic of a power MOSFET is best  (1) A parabola  (2) A straight line  (3) A rectangular hyperbola  (4) An exponentially decaying function			
	In the given figure, the Thevenin equivalent voltage and impedance a seen from the terminals P-Q is given by $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$			
72. A	(4) 2 V and 5 Ω  A coil having a resistance of 5 Ω and inductance of 0.1 H is connected i eries with a condenser of capacitance 50 μF. A constant alternating voltage f 200 V is applied to the circuit. The voltage across coil at resonance is (2) 1788 V			

PHD-EE-2018 (Electrical Engineering) Code-C (18)

Question No.	Questions
73.	An RLC series circuit resonates at a frequency $w_r$ the ratio of $w_r$ L/R = 10 the variable frequency voltage applied to the circuit is 20 sin $(\omega t + \pi/3)$ the voltage measured across the capacitance  (1) $200 / \sqrt{2}$ (2) $220 / \sqrt{2}$ (3) $20 / \sqrt{2}$ (4) $1/2$
74.	What is the relation between line voltage and phase voltage in case of delta connection? $ (1)  V_L = V_p. $ $ (2)  V_t = 1/\sqrt{3} \ V_p. $ $ (3)  V_L = \sqrt{3} \ V_p. $ $ (4)  \text{None of these} $
75.	The rms value of the current is a wire which carries a dc current of 10 A and a sinusoidal alternating current of peak value 20 A is  (1) 10 A (2) 14.14 A  (3) 15 A (4) 17.32 A
76.	The purpose of compensation for a thermocouple is  (1) To decrease temperature sensitivity  (2) To increase volatge output  (3) To cancel unwanted voltage output of a thermocouple  (4) Used for high-temperature circuits
77.	Semiconductor strain gages typical have much higher gage factors than those of metallic strain gages primarily due to  (1) Higher temperature sensitivity  (2) Higher Poisson's ratio  (3) Higher piezoresistive coefficient  (4) Higher magnetostrictive coefficient

PHD-EE-2018 (Electrical Engineering) Code-C (19)

r the op-amp shown = 350 nA. The valu rrent (I <sub>f</sub> ) are	es of the inpu	, the bias currents ε it bias current (I <sub>b</sub> ) ε	are I <sub>b1</sub> = 450 nA and and and the input offset
b  	-	—•: dintair si	parameter and the second secon
l <sub>b2</sub>	<b>-+</b> /	ection /	- 74. † Markus us ti - Odla some
$I_b = 800 \text{ nA}, I_f = 50$ $I_b = 400 \text{ nA}, I_f = 50$		$I_b = 800 \text{ nA}, I_f = 100$	
Hall Effect sensor	. M. M. (6)	1, - 400 nA, 1, - 400	O DA
can operate only	a few times b	efore failure	TO OF (1)
	ne velocity a	t the center is	times the mea
THE PERSON NAME AND PARTY OF THE PARTY.	(2) (4)	3.333	legames
ical range of thyris			in la Beodi Maria - 1954
3-100 µs	(4)	3-500 us	etrin op h etrin op
	$I_b = 400 \text{ nA}, I_f = 50$ Hall Effect sensor exists only in the is a non-contacting can operate only produces very large turbulent flow, the ocity.  1.2 2 ical range of thyris $3-10 \mu \text{ s}$ $3-100 \mu \text{ s}$	$I_b = 400 \text{ nA}, I_f = 50 \text{ nA}$ (4)  Hall Effect sensor exists only in theory is a non-contacting magnetic s can operate only a few times b produces very large voltages  turbulent flow, the velocity a ocity.  1.2 (2) 2 (4)  ical range of thyristor turn OFI $3-10 \mu s$ (2) $3-100 \mu s$ (4)	$I_b = 400 \text{ nA}, I_f = 50 \text{ nA}$ (4) $I_b = 400 \text{ nA}, I_f = 100 \text{ magnetic sensor}$ exists only in theory is a non-contacting magnetic sensor can operate only a few times before failure produces very large voltages  turbulent flow, the velocity at the center is pointy.  1.2 (2) 2.2 2 (4) 3.333  ical range of thyristor turn OFF time is $3-10 \mu_B$ (2) $3-50 \mu_B$

Question No.	Questions
82.	String efficiency depends upon  (1) voltage rating of whole string  (2) no. of SCR in the string  (3) voltage rating of one SCR  (4) all of these
83.	A thyristor string is made of a no. of SCR connected in series and parallel. The string have volume and current of 11 KV and 4 KA. The voltage and current rating of available SCRs are 1800 V and 1000 A. For a string efficiency of 90% let the number of SCRs in series and parallel are a and b respectively. Then the value of a and b will be  (1) 5, 7  (2) 4, 6  (3) 7, 5  (4) 6, 4
84.	A 200 A thyristor is to be operated in parallel with a 300 A thyristor. The ON state voltage drops are 1.5 V and 1.2 Volts. What is the value of resistance R to be connected in series with each thyristor, so that current through the combination is 500 A and each of them is fully loaded?  (1) $0.03 \times 10^{-2} \Omega$ (2) $0.3 \times 10^{-3} \Omega$ (3) $3.0 \times 10^{-3} \Omega$

PHD-EE-2018 (Electrical Engineering) Code-C (21)

Question	Questions
No.	in figure is 2 mA. Obtain the
85.	If a latching current for the circuit shown in figure is 2 mA. Obtain the value of minimum width of the property turn ON the SCR?
	1+ T-120V 30.2H
	$I_L = 2 \text{ mA}$
	(1) 3 μs (2) 3.1 μs
	(3) 3.2 μs (4) 3.3 μs
	figure. Calculate the value of R in ohm is
	figure. Calculate the value of R in ohm is $ \begin{array}{cccccccccccccccccccccccccccccccccc$
	figure. Calculate the value of R in ohm is
	$\begin{array}{c} A \\ \\ \\ \\ \\ \\ \end{array}$
	figure. Calculate the value of R in ohm is $\begin{array}{c c} A & I_{g} & R & I_{g} \\ \hline \end{array}$
(2	figure. Calculate the value of R in ohm is $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$
(2	figure. Calculate the value of R in ohm is $ \begin{array}{c c} A & I_g & R & I_g \\ \hline  & V_g & 20 \Omega & T & 8V \end{array} $ (a) 65

PHD-EE-2018 (Electrical Engineering) Code-C (22)

Question No.	Que	estio	ns
87.	7. The peak to peak source current ripple in amperes is		
	(1) 0.96	(2)	0.144
	(3) 0.192	(4)	0.288
88.	The average source current in amperes in steady state is		
	(1) 3/2	(2)	5/3
	(3) 5/2	(4)	15/4
89.	The rms value of load phase voltage is		
	(1) 105.1 V	(2)	141.4 V
	(3) 212.2 V	(4)	282.8 V
90.		00 V, t	he power consumed by three phase load
	is (1) 1.5 kW	(2)	2.0 kW
36.41	(3) 2.5 kW	(4)	3.0 kW
91.	A rotating electrical machine having its self-inductance's of both the state and the rotor windings independent of the rotor position will definitely not develop		
	(1) Starting Torque		
	(2) Synchronizing torque		
	(3) Hysteresis Torque		
9 9 9			원 경우 사람들이 보면하는 사람들 사람들은 바로 11일 12일 12 HTML

PHD-EE-2018 (Electrical Engineering) Code-C (23)

uestion No.	Questions		
92.	If peak value of phase mmf is $F_{max}$ , then peak value of the rotating field caused by three phase is  (1) (3/2) $F_{max}$ .  (2) $F_{max}$ .		
	(3) $3 F_{\text{max.}}$ (4) $(1/2) F_{\text{max.}}$		
93.	A 50 Hz, 4 pole turbo generator rated at 20 MVA, 13.2 KV has inerticonstant H = 3 kW sec / KVA. The kinetic energy stored in the rotor is  (1) 80 MJ  (2) 60 MJ		
	(3) 20 MJ (4) 10 MJ		
94.	An alternator is supplying a load of 300 kW of a p.f. of 0.6 lagging. If the power factor is raised to unity. How many more kilowatts can alternator supply for the same KVA loading  (1) 100 kW  (2) 200 kW  (3) 300 kW  (4) 500 kW		
95.	A 300 kVA, single phase transformer is designed to have resistance of 1.5% and max. efficiency occurs at load of 173.2 kVA. When supplying the full load at 0.8 p.f. lagging at normal voltage, the efficiency will be  (1) 12.6%  (2) 97.6%  (3) 35.5%  (4) 29.6%		
96.	For constant load current at which power factor the efficiency of a transformer will be maximum?  (1) Zero power factor  (2) Unity power factor  (3) Leading power factor  (4) Lagging power factor		

PHD-EE-2018 (Electrical Engineering) Code-C (24)

Question No.	Questions
97.	The all-day efficiency is the term related to
	(1) Power transformer
	(2) Distribution transformer
	(3) Current transformer
	(4) Voltage transformer
98.	Satisfactory commutation of DC machine requires
	(1) Smooth, concentric commutator properly undercut
	(2) Brushes should smoothly run in the holders
	(3) Brushes should be of proper grade and size
	(4) All of the above
99.	In a 3 - Φ induction motor running at full load which of these parameters
	is stationary with respect to the stator mmf wave?
	(1) Stator winding
,	(2) Rotor winding
	(3) Both rotor and stator winding
	(4) Rotor mmf wave
100.	The damper windings also called the squirrel cage winging's damper grids
	(1) consists of short-circuited copper bars embedded in the field pole
	faces
	(2) are provided in a synchronous motor to make itself starting
	(3) are provided on the stator for improving power factor
4	(4) both (1) and (2)
	(4) 10011 (1) 647 (1)

PHD-EE-2018 (Electrical Engineering) Code-C (25)

## (Set-"X")

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(M.Phil/Ph.D/URS-EE-2018)

Subject : ELECTRICAL ENGG.

sr. No. 100004

## OLLOW DEFURE START

1. All questions are compulsory.

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- 2. The candidates must return the Quanswer-sheet to the Invigilator concerned because leaving the examination reas, failing which a case of use of unfair-means / mis-behaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
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- 5. The candidate MUST NOT do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question book-let itself. Answers MUST NOT be ticked in the Question book-let.
- 6. There will be no Negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.
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- 8. BEFORE ANSWERING THE QUESTIONS, THE CANDIDATES SHOULD ENSURE THAT THEY HAVE BEEN SUPPLIED CORRECT AND COMPLETE BOOK-LET. COMPLAINTS, IF ANY, REGARDING MISPRINTING ETC. WILL NOT BE ENTERTAINED 30 MINUTES AFTER STARTING OF THE EXAMINATION.



Question No.	Questions
1.	Typical range of thyristor turn OFF time is (1) $3-10~\mu s$ (2) $3-50~\mu s$ (3) $3-100~\mu s$ (4) $3-500~\mu s$
2.	String efficiency depends upon  (1) voltage rating of whole string  (2) no. of SCR in the string  (3) voltage rating of one SCR  (4) all of these
3.	A thyristor string is made of a no. of SCR connected in series and parallel. The string have volume and current of 11 KV and 4 KA. The voltage and current rating of available SCRs are 1800 V and 1000 A. For a string efficiency of 90% let the number of SCRs in series and parallel are a and b respectively. Then the value of a and b will be  (1) 5,7  (2) 4,6  (3) 7,5  (4) 6,4

PHD-EE-2018 (Electrical Engineering) Code-D
(1)



No.	estion No. Questions		
<ul> <li>A 200 A thyristor is to be operated in parallel with a 300 A thyristor. ON state voltage drops are 1.5 V and 1.2 Volts. What is the resistance R to be connected in series with each thyristor, so that through the combination is 500 A and each of them is fully loade (1) 0.03 × 10<sup>-2</sup> Ω (2) 0.3 × 10<sup>-3</sup> Ω</li> <li>(3) 3.0 × 10<sup>-3</sup> Ω (4) 0.3 × 10<sup>-2</sup> Ω</li> </ul>			
5.	If a latching current for the circuit shown in figure is 2 mA. Obtain the value of minimum width of the property turn ON the SCR? $ \frac{T}{I_L = 2 \text{ mA}} $ 0.2 H		
falle e	(1) 3 μs (2) 3.1 μs (3) 3.2 μs (4) 3.3 μs		
6.	A thyristor will be triggered when $V_g = 1.5$ volt and $I_g = 100$ mA in the giver figure. Calculate the value of R in ohm is $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		

Question No.	Questions		
7.	The peak to peak source current ripple in amperes is		
	(1) 0.96 (2) 0.144		
	(3) 0.192 (4) 0.288		
8.	The average source current in amperes in steady state is		
	(1) 3/2 (2) 5/3		
	(3) 5/2 (4) 15/4		
9.	The rms value of load phase voltage is		
	(1) 105.1 V (2) 141.4 V		
	(3) 212.2 V (4) 282.8 V		
10.	In the DC bus voltage $V_d = 300 \text{ V}$ , the power consumed by three phase load is  (1) $1.5 \text{ kW}$ (2) $2.0 \text{ kW}$ (3) $2.5 \text{ kW}$ (4) $3.0 \text{ kW}$		
11.	Consider the gain-phase plot shown in fig. The gain margin and phase margin are $\frac{dB}{2 \ dB} = \frac{dB}{\omega = 100} = \frac{2G(j\omega)}{\omega = 100}$		
	-270* -180* -140* -90* Fig		

PHD-EE-2018 (Electrical Engineering) Code-D
(3)

Question No.	Questions
12.	The root locus of a unity feed function is given by  (1) $k/s (s+1) (s+2)$ (2) $k (s+1)/s (s+2)$ (3) $k (s+2)/s (s+1)$ (4) $ks/(s+1) (s+2)$
13.	The transfer function \(\frac{1+0.5s}{1+s}\) represents  (1) Lag network  (2) Lead network  (3) Lag-lead Network  (4) Proportional controller
14.	If the stability error for a step input and speed of the response be the criteria for design, the suitable controller will be  (1) P Controller  (2) PI Controller  (3) PD Controller  (4) PID Controller
15.	The open loop transfer function of a feedback system is $G(s) H(s) = \frac{K(s+1)}{(1-s)}.$ The nyquist plot of this system is $(1)  \frac{\ln}{\omega = 0}  (2)  \frac{\ln}{\omega = 0}  (4)  \frac{\ln}{\omega = 0}  \frac{\ln}{\omega = 0}  (4)  \frac$

PHD-EE-2018 (Electrical Engineering) Code-D
(4)



Question No.	Questions  The equation for 25 cycles electric current sine wave having rms value of 30 amps, will be		
16.			
	(1) $42.4 \sin 50 \pi t$ (2) $30 \sin 50 \pi t$		
	(3) $30 \sin 25\pi t$ (4) $42.4 \sin 25\pi t$		
17.	The equation of an emf is given by $e = I_m \left[ \sqrt{\left(R^2 + 4\omega^2 L^2\right)} \right] \sin 2\omega t$ . The amplitude of the wave will be		
	(1) $I_{m} \left[ \left( R^{2} + 4\omega^{2}L^{2} \right)^{\frac{1}{2}} \right]$ (2) $\sqrt{2}I_{m} \left[ \left( R^{2} + 4\omega^{2}L^{2} \right)^{\frac{1}{2}} \right]$		
	(3) $\left[I_{m}\left(R^{2}+4\omega^{2}L^{2}\right)\right]^{\frac{1}{2}}$ (4) $2I_{m}\left[\left(R^{2}+4\omega^{2}L^{2}\right)^{\frac{1}{2}}\right]$		
18.	In the figure, the potential difference between points P and Q is		
	P 2 4 Q Q Q Q Q Q Q Q Q Q Q Q Q Q Q Q Q Q		
	(1) 6 (2) -6		
	(3) 10 (4) 12		

Question No.	Questic	ons the direction
No. 19.	shown I. 4	the electric current I is the direction
	+10V	
	<ol> <li>(1) 0 A.</li> <li>(2) 1/3 A.</li> <li>(3) 5/6 A.</li> <li>(4) 4 A.</li> </ol>	
20.	In the figure given, the value' of R  R  14  10A  100V  2	
	<ul> <li>(1) 10 Ω</li> <li>(2)</li> <li>(3) 18 Ω</li> <li>(4)</li> </ul>	) 12 Ω ) 24 Ω

PHD-EE-2018 (Electrical Engineering) Code-D
(6)

Question No.	Questions
21.	EHV transmission has which of the following advantages?  (1) Reduction in noise  (2) Increase in transmission efficiency  (3) Improves voltage regulation  (4) All of these
22.	Absence of skin effect lower line cost, less corona effect are the features of which of the transmission system?  (1) EHV – AC system  (2) HVDC system  (3) Both (1) and (2)  (4) UHV – AC system
23.	Inside the station of the broad gauge line what is the clearance between track and lowest conductor for operating voltages from 650 V-3 kV?  (1) 10 m  (2) 7.2 m  (3) 8.6 m  (4) 7.6 m
	The area under load curve represents  (1) System voltage  (2) Current  (3) Average demand  (4) Maximum demand

PHD-EE-2018 (Electrical Engineering) Code-D (7)

Question	Questions	
No. 25.	A power station supplies the peak load of 50 MW, 40 MW and 70 MW to three localities. The annual load factor is 0.50 p.u. and the diversity factor of the load at the station is 1.55 the maximum demand on the station and average load respectively will be  (1) 51.61 MW  (2) 57.5 MW  (3) 53 MW  (4) 52 MW	
26.	Which of the followng circuit breakers produce least arc energy?  (1) Air blast (2) Air break (3) Minimum oil (4) Plain oil	
27.	A 100 Km long transmission line is loaded at 110 kV. If the loss of line i 5 MW and the load is 150 VA the resistance of the line is (1) 4.65 ohms/phase (2) 2.26 ohms/phase (3) 8.06 ohms/phase (4) 6.06 ohms/phase	
28.	A three phase, 33 kV oil circuit breaker is rated 1200 A, 2000 MVA, 3 a The symmetrical breaking current is (1) 1200 A (2) 3600 A (3) 35 kA (4) 104.8 kA	
29.	A 3 core cable gives on test a capacitance of 3.7 microfarad between two cores. Find the line charging current of the cable when it is connected to 11 kV, 50 Hz system?  (1) 14.76 A  (2) 1.476 A  (3) 14.7 mA  (4) 1 A	

PHD-EE-2018 (Electrical Engineering) Code-D
(8)

Question No.	Questions		
30.	The most suitable circuit breaker for short line fault without switching resistor is		
	(1) Oil circuit breaker (2)	Air blast circuit breaker	
	(3) SF <sub>6</sub> breaker (4)	None of these	
31.	The hexadecimal equivalent of the	octal number 171.62 is	
	(1) 3C1.C0 (2)	79.C8	
	(3) 89.C7 (4)	97.8C	
32.	Which of the following circuit can	be used as parallel to series converter?	
	(1) Digital Counter (2)	Decoder	
	(3) De-multiplexer (4)	Multiplexer	
33.	How many fillip-flops are required	l to construct a decade counter?	
	(1) 10 (2)	3 The Mark morks of All	
	(3) 4	<b>2</b>	
34.	Which is not a type of ROM?		
	(1) Mask ROM (2)	PROM	
	(3) EEPROM (4)	XROM	
35.	A stage in shift register consist of		
	(1) Latch (2)	Flip flop	
	(3) Byte of storage (4)	four bits of storage	

PHD-EE-2018 (Electrical Engineering) Code-D
(9)

uestion	Questions	
No. 36.	The closed loop transfer function of a system is $T(s) = \frac{(s+8) (s+6)}{s^6 + s^4 + 4s^3 - 4s^2 + 3s - 2}$ The number of poles in RHP and LHP are	4.53
	(1) 4,1 (3) 3,2 (4) 2,3 (4) 2,3 (5)	
37.	For a second order system settling time $T_s = 7 \sec$ and peak time sec. The location of poles are  (1) $= 0.07 \pm i.0.60$ (2) $= 0.69 \pm i.0.97$	$T_p = 8$
Telfor	(1) $-0.97 \pm j \ 0.69$ (2) $-0.69 \pm j \ 0.97$ (3) $-1.047 \pm j \ 0.571$ (4) $-0.571 \pm j \ 1.047$	<u>Q.</u>
38.	The open loop transfer function of a unity feedback system is $G(s) = \frac{50}{(1+0.1s)(1+2s)}$ The position, velocity and acceleration error constants are respectively.  (1) $0, 0, 250$ (2) $50, 0, 0$ (3) $0.250$ (4) $\infty, 50, 0$	tively
39.	(3) $0,250,\infty$ (4) $\infty,50,0$ A unity feedback system has a forward path transfer function is $G(s) = \frac{10(1+4s)}{s^2(1+s)}$ If the system is subjected to an input $r(t) = 1 + t + \frac{t^2}{2}, t \succ 0$ the steady state error of the system will be  (1) 1 (2) 0.1 (3) 10 (4) $\infty$	

PHD-EE-2018 (Electrical Engineering) Code-D
(10)

Question No.	Questions		
40.	For the Bode plot shown in figure, the transfer function is		
	dB 100 dB 40 dB/dec -60 dB/dec		
-300	$\omega = 10$ variable $\omega$ when $\omega = 10$		
	(1) $\frac{100 \text{ s}^2}{(1+0.1\text{s})^3}$ (2) $\frac{1000 \text{ s}^2}{(1+0.1\text{s})^6}$		
	(3) $\frac{15.6 \text{ s}^2}{(1+0.1\text{s})^6}$ (4) None		
41.	A rotating electrical machine having its self-inductance's of both the stator and the rotor windings independent of the rotor position will definitely not develop  (1) Starting Torque  (2) Synchronizing torque		
42.	(e) Hydrottosis Lot 4		
74.	If neak value of phase min is I, then peak value of the		
	caused by three phase is  (1) $(3/2) F_{max}$ (2) $F_{max}$ (3) $3 F_{max}$ (4) $(1/2) F_{max}$		
43.	caused by three phase is  (1) $(3/2) F_{max}$ .  (2) $F_{max}$ .  (3) $3 F_{max}$ .  (4) $(1/2) F_{max}$ .  A 50 Hz. 4 pole turbo generator rated at 20 MVA, 13.2 KV has inertial		
	(1) $(3/2) F_{max}$ (2) $F_{max}$		

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(11)

Question No.	Questions		
44.	An alternator is supplying a load of 300 kW of a p.f. of 0.6 lagging. If the power factor is raised to unity. How many more kilowatts can alternator supply for the same KVA loading		
	(1) 100 kW (2) 200 kW		
	(3) 300 kW (4) 500 kW		
45. A 300 kVA, single phase transformer is designed to have r 1.5 % and max. efficiency occurs at load of 173.2 kVA. When su full load at 0.8 p.f. lagging at normal voltage, the efficiency wi			
	(1) 12.6% (2) 97.6%		
	(3) 35.5% (4) 29.6%		
- 1	(0) 30.070		
46.	For constant load current at which power factor the efficiency of a transformer will be maximum?  (1) Zero power factor  (2) Unity power factor  (3) Leading power factor  (4) Lagging power factor		
47.	The all-day efficiency is the term related to		
	(1) Power transformer		
	(2) Distribution transformer		
	(3) Current transformer		
	(4) Voltage transformer		

PHD-EE-2018 (Electrical Engineering) Code-D (12)

Question No.	Questions		
48.	Satisfactory commutation of DC machine requires  (1) Smooth, concentric commutator properly undercut  (2) Brushes should smoothly run in the holders  (3) Brushes should be of proper grade and size		
49.	<ul> <li>(4) All of the above</li> <li>In a 3 - Φ induction motor running at full load which of these parameters is stationary with respect to the stator mmf wave?</li> <li>(1) Stator winding</li> </ul>		
	<ul><li>(2) Rotor winding</li><li>(3) Both rotor and stator winding</li><li>(4) Rotor mmf wave</li></ul>		
50.	The damper windings also called the squirrel cage winging's damper grids  (1) consists of short-circuited copper bars embedded in the field pole faces		
,	<ul> <li>(2) are provided in a synchronous motor to make itself starting</li> <li>(3) are provided on the stator for improving power factor</li> <li>(4) both (1) and (2)</li> </ul>		
	Mho relay is used for the protection of  (1) medium length lines (2) long transmission lines  (3) short length lines (4) no length criterion		

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(13)

Question	Questions
No. 52.	An overhead line conductor has an inductance per unit length of L henry  If the entire medium around the conductor is filled with a dielectric materia  of permittivity \varepsilon, then the inductance will  (1) L/\varepsilon  (2) L/0.5\varepsilon  (3) L  (4) unchanged
53.	When a line-to-ground fault occurs, the current in the phase is 100 A. The zero sequence current in the case will be  (1) 33.3 A (2) 0 A  (3) 66.6 A (4) 99.9 A
54.	Air blast circuit breaker is most suitably used in  (1) Up to 132 KV line  (2) Up to 260 KV line  (3) Up to 400 KV line  (4) any voltage
	To reduce the adverse effect of corona discharge which conductor specially used?  (1) ACSR  (2) Bundle conductor  (3) Aluminium conductor  (4) Copper conductor

PHD-EE-2018 (Electrical Engineering) Code-D
(14)

Question No.	Questions			
56.	A single phase one pulse controlled circuit has a resistance R and counter emf E load 400 sin (314t) as the source voltage. For a load counter emf of 200 V, the range of firing angle control is  (1) 30° to 150°  (2) 30° to 180°  (3) 60° to 120°  (4) 60° to 180°			
57.	Let of a thyristor $V_{c1}$ , $V_{c2}$ , $V_{c3}$ are forward break over voltage for galaxies. Then $ (1)  V_{c1} > V_{c2} > V_{c3} \text{ when } I_{g1} > I_{g2} > I_{g3} $ $ (2)  V_{c1} > V_{c2} > V_{c3} \text{ when } I_{g1} < I_{g2} < I_{g3} $ $ (3)  V_{c1} = V_{c2} = V_{c3} \text{ any value of } I_{g} $ $ (4)  V_{c1} > V_{c2} > V_{c3} \text{ when } I_{g1} \ge I_{g2} \ge I_{g3} $			
58.	Triacs cannot be used in AC voltage regulator for a  (1) Resistive load  (2) Inductive load  (3) Back emf load  (4) Resistive Inductive			
59.	Latching current for an SCR inserted between a dc voltage source of 200 V and load is 100 mA. Compute the minimum rate of width pulse required to turn ON the SCR in case load consists of $R = 20~\Omega$ in series with $L = 0.2~H$ (1) 200 $\mu$ s  (2) 300 $\mu$ s  (3) 150 $\mu$ s  (4) 100 $\mu$ s			

PHD-EE-2018 (Electrical Engineering) Code-D (15)

Questions	
Delay time is defined by the interval when	
<ol> <li>gate current increases from 90% to 100% of its final value</li> <li>anode current reaches 10% from forward leakage current</li> </ol>	
<ul><li>(3) anode voltage drops from 100% to 90% of its actual value</li><li>(4) all of these</li></ul>	
In the given figure, the Thevenin equivalent voltage and impedance a seen from the terminals P-Q is given by	
20\$\frac{1}{4V} 10\$\frac{1}{2} \frac{1}{2} \frac{1} \frac{1}{2} \frac{1}{2} \frac{1}{2} \frac{1}{2} \frac{1}{2} \f	
<ul> <li>(1) 4 V and 7.5 Ω</li> <li>(2) 2 V and 7.5 Ω</li> <li>(3) 4 V and 5 Ω</li> <li>(4) 2 V and 5 Ω</li> </ul>	
A coil having a resistance of 5 Ω and inductance of 0.1 H is connected is series with a condenser of capacitance 50 μF. A constant alternating voltage of 200 V is applied to the circuit. The voltage across coil at resonance is (1) 200 V (2) 1788 V (3) 1800 V (4) 2000 V	
An RLC series circuit resonates at a frequency $w_r$ the ratio of $w_r$ L/R = 10 the variable frequency voltage applied to the circuit is 20 sin $(\omega t + \pi/3)$ the voltage measured across the capacitance	
(1) $200 / \sqrt{2}$ (2) $220 / \sqrt{2}$ (3) $20 / \sqrt{2}$ (4) $1/2$	

Questio No.	Questions		
64.	What is the relation between line voltage and phase voltage in case of delta connection?		
	(1) $V_L = V_p$ . (2) $V_t = 1/\sqrt{3} V_p$ .		
	(3) $V_L = \sqrt{3} V_p$ . (4) None of these		
65.	The rms value of the current is a wire which carries a dc current of 10 A and a sinusoidal alternating current of peak value 20 A is		
	(1) 10 A		
	(2) 14.14 A		
	(3) 15 A		
	(4) 17.32 A		
66.	The purpose of compensation for a thermocouple is		
	(1) To decrease temperature sensitivity		
	(2) To increase volatge output		
	(3) To cancel unwanted voltage output of a thermocouple		
- Stanford	(4) Used for high-temperature circuits		
67.	Semiconductor strain gages typical have much higher gage factors than		
	those of metallic strain gages primarily due to		
	(1) Higher temperature sensitivity		
e zarkene.	(2) Higher Poisson's ratio		
	(3) Higher piezoresistive coefficient		
	(4) Higher magnetostrictive coefficient		

HD-EE-2018 (Electrical Engineering) Code-D (17)

Question No.	tion Questions				
68.	For the op-amp shown in the $I_{b2} = 350$ nA. The values of the current $(I_f)$ are	e figure the inpu	, the bias currents are $I_{b1}=450$ nA and it bias current ( $I_{b}$ ) and the input offset		
	I <sub>b1</sub> +	>			
	(1) $I_b = 800 \text{ nA}, I_f = 50 \text{ nA}$	(2)	$I_b = 800 \text{ nA}, I_f = 100 \text{ nA}$		
	(3) $I_b = 400 \text{ nA}, I_f = 50 \text{ nA}$	(4)	$I_b = 400 \text{ nA}, I_f = 100 \text{ nA}$		
69.	A Hall Effect sensor  (1) exists only in theory				
	<ul> <li>(2) is a non-contacting magnetic sensor</li> <li>(3) can operate only a few times before failure</li> <li>(4) produces very large voltages</li> </ul>				
70.	For turbulent flow, the ve velocity.	locity a	t the center is times the mean		
	(1) 1.2	(2)	2.2		
	(3) 2	(4)	3.333		
71.	A psychrometric chart is used to determine				
	(1) pH	(2)	Sound velocity in glasses		
	(3) CO <sub>2</sub> concentration	(4)	Relative humidity		

PHD-EE-2018 (Electrical Engineering) Code-D (18)

Question No.	Questions  The dynamic characteristics of capacitive transducer are similar to those of  (1) low pass filter  (2) high pass filter  (3) notch filter  (4) band stop filter				
72.					
73.	The effect of error damping is to  (1) provide larger settling time  (2) delay the response  (3) reduce steady state error  (4) any of the above				
74.	The bridge method commonly used for finding mutual inductance is  (1) Heaviside Campbell bridge  (2) Schering bridge  (3) De Sauty's bridge  (4) Wien bridge				
75.	The bridge circuit shown in the figure below is used for the measurement of an unknown element $Z_x$ . The bridge circuit is best suited when $Z_x$ is a $X_x$ (1) Lossy capacitor (2) Low Q inductor (3) High resistance (4) Low resistance				

PHD-EE-2018 (Electrical Engineering) Code-D (19)

Question No.	Questions			
76.	A 500 kVA, three phase transformer has iron losses of 300 W and full load copper losses of 600 W. The percentage load at which the transformer is expected to have maximum efficiency is  (1) 50.0%  (2) 70.7%  (3) 141.4%  (4) 200.0%			
77.	A single phase transformer has a maximum efficiency of 90% at full load and unity power factor. Efficiency at half load at the same power factor is  (1) 86.7%  (2) 88.26%			
	(1) 86.7%     (2) 88.26%       (3) 88.9%     (4) 87.8%			
78.	Which of the following motor definitely has a permanent magnet rotor  (1) DC commutator motor (2) Brushless DC motor  (3) Stepper motor (4) Reluctance motor			
79.	The type of single phase induction motor having the highest power factor at full load is  (1) Shaded pole type  (2) Split phase type  (3) Capacitor start type  (4) Capacitor run type			
80.	The direction of rotation of a three phase induction motor is clockwise when it is supplied with three phase sinusoidal voltage having phase sequence A-B-C, for counter clockwise rotation of the motor, the phase sequence of the power supply should be			
	(1) B-C-A (2) C-A-B			
	(1) B-C-A (2) C-A-B (3) A-C-B (4) None of above			

PHD-EE-2018 (Electrical Engineering) Code-D (20)

Question No.	Questions					
81.	The system of linear equations					
	(4d-1) x + y + z = 0					
	$-\mathbf{y}+\mathbf{z}=0$					
	(4d-1) z = 0					
	has a non-trivial solution, if d equals					
	(1) 1/2 (2) 1/4					
	(3) 3/4 (4) 1					
	$\begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$ is (are) $(1) & (0, 0, \alpha) \qquad (2) & (\alpha, 0, 0)$ $(3) & (0, 0, 1) \qquad (4) & (0, \alpha, 0)$					
83.	Consider the z-transform X (z) = $5z^2 + 4z^{-1} + 3$ ; $0 <  z  < \infty$ . The inverse z-transform x [n] is  (1) $5\delta [n+2] + 3\delta [n] + 4\delta [n-1]$ (2) $5\delta [n-2] + 3\delta [n] + 4\delta [n+1]$ (3) $5u [n+2] + 3u [n] + 4u [n-1]$ (4) $5u [n-2] + 3u [n] + 4u [n+1]$					

PHD-EE-2018 (Electrical Engineering) Code-D (21)

Question	Questions						
No. 84.	If $\delta(t)$ denotes a unit impulse then Laplace Transform of $\frac{d^2 \delta(t)}{dt^2}$ will be						
	$(1)$ $l$ $(2)$ $s^2$						
	(3) s . (4) s <sup>-2</sup>						
85.	The state equation of LTI system is represented by						
	$\dot{\mathbf{x}} = \begin{bmatrix} 0 & 0 \\ -2 & -1 \end{bmatrix} \mathbf{x} + \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix} \mathbf{u}$						
	The Eigen values are						
	(1) $-1, +1$ (2) $0.5 \pm j 1.323$						
	(3) -1,-1 (4) None						
86.	Line integral can be transformed into a surface integral by using						
	(1) Divergence theorem (2) Gauss theorem						
	(3) Stokes theorem (4) None of these						
87.	Four fundamental equations of electromagnetics are known as						
	(1) Fleming's laws (2) Faraday's laws						
	(3) Lorentz equations (4) Maxwell's equations						
88.	For a linear electromagnetic circuit, which of the following statements:						
	true?						
	(1) Field energy is equal to the co-energy						
	(2) Field energy is greater than the co-energy						
	(3) Field energy is lesser than the co-energy						
	(4) Co-energy is zero						

PHD-EE-2018 (Electrical Engineering) Code-D (22)

Question No.	Questions					
89.	Which of the following statements holds for the divergence of electric and magnetic flux  (1) Both are zero  (2) These are zero for static densities but non-zero for time varying densities.  (3) It is zero for the electric flux density					
	(4) It is zero for the magnetic flux density					
90.	A parallel plate capacitor has an electrode area of 100 mm², with a spacing of 0.1 mm between the electrodes. The dielectric between the plates is air with a permittivity of $8.85 \times 10^{-12}$ F/m. The charge on the capacitor is 100V. The Stored energy in the capacitor is:  (1) 8.85pJ (2) 440pJ (3) 22.1nJ (4) 44.3nJ					
91.	Whenever the magnetic flux changes with respect to an electric conductor or a coil, an EMF is induced in the conductor is Faraday's  (1) First law (2) Second law (3) Third law (4) Fourth law					
92.	<ul> <li>Inside a hollow conducting sphere</li> <li>(1) Electric field is zero.</li> <li>(2) Electric field is a non-zero constant.</li> <li>(3) Electric field changes with magnitude of the charge given conductor.</li> <li>(4) Electric field changes with distance from the center of the sphere.</li> </ul>					

PHD-EE-2018 (Electrical Engineering) Code-D
(23)

uestion	Questions
No. 93.	A conductor of length L has current I passing through it, when it is placed parallel to strong magnetic field. The force experienced by the conductor will be  (1) BIL (2) BIL <sup>2</sup> (3) BI <sup>2</sup> L (4) Zero
94.	Cork Screw rule is used to find  (1) Direction of magnetic field (2) Direction of electric field  (3) Direction of current (4) Direction of emf
95.	A point pole has a strength of $4\pi \times 10^{-4}$ weber. The force in Newtons on a point pole of $4\pi \times 1.5 \times 10^{-4}$ weber placed at a distance of 10 cm from it will be  (1) 20N (2) 15N  (3) 7.5N (4) 3.75N
96.	In a sample it is observed that a carrier takes 100 µs to over a distance of 10 cm. If the applied external field is 10 <sup>4</sup> V/cm; find the mobolity  (1) 10 <sup>7</sup> cm <sup>2</sup> /Vs  (2) 10 <sup>-3</sup> cm <sup>2</sup> /Vs  (3) 10 cm <sup>2</sup> /Vs  (4) 10 <sup>7</sup> m <sup>2</sup> /Vs
97	The current gain of a bipolar transistor drops at high frequency because of  (1) Transistor internal capacitances  (2) High current effects in the base  (3) Parasitic inductive elements  (4) The Early effect

PHD-EE-2018 (Electrical Engineering) Code-D (24)

## Code-D

Question No.	Questions						
98.	A transistor has $\alpha = 0.98$ , then determine $\beta$ .  (1) 50  (2) 49  (3) 70  (4) None of the above						
99.	The value of emitter capacitor CE in a multistage amplifier is about (1) $0.1\mu F$ (2) $100pF$ (3) $0.01\mu F$ (4) $50\mu F$						
100.	The conduction loss versus device current characteristic of a positive MOSFET is best  (1) A parabola  (2) A straight line  (3) A rectangular hyperbola  (4) An exponentially decaying function						

PHD-EE-2018 (Electrical Engineering) Code-D (25)

Maharshi Dayanand University Rohtak

Deptt. of <u>Electrical</u> Egg,

M. Phil/ PhD/URS Entrance Examination Answer Key

Sr. No.	Set-A	Set-B	Set-C	Set-D
1	В	D		C
2	D	C	D .	D
3				C
	A	A	С	
4	B ;	Α	D	D
5	В	D	Α 3	D
6	C	С	С	D
7	D	С	D	С
8	A	D	В	В
9	D	В	В	В
10	D	Α	D	D
11	A	D	D	A
12	Α	В	D	Α
13	D	С	Α	Α
14	C	C	Α	D .
15	В	Α	D c	D
16	С	A	В	Α
17	Α	С	D	Α
18	В ,	С	В :	В
19	D ‡.	Α	D	Α
20	Α .	С	C	В
21	В	C	В , .	D
22	D ,	D	Α	В
23	C i	c	Α	С
24	D -	D	C	C
25	Α -	D	В	A
26	C -	D	Α	A
27	D -	C	В	C
28	В	В	C	C
29	В	В	D :-	A
30	D .	D	D	C
31	Α -	В	D	В
32	Α -	D	В	D
33	A -	A	C	C
34	D -	В	C	D
35	D -	B	Α	A
36	-	С		C
37		D	_	
	Α		C	D
38	Β	A		В
39	A	D	A	B / 2 0
40		D		D
41	D ÷	D		D
42	<u>C</u>	D		A
43	A -	Α		В
44	A -	A	В	В
	D .	D	B	В
	C -	В	C	В
47	<u>c</u> -	D	D	В

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So. No	1/52	t-A	Set-6	3   Set-C	Set -]
48	D	÷:	В	Α ?	D
49	В	1	D	D ½	D
50	Α	- 41	С	D	D
51	D	ů	D	Α	В
52	D	11	A	A	A
53	A		В	A	A
54	_		В	D	C
	A			-	В
55	D	-	В		
56	В		В	Α	A
57	D	- 10	В		В
58	В		D	В	С
59	D		D	Α '	D
60	С	1	D	В	D a
61	D		В .	Α "	D
62	Α		D	Α	С
63	В	÷:	С	D 5	A
64	В	1	D	c	A
65	В	- 1	A	В	D
66	В		C	C	C
67	В	1.	D	Α -	C
	+				
68	D		В		D
69	D	-	В	D -	В
70	D	ļ.,	D	Α 🛈	A
71	D	į.	Α	D	D -
72	В		Α .	C -	D ·
73	C	Ĺ.	D	Α -	Α
74	С		С	Α -	Α '
75	Α	-	В	D :-	D .
76	Α		С	C	В
77	c		Α	C	D
78	С	i	В	D	В
79	Ā		D	В	D
80	c		A	Α	c
	В		В	C	В
81	-	* t.		-	D
82	A	1.	A		
83	Α	•	Α	C	A
84	С	••	С	D	В .
85	В		В	D	В
86	Α		Α	D	С
87	В	-	В	c . =	D
88	С	4.0	С	В -	Α
89	D	-	D	В	D
90	D		D	D	D
91	С	4.	Α	D	Α
92	D		A	Α	A
93	С	1	A	В	D
94	D	7-1	D		C
95	D	***	D		В
96	D		A	В	С
97	С	, 11	Α	В	Α
98	В		В	D	В
99	В	į.,	Α	D	D
100	D		В	D	A

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